



பேரிடரில் முதல் நிலை மீட்பாளர்களுக்கான பயிற்சி

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1. பயிற்சி வழங்கிடுவோருக்கு ஒரு சிறுகுறிப்பு

பயிற்சியின் நோக்கம்

நாம், சமீப காலத்தில் பேரிடர்களான புயல், வெள்ளம், தூறாவளி, நிலச்சரிவு, வறட்சி போன்ற இயற்கைச் சீற்றங்களை சந்தித்துக் கொண்டிருக்கிறோம். இதன் காரணமாக, மனித உயிரிழப்பு, கால்நடைகள் உயிரிழப்பு, வீடுகள், விளைநிலங்கள் பாதிப்பு, வாழ்வாதாரங்கள் பாதிப்பு. இவற்றால் பாதிக்கப்படுகிறோம். கோவிட்-19 எனும் நோய்த்தொற்று நமது துயரங்களை மேலும் பன்மடங்காக்கியது.

நாம் வசிக்கும் இயற்கைச்தூலல் தொடர்ந்து மாறி வருகிறது. இது மிகப்பெரிய புதிராக உள்ளது. பருவமழைக்காலத்தில் மட்டுமே மழை பெய்யும் என்ற நிலைமாறி, பருவம் தவறி பெருமழை பெய்கிறது. வடகிழக்குப் பருவமழை காலங்களில் (அக்டோபர் முதல் டிசம்பர்) புயல் வரும் என்ற நிலை மாறி புயல் மற்றும் காற்றழுத்த தாழ்வு மண்டலங்களில் பாதிப்பு எப்பொழது வேண்டுமானாலும் ஏற்படுகிறது. வரையறுக்க முடியாத வகையில் காலமாற்றம் ஏற்பட்டு வருகிறது. இத்தகைய இயற்கையின் மாறுபடும் காலமாற்றம் மற்றும் இயற்கைச் சீற்றங்களை எதிர்கொள்ள நமது திறனை வளர்த்துக்கொள்ளவே இப்பயிற்சி.

இயற்கைச் சீற்றங்களின் போது, மக்களையும் அவர்தம் உடமைகளையும் காப்பாற்ற வேண்டிய பெரும் கடமை அரசாங்கத்திற்கு உள்ளது. முன்னெச்சரிக்கை வழங்குவது, பேரிடர் காலங்களில் மீட்புப்பணி, நிவாரணம் வழங்குதல் மற்றும் பேரிடர் பாதிப்புகளை மறுசீரமைத்தல் அரசின் பொறுப்பாகும்.

ஆனால், எத்தகைய பேரிடர்களையும் தாங்கும் வல்லமை கொண்ட சமுதாயத்தை உருவாக்குவது நமது அனைவரின் பொறுப்பாகும். அரசுத் துறைகளின் நோக்கம் மற்றும் செயல்பாட்டோடு சமுதாயத்தின் எண்ணமும் செயலும் ஒன்றினையும் போது மட்டுமே பேரிடர்களை எதிர்கொள்ளும் வல்லமையை நாம் அடைய முடியும். இத்தகைய ஒருங்கிணைந்த செயல்பாடுகளுக்கு முன்னுதாரணமாக பல நிகழ்வுகள் சமுதாய பங்களிப்போடு நிறைவேறியுள்ளன. இந்த நிகழ்வுகளில் சமுதாயத்தைச் சார்ந்த / அந்தந்த கிராமங்களைச் சார்ந்த தன்னார்வலர்கள் மிகப்பெரிய பங்காற்றியுள்ளார்கள். இத்தகைய தன்னார்வலர்களை கண்டறிந்து, அவர்களின் தன்னார்வத்தைப் பாரட்டி, அவர்களின் பல்வேறு தனித்தனி திறன்களை பட்டைத்தீட்டி, பேரிடர்களின் போது மட்டுமல்லாமல், அனைத்துக் காலங்களிலும், அவர்களின் சேவையினை, சமுதாயத்திற்கு தொடர்ந்து பெற்றிடுவதும், இம்முன்னெடுப்பை, ஒரு மக்களின் இயக்கமாக உருவாக்குவதும் இப்பயிற்சியின் நோக்கமாகும்.

இப்பயிற்சி முழுவதுமே, பங்குபெறும்தன்னார்வலர்களின் தங்குதடையற்ற கலந்துரையாடல்கள் மூலம், அவர்களிடமிருந்து கருத்துக்களையும், அனுபவங்களையும் தெரிந்து கொண்டு, மேலும் அவர்களுக்கு புதிய தகவல்கள் புதிய அனுபவங்கள் குறித்து விளக்கி, அவர்களின் தன்னார்வத்திற்கும், தன்னம்பிக்கையும் கூட்டி உயிர் காத்திடும் பேரிடர் கால சேவையில் அவர்கள் தொடர்ந்து பங்கேற்றிட உதவிடும் முயற்சியாகும்.

பேரிடர் குறித்த அனுபவங்களை தொகுத்தல்

- இப்பயிற்சியில் கலந்து கொள்பவர்கள், தங்கள் பகுதியில் ஏற்பட்ட பேரிடர்கள் குறித்து அறிந்தவர்களாகவோ, தன்னார்வலர்களாக சேவையாற்றி பொதுமக்களுக்கு உதவியவர்களாக இருக்கலாம்.
- எனவே, அவர்களிடமிருந்து, அவரவருக்கு தெரிந்த பேரிடர்கள் குறித்தும், அவர்களின் அனுபவங்களை சுருக்கமாகத் தெரிந்து கொள்ளவும் அவற்றை பட்டியலிடவும்.
- 3. அவற்றைத் தொகுத்து, பேரிடர் குறித்த இதர தகவல்களையும் சேர்த்து, மேற்கொண்டு என்ன தெரிந்து கொள்ள வேண்டும் என்ற கேள்வியுடன் அவர்களின் ஆர்வத்தை தூண்டவும்.
- அரசோடு இணைந்து சமுதாயம் செயல்படும் பொழுது தான் பலன் கிடைக்கும் என்பதை விளக்கவும்.

























2. பேரிடர் மேலாண்மையின் சமுதாயத்தின் பங்கு

சுனாமி, பெருவெள்ளம், வர்தா புயல், கஜா புயல், நிவார், புரெவி புயல் போன்ற பேரிடர் காலங்களில் சமுதாயம் பெரும்பாங்காற்றியுள்ளது. அனைவரும் அறிந்தே சமுதாயம் என்று குறிப்பிடும் பொழுது, ஒட்டுமொத்த சமுதாயம் குறிப்பாக தன்னார்வலர்களின் பங்கு அளப்பரியதாகும். சமுதாயத்தின் இத்ததைகய செயல்பாடுகளால் காய்யபாற்றப்பட்ட உயிர்கள், பாதுகாக்கப்பட்ட உடமைகள், பேரிடர் காலங்களில் உணவளித்தவர்கள், குடிநீர் வழங்கியவர்கள், மருத்துவ உதவிபெற காரணமாக இருந்தவர்கள், அரசுத்துறைகளுடன் கைகோர்த்து இணைந்து செயல்பாட்டவர்கள் ஏராளம். இந்த பயிற்சியில் உள்ளவர்களும் தங்களின் அனுபவங்களை பகிர்ந்து கொள்ளலாம்.

உலகமே வியந்து பாராட்டிய கடலூர் மாவட்டம் சாமியார் பேட்டை அனுபவங்களைப் பற்றி தெரிந்து கொள்ளலாம்.

வீடியோ

TNSDMA வளைதளத்திலிருந்து பதிவிறக்கம் செய்யவும்.

மிகச்சிறிய கிராமமான சாமியார் பேட்டை மக்கள் கற்றுக்கொண்ட அனுபவங்களை பயன்படுத்தியதால் சுனாமி காலத்தில் உயிரிழப்பு மற்ற கிராமங்களைக் காட்டிலும் மிகக் குறைவாக இருந்ததை நீங்கள் பார்த்தீர்கள்.

ஒவ்வொரு கிராமத்தைச் சேர்ந்த தன்னார்வலர்களும் இதைப்போல பல உயிர்களை காப்பாற்றும் வாய்ப்பு உள்ளது.

முன்னெச்சரிக்கைத் தகவல்களை தங்கள் பகுதி மக்களுக்கு கொண்டுசெல்வது

- மீட்புப்பணிகளில் அரசுத்துறைகளுடன் இணைந்து செயல்படுவது
- தங்களின் நீச்சல் திறனால், வெள்ளத்திலிருந்து குழந்தைகள், வயதானவர்கள், நோய்வாய்ப்பட்டவர்களை காப்பாற்றுவது
- முதலுதவி செய்வது
- குடிநீர் விநியோகம்
- இவையின்றி சிறப்பு பயிற்சிகள் பெற்று பல்வகை மீட்புப்பணிகள் மேற்கொள்ளவும் வாய்ப்புள்ளது.

அரசு எவ்வளவு தயார்நிலையிலிருந்தாலும், சமுதாயம் இணைந்து செயல்பட்டால் தான், பேரிடர்களில் சவால்களை எதிர்கொள்ள முடியும். சமுதாயம் எனும்போது தன்னார்வலர்களின் பலமே சமுதாயத்தின் பலமாக அமைகிறது.

இச்சீரிய சேவையில் தங்களை ஈடுபடுத்திடவே இப்பயிற்சி.



3. இயற்கைப் பேரிடர்கள் ஏற்படக் காரணம்

புயல், வெள்ளம், வறட்சி போன்றவை இயற்கையாக நிகழ்பவையே. ஆயினும் அவற்றின் பாதிப்பையும் தீவிரத்தையும் மனித செயல்பாடுகள் அதிகப்படுத்துகின்றன. எடுத்துக்காட்டாக

வெள்ளம்	-	 நீர்வரத்து மற்றும் வடிகால் பகுதிகளில் ஆக்கிரமிப்பு மற்றும் குடியிருப்புகளை ஏற்படுத்துதல் 	
வறட்சி	-	• காட்டை அழித்தல்	
		 மேய்ச்சல் நிலங்களைப் பிற பயன்பாட்டிற்கு எடுத்துக்கொள்ளுதல் 	
		 நீர் நிலைகளை தூர்த்து மற்ற உபயோகங்களுக்கு பயன்படுத்துதல் 	
		 நிலத்தடி நீரை அளவுக்கு அதிகமாகப் பயன்படுத்துதல் 	
நில அதிர்வு / பூகம்பம்	-	 போதிய கட்டுமான வரைமுறைகள் இன்றி வீடுகள், தொழில் கூடங்கள் அமைத்தல் 	
சுனாமி	-	 கடலோரப் பகுதிகளில் கட்டடங்கள் / குடியிருப்புகளை ஏற்படுத்துதல் 	
		• காடுகளை அழித்தல்	
		• கடற்கரை மண் மேடுகளை அகற்றுதல்	
		• பவளப்பாறைகளை அழித்தல்	
புயல்	-	கடலோரக்காடுகளை அழித்தல்	

பேரிடர்கள் ஏற்பட சமுதாயம் எவ்வகையில் காரணமாக உள்ளது?

தாக்கும் தன்மையைப் பொறுத்துக் பேரிடர்களைத் திடீரெனத் தாக்குபவை கால

அவகாசத்துடன் தாக்குபவை எனப் பிரிக்கலாம்.

திடீரென தாக்கும் பேரிடர்கள்	கால அவகாசத்துடன் தாக்குபவை
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- நில நடுக்கம்	- புயல் / வெள்ளம்
- விஷவாயுக் கசிவு	- வறட்சி
- அணுக்கதிர்வுக்கசிவு	
- விபத்துக்கள்	

பேரிடர் மேலாண்மை:

- பேரிடர் தயார் நிலை (Prevention and Early Warning) 1.
- Lu(Search and Rescue Emergency Relief) 2.
- புணரமைப்பு மற்றும் புதுப்பித்தல் (Reconstruction and Rehabilitation) З.
- பேரிடர் தடுப்பு மற்றும் தணிப்பு (Prevention & Mitigation) 4.



4. பேரிடர் பற்றி நாம் ஏன் அறிந்து கொள்ள வேண்டும்

பேரிடரினால்

- 1. மனித உயிரிழப்பு ஏற்படுகிறது.
- பெருவாரி நோய்தொற்றுகளில் கோடிக்கணக்கான மதிப்புள்ள கால்நடைகள், பறவையினங்கள் அழிந்து பெரும் பொருட்சேதத்தை ஏற்படுத்துகிறது.
- வறட்சிக்கு இலக்காகும் பகுதிகளில் 73 சதவிகிதம் மக்கள் வாழ்கின்றனர். அடிக்கடி வரும் வறட்சியால் அவர்களின் வாழ்வாதாரம் பாதிப்படைகின்றன.
- 4. பேரிடர்களின் எண்ணிக்கையும், தீவிரமும் தொடர்ந்து அதிகரித்து வருகின்றன. சென்ற பத்தாண்டுகளில் நடைபெற்ற பேரிடர்களின் எண்ணிக்யைக் காட்டிலும் 2000-ல் அதிக எண்ணிக்கை பேரிடர் நிகழ்துள்ளன. இயற்கைப் பேரிடர்களுடன் மனிதர்களால் உருவாக்கப்பட்ட பல பேரிடர்களும் அதிகரித்து வருகின்றன.
- 5. பேரிடர்களால், பல ஆண்டுகளாக அரசு மற்றும் கூட்டுறவில் உருவான வளர்ச்சி அளிக்கப்பட்டு பொருளாதார பின்னடைவு ஏற்படுகிறது. இவற்றை புனரமைக்க மீண்டும் பெரும் நிதியும் காலமும் தேவை.
- இதுவரை நாம் கண்டிராத பேரிடர்களும் தோன்றியிருக்கின்றன. அடிக்கடி நிகழ்கின்றன. சேதங்களை ஏற்படுத்துகின்றன. (உம்)
 - 🛠 பூகம்பம்
 - 🛠 சுனாமி (ஆழிப்பேரலை)

எனவே பேரிடர் பற்றி சமுதாயம் அறிந்திருக்க வேண்டும்

5. பேரிடரை புரிந்து கொள்ளல்

பேரிடரின் விளைவுகளைத் தடுப்பது அல்லது குறைப்பது என்றால் அதைப்பற்றிய புரிதல் அவசியம், பேரிடர்களில் சில இயற்கையானவை, சில செயற்கையானவை (மனிதரால் உருவாக்கப்பட்டவை) என அறிந்துள்ளோம் அவற்றுக்குக் கீழ்க்கண்ட சில பண்புகள் ஒன்றோ பலவோ இருக்கலாம்.

- 🕨 அவை தனிநபர்கள் மற்றும் சமுதாயத்தை சீர்குலைக்கின்றன.
- 🕨 இயல்பான வாழ்க்கையை பாதிக்கின்றன.
- பொதுவாக அவை நிகழ்வதையோ அதன் விளைவுகளையோ நாம் முன்கூட்டியே கணித்தறிய முடிவதில்லை.
- அவற்றைச் சமாளிப்பதில் நம்மிடம் இயல்பாக உள்ள திறன்கள் போதுமானதாக இருப்பதில்லை.
- பேரிடர்களைச் சமாளிப்பதில் சமுதாயம் அரசுத்துறைகள் இணைந்து செயல்பட வேண்டியுள்ளது.
- 🕨 பூகம்பம் திடீரென ஏற்படுகின்றது.
- மனிதர்கள், கால்நடைகள், பயிர்கள், ஆரோக்கியம், சொத்து, சுற்றுச்சூழல் ஆகியவற்றை சேதப்படுத்துக்கின்றன.
- 🕨 சாதாரண அறிவார்ந்த தடுப்பு நடவடிக்கைகளுக்கு இவை அப்பாற்பட்டவை.
- பேரிடர்கள் சிக்கலானதும் புதிர் போலவும் தோன்றினாலும், பேரிடர்களுக்குச் சில பொதுக் கூறுகள் உள்ளன. அவற்றைப் புரிந்து கொள்ளுதல் பேரிடர்களைச் சமாளிப்பதில் நன்கு உதவும், அக்கூறுகளாவன.
 - 1. சேத நிகழ்வு (Hazard)
 - 2. சேத அபாயம் அல்லது இடர் (Risk)
 - 3. பாதிக்கப்படுபவரின் பலவீன நிலை (Vulnerability)

சேத நிகழ்வு

ஒரு பேரிடரைத் தோற்றுவிக்கும் ஆற்றல் உள்ள எந்த ஓர் இயற்கை அல்லது மனிதரால் உருவாக்கப்பட்ட நிகழ்வையும் சேத நிகழ்வு என அழைக்கலாம்.

இதற்கு எடுத்துக்காட்டாக,

நிலநடுக்கம், மண்சரிவுகள், வெள்ளம், எரிமலை வெடிப்புகள், சுனாமி, வறட்சி, பொருளாதாரச் சீர்குலைவு, போர்

- 🔌 இந்த நிகழ்வுகள் பேரழிவாக மாற வேண்டும் என்று தேவையில்லை.
- 🕨 சேத வாய்ப்புள்ள நிகழ்வை
 - வெள்ளத்தடுப்புக் கட்டுமானங்கள்
 - வடிகால் வசதி
 - மலைப்பகுதிகளைப் பலப்படுத்துதல் போன்ற சில நடவடிக்கைகள் மூலம் குறைக்கலாம்.

சேத அபாயம் அல்லது இடர்

ஒரு குறிப்பிட்ட சேத நிகழ்வு ஏற்படுவதற்கும் அதனால் மக்கள் மற்றும் சொத்துக்களுக்குச் சேதம் ஏற்படும் வாய்ப்பையே சேத அபாயம் எனப்படும்.

பாதிப்பிற்கான பலவீன நிலை

மக்களின் உயிர், வாழ்வாதாரங்கள் மற்றும் கட்டுமானங்கள் போன்றவை ஒரு பேரிடரினால் எந்த அளவிற்கு இழப்பிற்கோ சேதத்திற்கோ உள்ளகின்றன என்ற பாதிப்பிற்கான பலகீன நிலை எனப்படுகிறது.

பாதிப்பிற்கான பலகீன நிலை, இயற்கை அமைப்பு, சமூகநிலை, பொருளாதார நிலை, கல்விநிலை, ஆரோக்கியநிலை, போன்ற பல்வேறு காரணங்களைச் சார்ந்து வெவ்வேறு பிரிவினருக்கு வேறுபடக்கூடும்.

எடுத்துக்காட்டாக,

வறட்சி ஏற்பட்டால் ஒரே ஊரில் உள்ள கிணற்றுப் பாசன வசதி உள்ள விவசாயியையும், மானாவாரி விவசாயியையும் வேறுப்பட்டப் பாதிப்புகளுக்கு உள்ளாகின்றனர். இங்குப் பாசன வசதியில்லாத விவசாயியின் பாதிப்புக்கு ஆளாகும் நிலை பாசன வசதி உள்ள விவசாயியைக் காட்டிலும் அதிகம். அதே போல் வெள்ளச் சேத பாதிப்பிற்கு உள்ளாகும் நிலை கான்கிரீட் தளம் உள்ள குடியிருப்பவரைக்காட்டிலும் கூரை வீட்டில் குடியிருப்பவருக்கு அதிகம்.

சேத நிகழ்வுகள், நமது சக்திக்கு அப்பாற்பட்டவை. இடரும், பாதிப்புக்கு உள்ளாகும் நிலையும் சேராத வரை அது பேரிடராக மாறுவதும் இல்லை. ஆனால் தனிநபர், சமுதாயம் மற்றும் அரசு அளவில இடர் மற்றும் பாதிப்பிற்கு உள்ளாகும் அம்சங்களில் செயல்படுவதற்கான வாய்ப்புகள் உள்ளன. அதன் மூலம் ஒரு சேத நிகழ்வின் சேத ஆற்றவைக்குறைக்க முடியும்.

பேரிடர் மற்றும் அதன் கூறுகளைப்பற்றி அறிந்த பின்பு மட்டுமே பேரிடர் மேலாண்மையை மேற்கொள்ள முடியும், பேரிடர் மேலாண்மை ஏழுபடி நிலைகளைக் கொண்டது, இப்படிநிலைகள் தொடர்ச்சியானவை. ஓரளவு, இணைந்தும் செல்லும், மேலும் இவை வட்டப்பாதையில் அமைந்தவை. எனவே ஒன்றிலிருந்து மற்றொன்று இடைத்தொடர்பு கொண்டவை.

பேரிடர் வாய்ப்பைக் கண்டறிதல்

அச்சுறுத்தல் வாய்ப்புள்ள ஒரு நிகழ்வை பொதுவாக பேரிடர் வாய்ப்பு எனக்கூறுகிறோம். இப்பேரிடர் வாய்ப்பு சூறாவளிபோல் இயற்கையானதாகவோ, ஒரு தொழிற்சாலையிலிருந்து எதிர்பாராது வெளியிடப்பட்ட அபாயகரமான பொருள் போன்ற மனிதரால் உருவாக்கப்பட்டதாகவோ இருக்கலாம். இம்மாதிரியான பேரிடர் வாய்ப்பைக் கண்டறிய சம்பந்தப்பட்ட நாடு அல்லது வட்டாரத்தைக் கவனமுடன் ஆய்வு செய்ய வேண்டும்.

இதற்காகப் பல்வேறுப்பட்ட நிபுணத்துவம் பெற்ற அமைப்புகள், நிறுவனங்களிலிருந்து கடந்தகால பேரிடர் தொடர்பான நிகழ்வுகள் உள்ட்ட தகவல்கள் தேவைப்படும். இப்பேரிடர் வாய்ப்பு கண்டறிதல் முறை மூலம் பேரிடர் வாய்ப்பு வரைபடம் தயாரிக்க வேண்டும. இந்த வரைபடம் மூலம் இயற்கை அல்லது மனித பேரிடர் வாய்ப்பு எங்கு நிலவுகிறது என்பதை புவியியல் முறையில் நிறுவ முடியும். இப்பேரிடர் வாய்ப்பிற்கும் மக்கள் குடியிருப்புகள் மற்றும் நிறுவனங்களுக்கும் உள்ள தொடர்பு மூலம் சேத அபாயத்தை உணர முடியும்.

1. இலக்காகும் நிலையை அளவிடுதல்

மேற்குறிப்பிட்ட முறையில் பேரிடர் வாய்ப்பைக் கண்டறிவதன் மூலம் பேரிடரால் ஏற்படும் சேதம் அல்லது அழிவிற்கு இலக்காகும் நிலையிலுள்ள குடியிருப்புகள், மக்கள் மற்றும் சொத்துகளை பெரும்பாலும் துல்லியமாக கண்டிறிய முடியும்.

2. சேத அபாயத்தை மதிப்பிடுதல்

சேத அபாயத்திற்கு இரு பரிமாணங்கள் (அம்சங்கள்) உள்ளன.

- 1) எத்தனை முறை நிகழ்கிறது (Frequency)
- 2) தீவிரம் (Intensity)

6. சுனாமி

டிசம்பர் 26, 2004 இல் தென்கிழக்கு ஆசிய நாடுகளில் ஏற்பட்ட சுனாமியின் தாக்கத்தினால் 1,50,000-க்கும் மேற்பட்டோர் இறந்தனர். இப்பேரிடரால் ஏற்பட்ட மன அழுத்தம், பொருளாதார மற்றும் சுற்றுச் சூழல் இழப்புகளின் அளவினை கணக்கிட முடியாது. பல கிராமங்களின் வாழ்வாதாரங்கள் முற்றிலும் பாதிப்படைந்தன. கடந்த 40 ஆண்டுகளில் இதுவரை ஏற்பட்ட நிலநடுக்கங்களில் இதுவே மிகப் பெரியதாகும். ஒரே இரவில் நிகழ்ந்த இந்தப் பேரிழப்பு எவராலும் நினைத்துப் பார்க்க இயலாத ஒன்று. மேலும் இது உலகம் முழுவதும் பாதிப்புகளை உணரவைத்தது.

இடர் தணித்தல்

- சுனாமி எச்சரிக்கை மையத்திலிருந்து வரும் தகவல்களைக் கேட்டு அறிய வேண்டும்.
- கடற்கோள் குறித்து முன்னெச்சரிக்கையினைத் தொடர்ந்து உடனடியாக மக்கள் கடற்கரைப் பகுதியிலிருந்து வெளியேற வேண்டும்
- கடுமையாகப் பாதிக்கப்பட்ட நபர்களுக்கு உடனடியாக முதலுதவி செய்ய வேண்டும்.
- மீனவர்கள் கடலுக்கு மீன்பிடிக்க செல்லக்கூடாது.
- முதலில் உருவான அலை மட்டுமே அபாயகரமானதாக இருக்கும் என்று எண்ணிவிடக்கூடாது. அதைத் தொடர்ந்து வரும் அலைகளும் அபாயகரமானவையாகவே இருக்கும்.

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தமிழ்நாடு மாநில பேரிடர் மேலாண்மை ஆணையம் தமிழ்நாடு பேரிடர் அபாயக் குறைப்பு முகமை



சுனாம

, கடலின் அடியில் ஏற்படும் மாற்றத்தால் உருவாகும் மிகப்பெரிய கடல் அலையே சுனாமி ஆகும்.



கடல் நீர் பெருகி ஆழிப்பேரலையாக பெரிய அழிவை ஏற்படுத்துகிறது குறித்த சுனாமி தகவல்களுக்கு உள்ளூர் வானொலி மற்றும் தொலைக்காட்சி கேட்கவும் முன்னெச்சரிக்கையாக பாதுகாப்பான இடங்களுக்கு செல்லவும்.

கழந்தைகள், கருவுற்ற பெண்கள், முதியோர், மாற்றுத்திறனாளிகளுக்கு உதவவும்.

வதந்திகளை பரப்பக்கூடாது.

மாநீல அவரர கட்டுப்பாட்டு அறை என்: 1070 | மாவட்ட அவரர கட்டுப்பாட்டு அறை என்: 1077 | கைப்பேசி செயலி: tnsmart 📀 94458 69848 💟 @tnsdma 😱 tnsdma Tamilnadu 🎯 tn_sdma 🙄 www.tnsdma.tn.gov.in

7. புயல்கள்

புயல் எப்பொழுதும் பலத்த காற்றுடன் பெரும் மழையையும் வெள்ளப்பெருக்கையும் ஏற்படுத்துகின்றது. இது மரங்கள் வேருடன் சாய்தல், வடிகால் அமைப்புகளைப் பாதித்தல், மின்சாரத் துண்டிப்பு, போக்குவரத்து துண்டிப்பு, நீர் தேங்கதல், நோய்கள் பரவுதல், பயிர்கள் அழிவு, மண் அரிப்பு, பழைய கட்டடங்கள் சிதைவடைதல் ஆகியவற்றோடு உயிர்ச்சேதங்களையும் ஏற்படுத்துகின்றன.

டூடர் தணித்தல்

- மக்களைத் தாழ்வான பகுதியிலிருந்து அருகில் உள்ள உயரமான பகுதிகளுக்குச் செல்ல அறிவுறுத்த வேண்டும்.
- நீர் தேங்கியுள்ள பகுதிகளில் நீர் வடிய தற்காலிக கால்வாய் அமைக்கப்பட வேண்டும்.
- பழைய கட்டடங்களில் வசிக்கும் மக்களைத் தற்காலிகமாக வேறு இடங்களுக்கு
 மாற்ற வேண்டும்.
- மக்களின் உடைமைகள், முக்கிய ஆவணங்கள், அணிகலன்கள் ஆகியவற்றைப் பாதுகாப்பாக வைத்துக்கொள்ளுதல் வேண்டும்.
- குடிநீர் குழாய்களைப் பாதுகாப்பது அவசியமாகும்.
- மக்கள் அருகில் உள்ள மின்சாரக் கம்பங்களிலிருந்து கம்பிகள் அறுபட்டு மின் கசிவுகள் இருக்கின்றதா எனக் கவனிக்க வேண்டும்.
- மீனவர்கள் கடலுக்கு மீன்பிடிக்க செல்வதைத் தவிர்த்தல் வேண்டும்.
- உள்ளூர் வானொலி மற்றும் தொலைக்கட்சியில் சொல்லப்படும் குறிப்புகளை அனைவரும் கவனிக்க வேண்டும். நோய்கள் பரவுவதை தடுப்பதற்காக அனைவரும் கொதிக்க வைத்த நீரையே பருக வேண்டும்.



8. வெள்ளப்பெருக்கு

வெள்ளப் பெருக்கினால் கழிவுநீர் வடிகால் அமைப்பு அழிக்கப்படுதல், நீர் மாசுபடுதல், மண் அரிப்புகள், வண்டல்படிதல், நீர் தேங்குதல், வேளாண்மை நிலங்கள், கால்நடைகள் அழிக்கப்படுதல், மீன்பிடிச் சாதனங்கள் சேதப்படுதல் ஆகியவற்றோடு உயிர்ச் சேதங்களும் ஏற்படுகின்றன.

தமிழ்நாட்டிடன் வெள்ளப் பெருக்கிற்கு வாய்ப்புள்ள பகுதியில்

• தமிழ்நாட்டின் கடலோர மாவட்டங்களான, சென்னை, செங்கல்பட்டு, திருவள்ளுர், கடலூர், விழுப்புரம், தஞ்சாவூர், திருவாரூர், நாகப்பட்டினம், மயிலாடுதுறை, புதுக்கோட்டை, இராமநாதபுரம், தூக்குக்குடி, திருநெல்வேலி மற்றும் கன்னியாகுமரி ஆகிய 14 மாவட்டங்கள் ஒவ்வொரு ஆண்டும், பருவ மழைக்காலங்களில், வங்காள விரிகுடாவில் ஏற்படும் காற்றழுத்த தாழ்வுநிலை மற்றும் காற்றழுத்த தாழ்வு மண்டலம் ஆகியவற்றின் தாக்கித்தினால் பெரிதும் பாதிகப்படும் நிலை உள்ளது.





ஒரு பகுதியில் ஏற்படும் மழையளவு குறைவினால் ஏற்படும் குடிநீர்த்தட்டுப்பாடு, பயிர்கள் பாதிப்பு கால்நடைகள் தீவனம், தண்ணீர் இன்றி வறட்சி எப்பொழுது ஆரம்பிக்கிறது. எப்பொழுது முடிகிறது என்பதைத் தெரிவிப்பது கடினமாகும். இந்திய வானிலைத் துறையின் கூற்றின்படி, பற்றாக்குறையான மழைப்பொழிவே வறட்சிக்கு முக்கிய காரணம். பற்றாக்குறையான மழைப்பொழிவிற்குப் பருவகாலம் பொய்த்ப போரதால் உருவாகும் போதுமான மழைப்பொழிவின்னை, பருவகால மாறுபாடுகள், காடுகள் அழிவு, சுற்றுச்சூழல் சீர்கேடு, அதிக அளவு ஆவியாதல், மோசமான நில மேலாண்மை, தீவிர மேய்ச்சல் மற்றும் மண் அரிப்பு ஆகியன முக்கிய காரணங்களாகும்.

மற்ற விளைவுகளாவன

- 1. குடிநீர்த்தட்டுப்பாடு
- புன்செய் பயிர்கள் போதுமான மழை பெய்யாததால், மண்ணில் ஏற்படும் வறண்ட நிலையால், ஈரப்பதம் குறைவதால் பாதிக்கப்படுகின்றன.
- பாசன நீர்த்தேக்கங்கள், ஏரிகள், பாசனக் கிணறுகளில் நீர் மட்டம் குறைவதால் நன்செய் பயிர்களின் உற்பத்தி பாதிக்கப்படும்.
- கால்நடைகள் குடிப்பதற்கு நீரும், உணவாகப் பயன்படும் பசும்புல், வைக்கோல் இன்றி தவிக்கும்
- 5. ஊட்டச்சத்து குறைபாட்டால் ஏற்படும் நோய்கள்
- 6. போதிய உணவு உற்பத்தி குறைவதால், உணவுப்பற்றாக்குறை

டூடர் தணித்தல்

- மாற்றுப் பயிர் மற்றும் சொட்டு நீர்ப் பாசன முறை மூலம் பாசன நீர் உபயோகத்தில் சிக்கனத்தை பின்பற்றுதல்.
- மழைநீரைச் சரியான முறையில் சேமித்து, பயன்படுத்துதல்
- வறட்சிப் பிரதேசங்களில கால்நடை உணவு, குடிநீர் ஆகியவற்றை ஏற்படுத்துதல்
- வறட்சி நிவாரணத் திட்டமிடுதலை கிராம அளவில் கொண்டு வருதல்
- உணவு தேவைப்படும் பகுதிகளுக்கு ஏற்ப இறக்குமதி செய்து விநியோகித்தல் என்பது முக்கியமான ஒன்றாகும்.





வறட்சி என்பது மழையளவு குறைவினால் ஏற்படுவது

வானிலை வறட்சி, இயல்பான மழையை விட குறைவான மழையால் ஏற்படுவது. நீா் வளங்களின் வறட்சி, ஏாிகள், ஆறுகள், நீா்த்தேக்கங்கள் வறண்டு விடுவதால் ஏற்படுவது.

வேளாண்மை வறட்சி வேளாண்மைக்கான நீர் மற்றும் ஈரப்பதம் பற்றாக்குறையினால் ஏற்படுவது.

வறட்சி தணிப்பு நடவடிக்கைகள்

- நீர்நிலைகளை பலப்படுத்துதல்.
- தடுப்பணைகளை ஏற்படுத்துதல்.
- மழைநீர் சேகரிப்பு.
- பாசனத்திற்கான உயர் தொழில்நுட்பம்.
- தண்ணீரை மறுசுழற்சி செய்தல்.
- தண்ணீரை சிக்கனமாக பயன்படுத்துதல்.
- தண்ணீரை சேமித்தல்.
- வறட்சி தாங்கும் பயிர்களை ஊக்கப்படுத்துதல்.
- பயிர் சுழற்சி முறை.

மாநீல அவசர கட்டுப்பாட்டு அறை என்: 1070 மாவட்ட அவசர கட்டுப்பாட்டு அறை என்: 1077 கைப்பேசி செயலி: tnsmart 🕓 94458 69848 😏 @tnsdma 🌾 tnsdma Tamilnadu @ tn_sdma 🍘 www.tnsdma.tn.gov.in

10. நிலச்சரிவு

தமிழ்நாட்டில் நிலச்சரிவு ஏற்படச்கூடிய மாவட்டங்கள்

நீலகிரி மாவட்டத்தில் தொடர்ந்து நிலச்சரிவு பாதிப்பு ஏற்படுகிறது. ஈரோடு, திருப்பத்தூர்,

சேலம், திண்டுக்கல், தேனி மாவட்டங்களிலும், மண்சரிவு, பாறைச்சரிவுகள் ஏற்படுகின்றன.

(பங்கேற்பாளர்களின் தகவல்களோடு ஏற்படும் பாதிப்புகளை பட்டியலிடவும்)

நிலச்சரிவு ஏற்படக் காரணங்களை தொகுக்கவும்.



11. நிலநடுக்கம்

குறிப்பிட்ட நிலப்பகுதியில், குறைந்த நேரத்தில் பூமியின் அடிப்பகுதியில், திடீறென்ற ஏற்படுகின்ற அதிர்வே நிலநடுக்கம் ஆகும். பெரும்பாலான நில அதிர்வுகள் ஒரு நிமிடத்திற்கும் குறைவாகவே நிகழ்கின்றன. சில சமயங்களில் 3 அல்லது 4 நிமிடங்கள் கூட இவை நீடிக்கலாம். பூமிக்கடியில் நில அதிர்வானது, எந்த இடத்தில் தோன்றுகிறதோ, அந்தப் புள்ளியே நிலநடுக்க மையம் எனப்படுகிறது. நிலநடுக்க மையப்புள்ளிக்குச் செங்குத்தாகப் புவியின் மேற்பரப்பில் உள்ள புள்ளியை நிலநடுக்க வெளிமையம் என்கிறோம்.

நிலநடுக்கப் பாதிப்பு

நிலநடுக்கத்தினால் திடீரென்று வீடுகள் இடிந்து விழகின்றன. அதனால் பெருமளவில் மனித உயிரிழப்பு ஏற்படுகிறது. வீடுகளின் உறுதித்தன்மையானது, உள்ளூரில் நிலவும் காலநிலை, பயன்படுத்தப்படும் கட்டுமானப் பொருள்களின் தன்மை, வழக்கத்தில் உள்ள வீடுகட்டும் முறை ஆகியவற்றைப் பொறுத்தே கட்டடத்தின் உறுதி அமைகிறது. எனினும் நிலநடுக்கப் பாதிப்பிலிரந்து தப்பித்திட அல்லது பாதுகாத்திட புதிய உத்திகளைப் பயன்படுத்தி, வீடுகளை அமைப்பது சாலச்சிறந்ததாகும்.

பேரிடரின் போது செய்யச்கூடியவை மற்றும் செய்யக் கூடாதவை

நிலநடுக்கம் (பாதுகாப்புக் கருதி செய்யக்கூடியவை மற்றும் செய்யகூடாதவை)

நிலநடுக்கத்தின் போது வீடு அல்லது கட்டடத்தின் உள்ளே இருத்தால்

- பதற்றமடையாமல் அமைதியாக இருக்கவும்
- கண்ணாடியாலான சன்னல்கள், கதவுகள், நிலைப்பேழை, முகம் பார்க்கும்
 கண்ணாடிகள் ஆகியவற்றிலிருந்து விலகி நிற்கவும்.
- மேற்கூரையிலிருந்து இடிந்து விழுகின்றன பூச்சு, செங்கற்கள், கற்கள் ஆகியவற்றிலிருந்து விலகி நிற்கவும்.

- மேசைக்கும் அடியில் அல்லது எளிதில் உடையாத கட்டிலுக்கு அடியில் அமரவும்.
 இதனால், இடிந்து விழுகிற பொருள்களால் காயம் ஏற்படாமல் இருக்கும்.
- கதவினை நோக்கியோ, மாடிப்படியினை நோக்கியோ ஒடாமல் இருக்கவும், ஏனெனில், கதவோ, மாடிப்படிகளோ உடைந்து விழும் நிலை அல்லது நெருக்கடி ஏற்படலாம்.
- அறையின் மூலையில் அமர்ந்து, இரு கைகளினாலும் கழுத்தின் பின்பகுதியை இறுக்கமாகப் பிடித்துக் குனித்து கொள்ளவும்.

நிலநடுக்கத்தின் போது வீடு அல்லது கட்டடத்தின் வெளியே இருத்தால்

- திறந்தவெளி அருகாமையில் இருந்தால், அங்கே விரைந்து செல்வது நல்லது
- உயரமான புகைப்போக்கிகள், உயரமான கட்டடங்கள், உப்பரிகைகள், அறிவிப்புப் பலகைகள், மாடி முகப்பு ஆகியவற்றிலிருந்து விலகி நிற்கவும்.
- தெருக்களில் ஒடாமல், ஒரிடத்தில் இருக்கவும் ஏனெனில் கட்டடங்கள், மின்கம்பிகள், பாலங்கள், சாலையோரத்தில் உள்ள பெரிய விளம்பரப் பலகைகள் முதலியன உங்கள் மேல் விழக்கூடும்.

நிலநடுக்கத்திற்குப் பின்னர்

- உங்களுக்கோ, பிறருக்கோ காயங்கள் ஏற்பட்டுள்ளதா என்பதை உற்றுக் கவனிக்கவும், முதலில் வெட்டுக்காயத்திற்கும், கன்றிப்போன காயத்திற்கும் முதலுதவி செய்யவும்.
- மின் இணைப்புப் பொருள்களான குளிர்சாதனப் பெட்டி, தொலைக்காட்சிப்பெட்டி, வானொலிப்பொட்டி மற்றும் எரிவயு ஆகியவற்றின் இணைப்புகளை துண்டிக்கவும்.
- உலர் மின்கலம் மூலம் இயங்கக்கூடிய வானொலியை முக்கியமான தகவல்களைக் கேட்பதற்குப் பயன்படுத்தவும்.

• தொடர் நிலநடுக்கங்களுக்கு உங்களை தயார்படுத்திக் கொள்ளுங்கள்

செய்ய கூடாதவை

- பாதிப்புக்கு உள்ளான பகுதி அல்லது கட்டடங்களுக்கு அருகாமையில் இருக்க வேண்டாம்.
- தண்ணீரை வீணாக்க வேண்டாம். ஏனெனில் உடனடித் தேவைகளில் ஒன்றான தண்ணீர், தீயை அணைப்பதற்கு அவசியமாகும்
- கடுமையான காயம் அடைந்தோரை இடம் பெயரச் செய்ய வேண்டாம்
- மருத்துவ உதவி வரும் வரை அமைதி காக்கவும்
- வதந்திகளைப் பரப்பிட வேண்டாம். அது மக்களிடையே பீதியை ஏற்படுத்தும், பய

உணர்வின் காரணமாக நிலைமை மேலும் மோசமாக்க கூடும்.





- 🌶 காயங்கள் ஏற்பட்டு உள்ளதா என்பதை சோதித்து பார்க்க வேண்டும்.
- அரசு தரும் முன்னெச்சரிக்கைகளை கவனமாக பின்பற்ற வேண்டும்.



- நில நடுக்கம் ஏற்படும் பொழுது கூட்டமான கடைகளிலோ பொது இடங்களிலோ எளிதில் பொருட்கள் சரிந்து விழும் இடத்தில் நிற்கக்கூடாது.
- கட்டட இடிபாடுகளில் சிக்காமல் பாதுகாப்பான இடத்திற்கு செல்ல வேண்டும்.
- கடற்கரையில் இருப்பதை தவிர்க்கவும் ஏனென்றால் சுனாமி உருவாகலாம்

மாநீல அவசர கட்டுப்பாட்டு அறை என்: 1070 மாவட்ட அவசர கட்டுப்பாட்டு அறை என்: 1077 கைப்பேசி செயலி: tnsmart 😒 94458 69848 💙 @tnsdma 存 tnsdma Tamilnadu 🎯 tn_sdma 😨 www.tnsdma.tn.gov.in 12. இடியுடன் கூடிய மழை, மின்னல் தாக்குதல்கள்



13. அனல்காற்று












<u>கால்நடைகளுக்கான</u> குறிப்புகள்

- கால்நடைகளை நிழல் தரும் கூரை அடியில் கட்டவும் அவசியமாக போதுமான
- அவசியமாக போதுமான அளவு தண்ணீர் கொடுக்கவும் கால்நடை தீவனங்களை வெட்ட வெனியில் போடவேன்டாம் அடைக்கப்பட இடத்தில் கால்நடைகளை கட்ட வேன்டம்
- வேண்டாம்
- வேண்டாம பறவைகளுக்கு போதுமான நிழற்கூரைகள் அமைத்துக் கொடுத்து போதுமான நீர் கொடுக்கவும்



14. **தீ விபத்துகள்**



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தீ விபத்து குறித்து தீயணைப்புத் துறைக்கு உடனடியாக தகவல் தெரிவிக்க வேண்டும்.



தீ விபத்தில் காயமுற்றோருக்கு உரிய முதலுதவி செய்த பின்பு மருத்துவரிடம் சிகிச்சை பெற வேண்டும்.

கட்டடத்தில் இருந்து தப்பிக்கும் போது தரையில் குனிந்தபடி தப்பிக்க வேண்டும். அவ்வாறு இல்லையெனில் புகையினைச் சுவாசித்து உயிரிழக்க நேரிடும். உடைகளில் தீ பிடித்தால் தரையில் படுத்து, உருண்டு, தீயினை அணைக்க வேண்டும்.

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தீ விபத்து ஏற்படும்போது கூச்சலிட்டோ, விசில் அடித்தோ, சுவர்களில் தட்டியோ அனைவரையும் எச்சரிக்க வேண்டும்.

- தீ விபத்தீன் போது மின்சாரம், சமையல் எரிவாயு கலன் ஆகியவற்றின் இணைப்பை துண்டிக்க வேண்டும்.
- வீடுகள் / பள்ளி / அலுவலகங்களில் தீயை அணைப்பதற்கான உபகரணங்களை பொருத்தி பாதுகாக்க வேண்டும்.

மாநீல அவசர கட்டுப்பாட்டு அறை எண்: 1070 | மாவட்ட அவசர கட்டுப்பாட்டு அறை எண்: 1077 | கைப்பேசி ஒசுயலி: tnsmart <u>© 94458 6</u>9848 🎐 @tnsdma 📪 tnsdma Tamilnadu 🧔 tn_sdma சூ www.tnsdma.tn.gov.in

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பேரிடரில் முதல் நிலை மீட்பாளர்களுக்கான பயிற்சி கையேடு



கோட்ட அளவிலான இரண்டாம் நிலை ஒரு நாள் பயிற்சி

தமிழ்நாடு பேரிடர் அபாய குறைப்பு முகமை எழிலகம் இணைப்பு கட்டிடம், 5-வது தளம், சேப்பாக்கம், சென்னை – 05.

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1. முதல் நிலை மீட்பாளர்களின் தகுதி மற்றும் பொறுப்புகள்

முதல் நிலை மீட்பாளர்களுக்கான தகுதிகள்

- 1. நோயின் தன்மையை புரிந்து கொள்ளும் சக்தி (Good Observer)
- உடனடியாக என்ன செய்யவேண்டும் என்று முடிவெடுத்து செயல்படுத்தும் திறமை (Decision, Conclusion and Action)
- 3. அருகில் உள்ள பொருட்களை வைத்து எவ்வாறு முதலுதவி செய்ய வேண்டும் என்ற திறன் (Presence of Mind for using available resources)
- சுற்றியுள்ள மக்களை கட்டுப்படுத்தவும், அவர்களிடமிருந்து தேவையான உதவியை பெற்றுகொள்ளும் திறன் தேவை.
- 5. முதலுதவி வழங்கும் போது பதற்றப்படாமல் இருக்க வேண்டும்.
- இரத்தம் வருவதை உடனடியாக நிறுத்த வழிமுறைகள் தெரிந்திருக்க வேண்டும்.

முதல் நிலை மீட்பாளர்களின் பொறுப்புகள்

- முதலுதவி செய்பவர் தன் பாதுகாப்பையும் அவசியம் கவனத்தில் கொள்ள வேண்டும்.
- 2. அவசர கால தொடர்பை அழைக்க

அவசர கால தொடர்பு எண்		
காவல்துறை	100	
மருத்துவ அவசர ஊர்தி	108	
அவசரகால தொடர்பு எண்கள் 1070/1077		

- 3. பாதிக்கப்பட்டவருக்கு சிகிச்சையளிப்பதற்கு முன்னும் பின்னும் உங்கள் கைகளை சோப்பு மற்றும் தண்ணீரில் நன்கு கழுவவும்.
- 4. கையுறைகளை அணியுங்கள்.
- முதலுதவியின் போது தண்ணீர் குடிப்பது, சாப்பிடுவது மற்றும் கையால் வாயைத் துடைக்க கூடாது.

- இரத்தம் அல்லது பிற உடல் திரவங்களால் மாசுபடுத்தப்பட்ட பகுதிகளை கிருமிநாசினி ஊற்றி சுத்தம் செய்யுங்கள்.
- 7. நீங்கள் பாதிக்கப்பட்டவருக்கு உதவிய பிறகு மருத்துவருடன் ஆலோசிக்கவும்.
- 8. கையுறைகளை அகற்றும்போது, வெளிப்புறத்தைக் தொடக்கூடாது என்பதை உறுதிசெய்து கையுறைகளை தொற்று ஏற்படாதவாறு உரைப்பையில் வைக்கவும்.
- பாதிக்கப்பட்டவர்களுக்கு உதவியை செய்த பிறகு, மருத்துவர் வரும் வரை பாதிக்கப்பட்டவர்களுடன் இருக்கவும்.
- 10. மருத்துவ அவசர ஊர்தியை அழைக்க அருகில் உள்ள ஒரு பார்வையாளர் அல்லது உறவினரிடம் தெரியப்படுத்துங்கள்.
- பாதிக்கப்பட்டோரை எவ்வாறு நடத்துவது மற்றும் சரிசெய்வது பற்றி முதலில் தீர்மானிக்கவும்.
- 12. பாதிக்கப்பட்டவர் நல்ல நினைவில் இருக்கிறாரா அல்லது உயிருக்கு ஆபத்தான மோசமான இரத்தப்போக்கு இருக்கிறதா என்று சோதித்து உடனடியாக இரத்தப்போக்கை கட்டுப்படுத்தவும்.

2. பேரிடரினால் பாதிக்கப்பட்டோருக்கான முதலுதவி

ഗ്രട്ടയ്യട്ടബി எത്പട്ടു எത്ത?

ஆபத்தான நிலையில் இருக்கும் ஒரு நபருக்கு அருகில் கிடைக்கக்கூடிய பொருட்களை வைத்து உடனடியாக சிறிய சிகிச்சைகள் அளித்து, பாதிப்பை அதிகரிக்க விடாமல், மருத்துவரிடம் செல்லும் வரை பாதுகாப்பது முதலுதவி ஆகும்.

முதலுதவிக்கான அடிப்படை கொள்கைகள்

- முதலுதவி வசதிகளுடன் கூடிய முதலுதவிப் பெட்டியை எப்போதும் வீட்டில் வைத்திருக்க வேண்டும். அதில் அவசர தேவைக்கான மருந்துகள் இருக்க வேண்டும்.
- முதலுதவிப் பெட்டி மற்றும் மருந்துகளை குழந்தைகளின் கைகளுக்கு எட்டாத இடத்தில் வைக்க வேண்டும்.
- பாதிக்கப்பட்டவர்களுக்கு முதலுதவி செய்யும் பொழுது, முதலுதவி செய்யும் நபரின் பாதுகாப்பைக் கவனத்தில் கொள்ள வேண்டும்.
- 4. அவசர சூழ்நிலையில் பாதிக்கப்பட்டவர்கள், இயல்பாக மூச்சுவிடுவதற்குத் தேவையான சூழ்நிலையினை ஏற்படுத்தித் தர வேண்டும். இல்லையெனில் செயற்கை சுவாசத்திற்கான ஏற்பாடுகளைச் செய்ய வேண்டும்.
- 5. பாதிக்கப்பட்ட நபரின் உடலில் இருந்து இரத்தம் அதிகமாக வெளியேறும் நிலையிலும், பாதிக்கப்பட்ட நபர் விஷம் உட்கொண்ட நிலையிலும், இதய மற்றும் சுவாச இயக்கங்கள் நிற்பது போன்ற நிலையிலும் மிகவும் வேகமாக சிகிச்சையளிப்பது அவசியம். ஒவ்வொரு விநாடியும் மிக மிக முக்கியமானதாகும்.
- 6. பாதிக்கப்பட்டவர்கள் கழுத்திலோ அல்லது பின்புறத்திலோ காயம் ஏற்பட்டு இருந்தால் உடனே மருத்துவ வசதி அளிக்க வேண்டும். பாதிக்கப்பட்டவர் வாந்தி எடுத்து ஆபத்துக் கட்டத்தைத் தாண்டி விட்டால், ஒரு சாய்த்துப் படுக்க வைத்து உடலை வெது வெதுப்பாக வைப்பதற்கு போர்வை அல்லது கம்பளியால் போர்த்தி விட வேண்டும்.
- முதலுதவி அளிக்கும் போதே, மருத்துவரின் உதவி பெறுவதற்கான ஏற்பாடுகளைச் செய்ய வேண்டும்.
- 8. அமைதியாய் இருந்து, பாதிக்கபட்டவருக்கு மனதைரியத்தை அளிக்க வேண்டும்.

- பாதிக்கப்பட்ட நபர் மயக்க நிலையில் இருக்கும் போது குடிப்பதற்கு / அருந்துவதற்கு / திரவப்பொருட்களை எதையும் கொடுக்கக்கூடாது.
- 10. பாதிக்கப்பட்ட நபருக்கு ஏற்றுக்கொள்ளாத எதிர்வினை தரும் மருந்துகளின் விபரங்களை கேட்டு தெரிந்து கொள்ள வேண்டும். மருத்துவ அடையாள அட்டை இருப்பின் அதிலிருந்தும் விபரங்களை தெரிந்து கொள்ளலாம்.

பேரிடர் அவசரக் கால உதவிப் பொருள்கள் / பெட்டி (Disaster Emergency Kit)

- 1. இயற்கை பேரிடர்கள் நிகழ்வின்போது, அரசு அலுவலர்கள் மற்றும் காவல் துறையினரின் உதவி உடனடியாக கிடைக்காத சூழ்நிலையில், அதற்கு எதிர்பார்த்திருக்க இயலாது. நாமே அவசரக் கால உதவிப் பொருள்களை அதற்குரிய பெட்டியில் அல்லது பையில் வைத்துக் கொள்வது மிகவும் நல்லது.
- ஏனெனில், பேரிடரின் போது, அவசரக் கால உதவிப் பொருள்கள் விற்பனை செய்யும் அங்காடிகள் முற்றிலும் சேதமடையலாம்.
- மிக விரைவில் பொருள்கள் தீர்ந்தும் போகலாம். அங்காடிக்கே சென்றிட இயலாத நிலையும் ஏற்படலாம்.
- 4. குறிப்பாக, குடிநீர், உணவு, முதலுதவிப் பொருள்கள், உடைகள், படுக்கைகள் மற்றும் சுகாதாரத்திற்கு உதவும் பொருள்கள், கருவிகள், சிறப்புப் பொருட்கள் ஆகியவற்றை தயார் நிலையில் வைத்திருத்தல் மிகவும் நல்லது.

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ஒருவருக்கு ஒரு நாளைக்கு 3-4 லிட்டர் குடிநீர் ஒரு கேலன் (Gallon) நீர் தேவைப்படுகிறது.

ஆகையினால் நமக்கு மூன்று நாட்களுக்குத் தேவையான பாதுகாப்பான குடிநீரைக் கையிருப்பில் வைத்துக் கொள்ள வேண்டும்.

சுத்திகரிக்கப்படாத நீராக இருப்பின், அதில் சிறிதளவு வெளுப்புக்காரம் (Bleaching powder) கலந்து சுத்தம் செய்து, அந்நீரைக் குளிர்ந்த இருட்டான அறைகளில் பாதுகாக்க வேண்டும்.

4

மூன்று நாளுக்குத் தேவையான உணவினை கையிருப்பாக வைத்துக் கொள்ள வேண்டும்.

அது எளிதில் கெட்டுப் போகாத / குளிரூட்டித் தேவைப்படாத மற்றும் சமைத்திட அவசியமில்லாததாகவும், உப்பு அதிகமில்லாத உணவுப் பொருள்களாகவும் இருத்தல் அவசியம்.

ஏனெனில் உப்பிட்ட பொருள் தாகத்தை அதிகரிக்கும்.

பரிந்துரைக்கப்படும் உணவுப் பொருள்கள் பின்வருமாறு:

மிட்டாய் வகைகளில்

- 🕨 கேண்டி,
- ≽ சாக்லேட்,
- ≽ தேநீர்,
- ≽ காப்பி,
- ≽ சர்க்கரை,
- الله 🖌 🖌
- 🕨 மிளகு கலந்த பழச்சாறு,
- 🕨 பால்
- ≽ மாவு,
- 🕨 பாட்டிலில் அடைக்கப்பட்ட பழச்சாறு,
- 🕨 காய்கறிகள் மற்றும் இறைச்சி,
- 🕨 வெண்ணெய்,
- ≽ ജെல்லி,
- ≽ குழந்தை உணவு,
- 🕨 தேவையான வைட்டமின் மாத்திரைகள் மற்றும்
- 🕨 செல்லப்பிராணிகளுக்குத் தேவையான உணவுப் பொருள்கள்.

முதலுதவிப் பெட்டி

வீட்டிற்கு ஒன்றும் வாகனத்திற்கு ஒன்றுமாக இரு முதலுதவிப் பெட்டிகளைத் தனித்தனியாக தயார் நிலையில் வைத்திருக்கவும், உபயோகப்படுத்திய பொருட்கள் அன்றன்றே மீண்டும் முதலுதவிப் பெட்டியில் திரும்பப் பெற்று வைக்கவும்.

முதலுதவிப் பெட்டியில் அவசியம் இருக்க வேண்டியவை

- காயங்களுக்குக் கட்ட உதவும், ஒட்டக்கூடிய பேண்டேஜ் பல வகைகளில் அளவுகளில்,
- 4 அங்குலம் தொற்று நீக்கிய தூய்மையான வெள்ளைத் துணி, (Sanitized Bandage Cloth)
- 🕨 முக்கோணப் பேண்டேஜ்,
- 🕨 3 அங்குலம் சுற்றக்கூடிய பேண்டேஜ்,
- ≽ ഖെப்பமானி,
- 🕨 பெட்ரோலியம் ஜெல்லி டியூப் அல்லது பிற உயவுப் பொருள்கள்,
- 🕨 இரப்பர் கையுரை,
- சூரியத் தடுப்புப் பசை, (Sun Screen Lotion)
- 🕨 வயிற்றுக்கோளாறுக்கான மாத்திரைகள்,
- 2 அங்குலம் தொற்று நீக்கிய வெள்ளைத் துணி, (Sanitized Bandage Cloth)
- 🕨 ஒட்ட உதவக்கூடிய டேப்,
- 2 அங்குலம் சுற்றக்கூடிய நீக்கிய வெள்ளைத் துணி, (Sanitized Bandage Cloth)
- ≽ கத்தரிக்கோல்,
- ≽ ஈரமான துணி,
- 🕨 அறுக்கக்கூடிய பிளேடு,
- 🕨 பல்வேறு வகையான காப்பூசி,
- 🕨 கைகழுவுவதற்கான சோப்பு,
- பொதுவான மாத்திரைகள் மற்றும் (General Medicines)
- வலி நிவாரணிகள் (Pain Killers)

ஆடைகள், படுக்கை மற்றும் சுகாதாரப் பொருள்கள்

பேரிடர் காலங்களில் முதலுதவி பெட்டியில் வைக்கப்படும் உடைகள் குளிரையும், வெப்பத்தையும் தாங்கிடக் கூடியதாக இருக்கிறதா என்பதை உறுதிப்படுத்திக் கொள்ள வேண்டும். அவற்றில், ஒவ்வொருவருக்குமான, மாற்று உடை மற்றும் காலணிகளும் இருந்திடல் வேண்டும். இவைதவிர, குளிப்பது மற்றும் துவைப்பதற்கான சோப்பு, கழிப்பறைத் துடைப்புத்தாள், பெண்களுக்குத் தேவையான பொருள்கள், குப்பை சேகரிப்புப் பைகள் மூடியுடன் கூடிய வாளி, கிருமிநாசினி மற்றும் வெளுப்புக் காரம் முதலியன இருத்தல் வேண்டும்.

கருவிகள்

- சமைக்க உதவும் பொருள்கள், காகிதத்தலான குவளைகள், சாப்பிடப் பயன்படும் தட்டுகள், நெகிழிப் பாத்திரங்கள,
- உலர் மின்கலத்தினால் இயங்கும் வானொலிப் பெட்டி அல்லது தொலைக்காட்சிப் பெட்டி மற்றும் கூடுதலான உலர் மின்கலன்கள், (Battery)
- 🕨 தேவையான பணம் அல்லது காசோலை அல்லது சில்லரைக் காசுகள்,
- 🕨 தீயணைப்பு ஏ, பி மற்றும் சி வகை சிறியரக உலோகப்புட்டிகள்,
- 🕨 கட்டுத்துணி,
- ≽ வெள்ளைத்தாள், எழுதுகோல்,
- ≽ ஊதல்,
- ≽ உள்ளுர் வரைப்படம்,
- ≽ அவசரக் கால ஆயத்தப் பயன்பாட்டிற்குப் பயன்படுத்தும் கையேடு,
- 🕨 மின்பொறிக் கைவிளக்கு, தேவைப்படும் உலர் மின்கலம்,
- 🕨 புட்டிகளைத் திறக்க உதவும் கருவிகள் மற்றும் கத்திகள்,
- 🕨 கூடாரம் அமைப்பதற்கானப் பொருள்கள்,
- 🕨 நெகிழிகளலான சேமிப்புக் கலன்,
- 🕨 ஊசிகள், நூற்கண்டு, நெகிழி விரிப்புகள்

முக்கியப் பொருள்கள்

- பிறப்புச் சான்று / கல்விச்சான்றிதழ் / குடும்ப அட்டை / ஆதார் அட்டை / வாக்காளர் அடையாள அட்டை,
- கடவுச்சீட்டு (Pass Port)
- 🕨 பத்திரம் மற்றும் உயில் சாசனம்,
- 🕨 புகைப்படத்துடன் கூடிய அடையாள அட்டை,
- 🕨 வங்கிக் கணக்குக் புத்தகம், கணக்கு எண் மற்றும் கடன் அட்டை,
- முக்கிய விவரங்கள் அடங்கியப் பட்டியல், புத்தகங்கள், பணம், நகை, கண்கண்ணாடி மற்றும் பரிந்துரைக்கப்பட்ட மருந்துகள் உள்ளிட்ட பொருட்கள் இருத்தல் வேண்டும்.

முதலுதவியின் 4 அம்சங்கள்			
	விழிப்புணர்வ	I	மதிப்பீடு
உதவுவதற்கு	முன்	பாதிப்பிற்கான	நிலைமையை அறிந்த பிறகு அதற்கு உங்களால்
காரணங்களில் க	வனம் செலுத்	த வேண்டும்.	தகுந்த முதலுதவி அளிக்க முடியுமா என மதிப்பீடு
			செய்துகொள்ளுங்கள்.
	செயல்		பிந்தைய பராமரிப்பு
சுய மதிப்பீட்டிற்	ரு பின் உங்க	ளால்	பாதிக்கப்பட்டவர் சிறந்த கவனிப்பில்
முடியுமானால்	செயல்பட தெ	௱டங்கலாம்	மாற்றப்படும் வரை அவருடன் இருங்கள்
நினைவில் கொள்ளுங்கள்			
சுய பாதுகாப்பு, பார்வையாளர் பாதுகாப்பு மற்றும் பாதிக்கப்பட்டவர் பாதுகாப்பு என்ற வரிசையில்			

முதலுதவி செய்ய வேண்டும்

அடையாளங்கள்: இரத்தபோக்கு, வீக்கம் மற்றும் சிராய்ப்பு போன்றவற்றை முதலுதவியாளர் பார்ப்பது அல்லது உணர்வது முக்கியமான அடையாளமாகும்.

அறிகுறிகள்: வலி, மங்கலான பார்வை அல்லது குமட்டல் போன்றவற்றை பாதிக்கப்பட்டவர் உணர்வது முக்கிய அறிகுறியாகும்.

பாதிக்கப்பட்டவரின் மதிப்பீட்டிற்குப் பிறகு, குறைபாடுகள், வெளி காயங்கள், மென்மை மற்றும் வீக்கம் ஆகியவற்றைப் பார்த்து உணருவதன் மூலம் பாதிக்கப்பட்டவரின் பாதிப்பினை மதிப்பிட வேண்டும்.

முழு உடல் பரிசோதனை

பாதிக்கப்பட்டவரை கீழ்கண்ட முறையில் முழு உடல் பரிசோதனை செய்யலாம்.

- 🕨 முதலில், ஏதேனும் காயங்கள் இருக்கிறதா என்று சோதிக்கவும்.
- வாய், மூக்கு அல்லது காதுகளில் இருந்து இரத்தம் அல்லது திரவம் வந்தால் மண்டை ஓடு எலும்பு முறிவைக் குறிக்கலாம்.
- 🕨 கருவிழியின் அளவு மற்றும் ஒளியின் எதிர்வினை ஆகியவற்றை சரிபார்க்கவும்.

- முகம் மற்றும் தாடையில் எதாவது குறைபாடு மற்றும் காயம் உள்ளதா என சரிபார்க்கவும்.
- கண்கள், மூக்கு, வாய் மற்றும் காதுகளுக்கு பின்னால், முகத்தில் வீக்கம் மற்றும் சிராய்ப்புக்கான அறிகுறிகளைப் பாருங்கள்.
- பாதிக்கப்பட்டவரின் தோலின் வெப்பநிலை மற்றும் தோலின் நிறம், அறுவை சிகிச்சை வடுக்கள்.
- கழுத்தின் நரம்புகள் வீங்கியுள்ளனவா, தொண்டை சுற்றி வீக்கம் இருக்கிறதா என்று சோதிக்கவும்.
- 🕨 அறுவை சிகிச்சை வடுக்கள் உள்ளனவா என சரிபார்க்கவும்.
- 🕨 அடிவயிற்றில் வீக்கம் அல்லது சிராய்ப்பு இருப்பதைச் சரிபார்க்கவும்
- கடினத்தன்மை அல்லது மென்மைக்கு அடிவயிற்றை மெதுவாக அழுத்தி பரிசோதிக்கவும்.
- பாதிக்கப்பட்டவரை பரிசோதிக்க குறிப்பாக தன்மையான அல்லது மென்மையான இடங்களில் உங்கள் விரல் நுனியால் குத்திப்பார்க்கக் கூடாது.

முக்கிய அறிகுறிகள்			
துடிப்பு	துடிக்கிறது / நிமிடம் <i>01-11</i>		
சுவாசம்	சுவாசம் ⁄ நிமிடம் <i>00-01</i>		
தோல் நிறம்	சூடான, இளஞ்சிவப்பு மற்றும் உலர்ந்த		
	நிலை		
நினைவுகளின் நிலை	விழிப்பு நிலை மற்றும் நிலைகளைச்		
	சார்ந்த நிலை		

DRABC

DRABC இன் கொள்கை என்பது ஒரு விபத்தினால் பாதிக்கப்பட்டவரை எவ்வாறு

மதிப்பிடுவது அல்லது அவசரகால சூழ்நிலையில் பாதிக்கப்பட்டவரை எவ்வாறு மதிப்பிடுவது

மற்றும் நிர்வகிப்பது என்பதற்கான வழிகாட்டுதல்களை வழங்குகிறது.

டிஆர்ஏபிசி (DRABC) – **க்கான** விளக்கம்:

- டி– ஆபத்து (D. Danger)
- ஆர்– பதில்/வினையாற்றுதல் (R Response).
- ஏ– சுவாசப்பாதை (A Airway)
- பி– சுவாசம் (B–Breathing)
- சி– அழுத்தம் (C Circulation)

சுவாசப் பாதை



- பாதிக்கப்பட்டவர் மயக்கமடைந்து சுவாசிக்கவில்லை என்றால் சுவாசப்பாதையில் ஏதாவது தடங்கல் உள்ளதா என சரிபார்க்க வேண்டும்.
- தலையை பின்னால் சாய்த்து கன்னத்தை உயர்த்தவும். கழுத்தில் எந்த காயமும் இல்லை என்றால் பாதிக்கப்பட்டவரின் முகத்தை சற்று கீழ்நோக்கி நகர்த்தவும். சுவாசப்பாதை தெளிவாக இருப்பதை உறுதிப்படுத்த வாயில் நாக்கு, தொண்டைப்பகுதிக்கு

செல்லாததை உறுதி செய்யுங்கள்.

- ஏதாவது வெளிப்பொருள் (Foreign Material) தெரிந்தால், பாதிக்கப்பட்டவரை அவரது பக்கவாட்டில் திருப்பி, அவரை உங்கள் முழங்கால்களில் நிறுத்தி அவருடைய வாயை திறந்து அடைத்திருக்கும் பொருளை கையுறை அணிந்து அதனை வெளியே எடுக்க வேண்டும்.
- பாதிக்கப்பட்டவர் சுவாசித்தால், மயக்கமடைந்து விட்டால், அவரை மீட்பு நிலையில் வைக்கவும். அவர் சுவாசிக்கவில்லை என்றால், இரண்டு விரைவான மீட்பு சுவாசங்களைக் கொடுங்கள்.
- உங்கள் வாயை அகலமாகத் திறந்து, ஆழ்ந்த மூச்சை எடுத்து, பாதிக்கப்பட்டவரின் வாயைத் திறந்து உங்கள் வாயை இறுக்கமாக பொருத்துங்கள்.



- பாதிக்கப்பட்டவரின் மார்பு உயரும் வரை நீங்கள் ஊதுங்கள்.
- > பின் பாதிக்கப்பட்டவரின் வாயிலிருந்து உங்கள் வாயை அகற்றி காற்று நுரையீரலை விட்டு வெளியேற அனுமதிக்கவும்.
- பாதிக்கப்பட்டவரின் வாய்க்கு அருகில் உங்கள் காதை வைத்து, மார்பை இயல்பான நிலைக்குத் தள்ளும்போது காற்று வெளியேறுவதை உணரவும்.

அழுத்தம்

முதலுதவியாளர் உடலின் அறிகுறியைச் சரிபார்த்து, சுவாசத்தின் அறிகுறிகள் இல்லாவிட்டால் சிபிஆர் தொடங்க வேண்டும்:

மீள் உயிர்ப்பு சுவாசம் (சி.பி.ஆர்)

- மீள் உயிர்ப்பு சுவாசம் (சிபிஆர்) என்பது நுரையீரலின் செயற்கை காற்றோட்டம் மற்றும் இரத்தத்தின் செயற்கை சுழற்சியை வழங்கும் செயல் முறையாகும்.
- சிபிஆர் ஐ கையாளுவதற்கு முன், பாதிக்கப்பட்டவர் சுவாசிக்கிறாரா இல்லையா என்பதைச் சரிபார்ப்பது மிக முக்கியம். எனவே, டி. ஆர்.எ.பி.சி. இன் செயல்முறை கவனமாக பின்பற்றப்பட வேண்டும்.



அழுத்தத்தின் செய்முறை



குழந்தைகளுக்கான மீள் உயிர்ப்பு சுவாசம்

12 மாதங்களுக்கும் குறைவான குழந்தை சுவாசிக்கவில்லை என்றால், அவசர மருத்துவ உதவிக்கு அழைக்கவும்.

- 🕨 சுவாசப் பாதை தடங்களை சீரமைக்கவும்.
- கழந்தையை முதுகில் ஒரு உறுதியான, தட்டையான மேற்பரப்பில் அல்லது உங்கள் நீட்டிய கையில் வைக்கவும்.
- நடுத்தர மற்றும் ஆள்காட்டி விரலை மைய எலும்பில் வைக்கவும், மார்பு ஆழத்தில் 1/3 வரை 30 முறை அழுத்தவும். நிமிடத்திற்கு 2 சுவாசம் மற்றும் 30 அழுத்தங்கள் கொண்ட 3 சுழற்சிகளை மீண்டும் செய்யவும்.
- உதவி வரும் வரை அல்லது குழந்தை மீண்டும் சுவாசிக்கத் தொடங்கும் வரை சிபிஆர் ஐ தொடரவும்

சிபிஆர் விகிதங்கள்					
உடல் அமைப்பு	அழுத்தம் மூச்சு மீட்பு	சிபிஆர் சுழற்சிகள் 100 சிபிஆர் / 1நிமிடம்=1சுழற்சி	அழுத்தத்தின் ஆழம்	பயன்படுத்த வேண்டியவை	அழுத்தத்தின் இடம்
பெரியவர்	30:2	5 சுழற்சிகள்	மார்பின் அழுத்தம்	கைகள்	மார்பின் மையம்
குழந்தை	30:2	3 சுழற்சிகள்	மார்பின் அழுத்தம்	கைகள்	மார்பின் மையம்
சிசு	15:2	3 சுழற்சிகள்	மார்பின் அழுத்தம்	விரல்கள்	மார்பின் மையம்

சிபிஆருக்குப் பிறகு காப்பாற்றும் நிலையின் செயல்

ஒரு தகுதிவாய்ந்த முதலுதவி நபர்கள் நோயாளிக்கு மூச்சு அதிர்வு கருவி (Defibrillation) கவனித்து பயன்படுத்த வேண்டும். அதை குறிப்பில் எழுதி வைத்திட வேண்டும். மூச்சு சீராகி காப்பாற்றப்பட்ட அனைத்து நோயாளிகளும் மருத்துவமனைக்கு அனுப்பப்பட வேண்டும்.

ஆஞ்சினா (இதயவலி)



கரோனரி தமனிகள் என்று அழைக்கப்படுகின்ற இதயத்தினுடைய தமனிகளில் கொழுப்பு சேமிக்கப்படும் போது ஆஞ்சினா ஏற்படுகிறது. இதன் காரணமாக தமனிகள் சுருக்கமடைகின்றன.

இதனால் அது கொண்டு செல்லும் இரத்தத்தின் அளவு குறைந்து இதய

தசைகளுக்கு செல்லும் ஆக்ஸிஜனின் அளவு குறைகிறது. ஒரு குறிப்பிட்ட காலத்திற்கு மேல் சேகரிக்கப்பட்ட கொழுப்புகள் தமனியை முழுமையாக அடைக்கிறது. இது மாரடைப்பு அல்லது இதய செயல்படாமைக்கு வழிவகுக்கிறது.

இதயவலியின் அறிகுறிகள்

- ≽ கழுத்து, தோள் மற்றும் கைகளுக்கு பரவும் மார்பு வலி,
- 🕨 மூச்சுவிடுதல் சிரமம்,
- ≽ வாந்தி,
- ≽ பலவீனம் ,
- 🕨 குறைவான தலைபாரம்,
- 🕨 விரைவான துடிப்பு,
- ≽ பதட்டம்,

ഗ്രട്ടയ്യട്ടഖി:

- 🕨 உடனடியாக அவசர கால அழைப்பை மேற்கொள்ள வேண்டும்.
- 🕨 பாதிக்கப்பட்டவரை ஓய்வில் வைக்கவேண்டும்.
- பாதிக்கப்பட்டவரை ஏற்கனவே ஆஞ்சினாவின் பாதிப்புக்கு உள்ளாகி இருந்தால், மருந்து எடுக்க அவருக்கு உதவுங்கள்.
- நினைவில் இருக்கும் போது, அவரது முக்கிய அறிகுறிகளைக் கவனித்து, குறித்து வைத்திருங்கள்.
- 🕨 அவர் நினைவை இழந்தால், சிபிஆரைத் தொடங்குங்கள்.

காயங்கள் மற்றும் இரத்தப்போக்குகள்

அறிகுறிகள்

- 🕨 சிவந்த மற்றும் சிராய்ப்பு தோல்,
- 🕨 இரத்தம் வெளியேறுதல்,
- 🕨 பாதிக்கப்பட்ட பகுதியை சுற்றி வீக்கம்,

- 🕨 காயத்திலிருந்து திரவம் வெளியேறுவது,
- 🕨 கடுமையான வலி,
- 🕨 பாதிக்கப்பட்ட பகுதியில் சூடான மற்றும் எரியும் உணர்வு,
- 🕨 சுத்தமாக வெட்டப்பட்ட தோல்,
- 🕨 தோல் சிவந்திருத்தல்,
- 🕨 அதிகப்படியாக விரைவாக இரத்தம் வெளியேறுதல்,
- 🕨 பாதிக்கப்பட்ட பகுதியைச் சுற்றி வீக்கம்,

ഗ്ര<u>ട്</u>ടയ്യട്ടഷി:

- உடனடியாக அவசர உதவிக்கு அழைப்பை அனுப்பவும். காயத்தின் தாக்கம் அதிகமாக தென்பட்டால் உடினடியாக மருத்துவரை அணுகவும்.
- 🕨 கைகளை கழுவி, கையுறைகள் பயன்படுத்தவும்
- ≽ காயத்தை நன்கு கவனமாக கழுவவும்.
- 🕨 காயத்தை உலர வைக்கவும்.
- சிவப்புக்கோடுகள், சீழ், அதிக வலி அல்லது காய்ச்சல் இருந்தால் மருத்துவ உதவியை நாடுங்கள்.
- பாதிக்கப்பட்டவரை கவனித்தபின், துண்டிக்கப்பட்ட பகுதியை சுத்தமான பிளாஸ்டிக் பையில் வைத்து பனிக்கட்டியின் மேல் வைக்கவும்.
- 🕨 விபத்துக்குள்ளானவர் எதையும் சாப்பிடவோ, குடிக்கவோ கூடாது

நரம்பு மண்டலக் கோளாறுகள்

அறிகுறிகள்

- 🕨 லேசான தலைசுற்றல்,
- ≽ குமட்டல்,
- 🕨 மெதுவான, மிக மெதுவான இதயத்துடிப்பு,
- 🕨 மங்கலான பார்வை,
- ≽ குழப்பம்,
- ≽ சோர்வு,
- 🕨 தெளிவின்மை,

- 🕨 தெளிவற்ற பேச்சு,
- ≽ தசைகள் தளர்தல்,
- 🕨 வாய் கோணலாதல்,
- 🎽 எச்சில் வடிதல்,
- ≽ முடக்கு வாதம்,
- 🕨 உடல் தசைகள் இறுகுதல்,
- 🕨 விரிவடைந்த மற்றும் மெதுவாக செயல்படும் கருவிழிகள்,

ഗ്രട്ടയ്യട്ടഷി:

- 🕨 அவர் நினைவை இழந்தால், அறிகுறிகளைச் சரிபார்க்கவும்.
- 🕨 உடனடியாக மருத்துவ உதவிக்கு அழைப்பு விடுங்கள்.
- மூச்சில்லை என்றால், சிபிஆர்.ஐ தொடங்குங்கள். மருத்துவர்கள் பொறுப்பேற்கும் வரை தொடரவும்.
- பாதிக்கப்பட்டவருக்கு வலிப்பு வருவதை உணர்ந்தால், சுத்தமான இடத்தில், தரையில் படுக்கவைத்து அவருக்கு உதவுங்கள்.
- வாந்தி அல்லது பிற திரவங்களை வெளியேற்ற அனுமதிக்கும் வகையில், ஒருபக்கம் சாய்த்துப் படுக்க வைக்கவும்.
- 🕨 அவரை சுற்றியுள்ள கூர்மையான பொருள்களை அகற்றுதல்.
- 🕨 உதவி வரும் வரை சி.பி.ஆர். ஐ தொடரவும்.

நீரில் மூழ்கியவர்களுக்கான முதலுதவி

- 🕨 உடனடியாக அவசர கால உதவிக்கு அழைத்துப் பேசவும்.
- 🔌 ஒரு கயிற்றை எறிந்து நீரில் மூழ்கும் நபரிடம் காட்ட வேண்டும்.
- நீச்சல் மூலம் கயிற்றில் இழுக்க முயற்சி செய்யுங்கள். நீச்சல்பயிற்சி பெற்றிருந்தால் மட்டும் பாதிக்கப்பட்டவரை தண்ணீரிலிருந்து வெளியேற உதவுங்கள்.
- 🕨 பாதிக்கப்பட்டவரை தண்ணீரிலிருந்து வெளியே கொண்டு வந்த பிறகு
- 🕨 தெளிவான காற்றோட்டமுள்ள சூழலில் படுக்கவைக்கவும்.
- 🕨 ஒரு நபர் வாயிலிருந்து மற்ற நபருக்கு வாய்வழியாக மூச்சு அளிக்கலாம்.

- 🕨 ஈரமான துணிகளை முதலில் அகற்ற வேண்டும்.
- 🕨 நோயாளியை வெதுவெதுப்பாகவும், கூடாகவும் வைத்திருங்கள்.
- தேவைப்படும்போது அருகில் உள்ள மருத்துவமனைக்கு அழைத்து செல்ல வேண்டும்.
- 🕨 தலை, கழுத்து மற்றும் முதுகெலும்புக்கு காயம் இருக்கிறதா என்று சோதிக்கவும்.
- ≽ சுவாசிக்கவில்லை என்றால், சிபிஆரைத் உதவி வரும் வரை தொடருங்கள்.
- 112 மற்றும் 108 ஐ அழைத்துத் தேவையான மருத்துவ வழிமுறைகள் கேட்டு அறிந்துகொள்ளவும்.
- 🕨 துடிப்பு இல்லை என்றால், சிபிஆர் (CPR)- ஐ உடனே தொடங்குங்கள்
- 🕨 நிமிடத்திற்கு 100-120 என்ற விகிதத்தில் மார்பு அழுத்தங்களை மட்டும் செய்யுங்கள்.
- 🕨 முக்கிய அறிகுறிகளைக் கவனித்துப் பதிவு செய்யுங்கள்.

3. பேரிடர்களின் போது கவனம் செலுத்த வேண்டியவை

1. புயல் மற்றும் தூறாவளி

புயலின் போது செய்ய வேண்டியவை மற்றும் செய்யக்கூடாதவை:

புயலுக்கு முன்

- வீட்டைச் சரிபார்க்கவும்: தளர்வான ஒடுகளைப் பாதுகாக்கவும் மற்றும் கதவுகள் மற்றும் ஜன்னல்களை சரி பார்க்கவும்.
- வீட்டிற்கு அருகில் உள்ள காய்ந்த கிளைகள் அல்லது காய்ந்த மரங்களை அகற்றவும்; தளர்வான செங்கற்கள், குப்பைத் தொட்டிகள், கண்ணாடி ஜன்னல்களை மூடி வைக்க சில மரப் பலகைகளை தயாராக வைக்கவும்,
- மண்ணெண்ணெய், மின்கலம் மூலம் இயக்கப்படும் ஒளிப்பெருக்கி மற்றும் போதுமானவைகளை தயாராக வைத்திருங்கள்.
- அவசர காலத்தில் பயன்படுத்த பதப்படுத்தப்பட்ட உணவை தயாராக வைத்திருக்கவும். வானொலியைக் கேளுங்கள் (அகில இந்திய வானொலி நிலையங்கள் வானிலை எச்சரிக்கைகளை வழங்குகின்றன).
- 🕨 எச்சரிக்கைகளை தொடர்ந்து கேட்கவும்.
- 🕨 கிடைக்கும் தகவலை மற்றவர்களுக்கும் பகிருங்கள்.
- வதந்திகளை நம்ப வேண்டாம். அவற்றை பரப்ப வேண்டாம்; இது பதற்ற சூழ்நிலைகளை தவிர்க்க உதவும்.
- 🕨 அதிகாரப்பூர்வ தகவலை மட்டுமே நம்புங்கள்
- உங்கள் பகுதிக்கு சூறாவளி எச்சரிக்கை கொடுக்கப்படும்போது, இயல்பான வேலையைத் தொடரவும், ஆனால் வானொலியில் தரப்படும் எச்சரிக்கைகளை முழுவதுமாக பின்பற்றவும்.
- வெள்ளம் வரும் முன் வெள்ள நீர் எட்ட முடியாத உயர்ந்த நிலப்பகுதிக்கு சென்று விடுங்கள்
- உங்கள் வீடு உயரமான இடத்தில் பாதுகாப்பாக கட்டப்பட்டிருந்தால், வீட்டின் பாதுகாப்பான பகுதியில் தஞ்சம் அடையுங்கள். சம்மந்தப்பட்ட அதிகாரி, பாதுகாப்பான இடத்திற்கு வெளியேறும்படி அறிவுறுத்தினால், அந்த இடத்தை விட்டு உடனடியாக வெளியேறுங்கள்.

- உங்களிடம் மரப்பலகைகளால் ஆன கதவுகள் இல்லை என்றால், பிளவுகளைத் தடுக்க கண்ணாடிகளில் காகிதக் கீற்றுகளை ஒட்டவும்.
- சமைக்காமல் உண்ணக்கூடிய கூடுதல் உணவைப் பெறுங்கள். தேவையான குடிநீரை பொருத்தமான மூடப்பட்ட பாத்திரங்களில் சேமிக்கவும்.
- 🕨 உங்கள் வீட்டில் உள்ள மின் இணைப்புகளை அணைக்கவும்.
- நீங்கள் வீட்டை காலி செய்ய வேண்டியிருந்தால், வெள்ள சேதத்தை குறைக்க தேவையான மதிப்புமிக்க பொருட்களை மேல் தளங்களுக்கு எடுத்துச்செல்லவும். (உம்) முக்கியமான பத்திரங்கள் ஆதார் அடையாள அட்டை, ரேஷன் கார்டுகள், பள்ளி, கல்லூரி சான்றிதழ்கள், பாடப்புத்தகங்கள்)
- சூறாவளியின் போது மின்தடை ஏற்படும். எனவே, தேவையான விளக்கு, டார்ச் அல்லது பிற அவசர விளக்குகள் சரியான நிலையில் இருப்பதை உறுதிசெய்து அவற்றைத் தயராக வைத்திருங்கள்.
- கழந்தைகள் மற்றும் பெரியவர்களுக்கு அவர்களின் தேவைக்கேற்ப சிறப்பு உணவு ஏற்பாடு செய்யுங்கள்.
- புயலின் மையம் உங்கள் வீட்டின் மீது நேரடியாகச் சென்றால், காற்று மற்றும் மழையில் அரை மணி நேரம் நீடிக்கும். இந்த நேரத்தில் வெளியே செல்ல வேண்டாம்: ஏனென்றால் அதற்குப் பிறகும் உடனடியாக புயல் மீண்டும் தொடங்கும். புயல் முழுமையாக கடந்து விட்டது என்ற அறிவிப்பு வரும்வரை வீட்டிற்குள் இருப்பது தான் பாதுகாப்பனது.

புயலுக்கு பின்

- உங்களுக்கும் உங்கள் குடும்பத்தினருக்கும் சில நாட்களுக்குத் தேவையான அத்தியாவசியப் பொருட்களை தயார் செய்யவும். இவற்றில் மருந்துகள், குழந்தைகள் மற்றும் பெரியவர்களுக்கான சிறப்பு உணவு ஆகியவை இருக்க வேண்டும்.
- உங்கள் பகுதிக்கென குறிப்பிட்டுக் காட்டப்படும் பாதுகாப்பான தங்கும் இடங்களுக்குச் செல்லுங்கள்.
- 🕨 காப்பகத்தில் இருப்பின் காப்பாளரின் வழிமுறைகளைப் பின்பற்றவும்.
- 🕨 நீங்கள் வெளியேறும்படி அறிவிக்கப்படும் வரை அங்கேயே தங்குங்கள்.
- நீங்கள் உங்கள் வீட்டிற்குத் திரும்பலாம் என்று அறிவிக்கப்படும் வரை நீங்கள் தங்குமிடத்தில் இருப்பதே பாதுகாப்பானது.

- 🕨 நீங்கள் உடனடியாகத் தொற்று நோய்களுக்கு எதிராகத் தடுப்பூசி போட வேண்டும்.
- விளக்கு கம்பங்களில் இருக்கும் தளர்வான மற்றும் தொங்கும் கம்பிகளை கண்டிப்பாக தொடக்கூடாது.
- 🕨 உங்கள் வளாகத்தில் உள்ள குப்பைகளை உடனடியாக அகற்றவும்.
- 🕨 சரியான இழப்புகளை உரிய அதிகாரிகளுக்கு தெரிவிக்கவும்

2. வெள்ளம்

செய்ய வேண்டியவை:

- மின் மற்றும் எரிவாயுப் பொருள்களின் இணைப்பினைத் துண்டிக்கவும். குறிப்பாக, அவற்றின் பிரதான மின் இணைப்பினைத் துண்டிக்கவும்.
- அவசரக் காலப் பெட்டியை (Emergency Kit) எடுத்துக் கொள்ளவும். மேலும், உறவினர்கள் மற்றும் நண்பர்களுக்கு எங்குச் செல்கிறீர்கள் என்பதை அவசியம் தெரியப்படுத்தவும்.
- தீங்கு விளைவிக்கக்கூடிய கழிவு நீர், எண்ணெய், இராசயனங்கள் மற்றும் இதரப் பொருள்கள் வெள்ளநீரில் கலக்கும் அபாயம் இருப்பதால், அதைத் தொடுவதைத் தவிர்க்கவும்.
- தேங்கிய நீரில் நடக்க நேரிட்டால், நீரின் ஆழம் மற்றும் மறைந்துள்ள சாக்கடைக் குழிகள், (Open manholes or ditches) நீர் வடிகால் அல்லது வாய்க்கால் முதலியவற்றில் விழாமல் இருக்க, ஒரு கம்பு அல்லது குச்சியைப் பயன்படுத்தவும்.
- வெள்ளத்தினால் உயர்மின் அழுத்தக் கம்பிகள் அறுந்து கிடக்கலாம். இதனால், நீரில் மின்சாரம் பாய்வதற்கு வாய்ப்பு உண்டு. எனவே, அதிலிருந்து தள்ளி இருக்கவும். மின்கம்பிகள் அறுந்து விழுந்துள்ளதை, மின்சாரத் துறையினருக்குத் தெரியப்படுத்தவும்.
- வெள்ளத்திற்குப் பிறகு சாலைகள், விளையாட்டுத் திடல்கள் மற்றும் தரைகளில் கட்டடங்களின் இடிபாடுகள், உடைந்த கண்ணாடித் துண்டுகள், கூர்மையான ஆயுதங்கள், ஆணிகள் முதலியன இருக்கலாம். வெள்ளத்தினால் தரை மற்றும் படிக்கட்டுகளில் சேறு மற்றும் சிதைந்த பொருள்கள் இருப்பதால், வழுக்கி விழுவதற்கான வாய்ப்புகள் அதிகம். எனவே, ஆழம் அறிந்த பின்னரே நடக்க முயற்சிக்க வேண்டும்.

செய்யக்கூடாதவை:

- ஒடும் நீரில் நடக்க வேண்டாம். ஏனெனில், நீரோட்டமானது, ஆழமற்றது போல் தோற்றமளிக்கலாம். ஆனால், வேகமாக ஓடுகின்ற நீர் உமது கால்களை இடறி விடலாம்.
- வேகமாக ஓடும் நீரில் நீந்த வேண்டாம். ஏனெனில், அந்நீரால் அடித்துச் செல்லப்படலாம்: அல்லது நீரில் உள்ள பொருளின் மீது மோதிக்கொள்ள நேரிடலாம்.

- வெள்ளம் சூழ்ந்த பகுதிகளில் வாகனத்தை ஒட்டுதல் வேண்டாம்: எதிர்பாராமல் நீரின் ஆழம் அதிகரிக்கலாம். உமது வாகனத்தை அடித்துச் செல்ல, அரை மீட்டர் (1½அடி) உயர வெள்ளமே போதுமானது. வெள்ளத்தில் வாகனத்தை இயக்குவதால், அருகிலுள்ள பொருள்களுக்கும் சேதம் ஏற்படக்கூடும்.
- வெள்ளப்பெருக்கின் அபாயத் தன்மை குறைந்துவிட்டது என்கிற அதிகாரப்பூர்வமான அறிவிப்பு வரும்வரை, உங்களின் இருப்பிடத்திற்கு செல்ல வேண்டாம்.
- தகுதி பெற்ற மின் பொறியாளரைக் கொண்டு சோதிக்காதவரை, வீட்டிற்கு மின் இணைப்பைக் கொடுக்க வேண்டாம். வாயுக்கசிவு குறித்து எச்சரிக்கையாக இருக்கவும் – புகைப்பிடித்தல் கூடாது. மெழுகுவத்தியோ, லாந்தர் விளக்கோ ஏற்ற வேண்டாம். வேறு எந்த வகையிலும் தீ மூட்டவும் வேண்டாம்.
- வெள்ள நீருடன் தொடர்புடைய எந்த உணவுப் பொருள்களையும் உண்ண வேண்டாம்: ஏனெனில், அவை மூலம் தொற்றுநோய் பரவிடும் அபாயம் அதிகமுள்ளது.

நிலநடுக்கம்

நிலநடுக்கத்தின்போது வீடு அல்லது கட்டத்தின் உள்ளே இருந்தால்

- 🕨 பதற்றமடையாமல் அமைதியாக இருக்கவும்.
- கண்ணாடியாலான சன்னல்கள், கதவுகள், நிலைப்பேழை (Almirahs), முகம் பார்க்கும் கண்ணாடிகள் ஆகியவற்றிலிருந்து விலகி நிற்கவும்.
- மற்கூரையிலிருந்து இடிந்து விழுகின்ற பூச்சு (Plaster), செங்கற்கள், கற்கள்ஆகியவற்றிலிருந்து வில நிற்கவும்.
- மேசைக்கு அடியில் அல்லது எளிதில் உடையாத கட்டிலுக்கு அடியில் அமரவும். இதனால், இடிந்து விழுகிற பொருள்களால் காயம் ஏற்படாமல் இருக்கும்.
- கதவினை நோக்கியோ, மாடிப்படியினை நோக்கியோ ஓடாமல் இருக்கவும். ஏனெனில், கதவோ, மாடிப்படிகளோ உடைந்து விழும் நிலை (அ) நெருக்கடி ஏற்படலாம்.
- அறையின் மூலையில் அமர்ந்து, இரு கைகளினாலும் கழுத்தின் பின்பகுதியை இறுக்காமப் பிடித்துக் குனிந்து கொள்ளவும்.

நிலநடுக்கத்தின்போது கட்டடத்தின் வெளியில் இருந்தால்:

🕨 திறந்தவெளி அருகாமையில் இருந்தால், அங்கே விரைந்து செல்வது நல்லது.

- உயரமான புகைப்போக்கிகள் (Chimneys), உயரமான கட்டடங்கள், உப்பரிகைகள், அறிவிப்புப் பலகைகள், மாடி முகப்பு ஆகியவற்றிலிருந்து விலகி நிற்கவும்.
- தெருக்களில் ஓடாமல், ஓரிடத்தில் இருக்கவும்: ஏனெனில் கட்டடங்கள், மின்கம்பங்கள், பாலங்கள், சாலையோரத்தில் உள்ள பெரிய விளம்பரப் பலகைகள் (Hoardings) முதலியன உங்கள் மேல் விழக்கூடும்.

நிலநடுக்கத்திற்குப் பின்னர்:

- தங்களுக்கோ, பிறருக்கோ காயங்கள் ஏற்பட்டுள்ளதா என்பதை உற்றுக் கவனிக்கவும். முதலில் வெட்டுக்காயத்திற்கும், கன்றிப் போன காயத்திற்கும் முதலுதவி செய்யவும்.
- அவசரக் காலச் சேவையைத் துரிதப்படுத்தி, தெருக்களில் உள்ள இடையூறுகளை அகற்றவும்.
- மின் இணைப்புப் பொருள்களான குளிர்சாதனப்பெட்டி, தொலைக்காட்சிப்பெட்டி, வானொலிப்பெட்டி மற்றும் எரிவாயு ஆகியவற்றின் இணைப்புகளைத் துண்டிக்கவும்.
- காலணிகள் அணிவதன் மூலம் இடிபாடுகளிலிருந்து உங்கள் கால்களைப் பாதுகாக்கலாம்.
- உலர் மின்கலம் மூலம் இயங்கக்கூடிய வானொலியை, முக்கியமான தகவல்களைக் கேட்பதற்குப் பயன்படுத்தவும்.
- ≽ தொடர் நிலநடுக்கங்களுக்கு உங்களைத் தயார்படுததிக் கொள்ளுங்கள்.

செய்யக் கூடாதவை:

- பாதிப்புக்கு உள்ளான பகுதி (அ) கட்டடங்களுக்கு அருகாமையில் கூட்டமாக இருக்க வேண்டாம்.
- தண்ணீரை வீணாக்க வேண்டாம். ஏனெனில், உடனடித் தேவைகளில் ஒன்றான தண்ணீர், தீயினை அணைப்பதற்கு அவசியமாகும்.
- 🕨 கடுமையான காயம் அடைந்தோரை இடம் பெயரச் செய்ய வேண்டாம்.
- 🕨 மருத்துவ உதவி வரும் வரை அமைதி காக்கவும்.
- வதந்திகளைப் பரப்பிட வேண்டாம். அது மக்களிடையே பீதியை ஏற்படுத்தும். பய உணர்வின் காரணமாக, நிலைமை, மேலும் மோசமாகக் கூடும்.

3. ഥിൽതൽ

மின்னலின் போது செய்ய வேண்டியவை

- 🕨 இருண்ட கரு மேகங்களையும், அதிகப்பட்டியான காற்றினையும் கவனிக்க வேண்டும்
- இடியின் சப்தத்தை நீங்கள் கேட்டால், மின்னல் தாக்கும் இடத்தின் அருகில் நீங்கள் இருக்கிறீர்கள் என்பதை உணர்ந்து கொள்ளுங்கள்
- இடி மன்றும் மின்னல் குறித்த முன் எச்சரிக்கை தகவல்களுக்கு ஊடகங்களை தொடர்ந்து கவனிக்கவும்
- வீட்டிற்குள்ளேயே இருக்க வேண்டும், முடிந்தவரை பயணம் செய்வதை தவிர்க்க வேண்டும்
- ஜன்னல்கள் மற்றும் கதவுகளை மூடி வைக்கவும் மற்றும் வெளியில் உள்ள பொருட்களை (தளவாடங்கள், தொட்டிகள் முதலியன) பாதுகாப்பாக வைக்கவும்.
- 🔌 குழந்தைகள் மற்றும் கால்நடைகள் உட்புறம் இருப்பதை உறுதி செய்ய வேண்டும்
- மின்னல் தாக்கத்தின் போது, மின் எழுச்சி ஏற்படுவதைத் தவிர்க்கும் பொருட்டு, அவசியமற்ற மின் சாதனங்களின் இணைப்பை துண்டிக்க வேண்டும். இடி மற்றும் மின்னல் தாக்கத்தின் போது, பொருட்கள் வீசி எறியப்பட்டு விபத்துக்கள் ஏற்பட வாய்ப்பு உள்ளதால், மரக்கட்டைகள், இடிந்த சிதிலங்கள், தேவையற்ற பொருட்கள் இருப்பின் அவற்றை உடனடியாக அகற்ற வேண்டும்

செய்யக் கூடாதவை

- உலோகக் குழாய்களில் மின்னல் பாயும் என்பதால், இடி மற்றும் மின்னல் தாக்கத்தின் போது குளிப்பதை தவிர்க்கவும். மேலும், ஓடும் நீரோடைகளிலிருந்து விலகி இருக்கவும்.
- கதவுகள், ஜன்னல்கள், நெருப்பு மூட்டப்படும் இடங்கள், அடுப்புகள், குளியல் தொட்டிகள் மற்றும் மின்சாரம் பாயும் பொருட்களிலிருந்து விலகி இருக்கவும்.

வெளியில் இருக்கும் போது

செய்யக்கூடியவை

- உடனடியாக பாதுகாப்பான தங்குமிடத்திற்கு செல்ல வேண்டும் உலோகக் கட்டமைப்புகளையும் கட்டுமானங்களையும், உலோகத் தகடு கொண்ட தங்குமிடங்களையும் தவிர்க்கவும்.
- தாழ்வான பகுதியில் உள்ள தங்குமிடத்தை கண்டறிவதோடு, அந்த இடம் வெள்ள பாதிப்பிற்கு உள்ளாகாத இடம் என்பதை உறுதி செய்து கொண்டு அந்த இடத்தில் தங்க வேண்டும்.

- குதி கால்களை ஒன்று சேர்த்து, தலை குணிந்து, தரையில் பதுங்குவது போல அமர்ந்து கொள்ள வேண்டும்
- உங்களது கழுத்திற்கு பின்னால் இருக்கும் முடியில் நீங்கள் ஏதேனும் மாற்றத்தை உணர்ந்தால், நீங்கள் இருக்கும் இடத்திற்கு அருகில் மின்னலின் தாக்கம் உடனடியாக நிகழப்போகிறது என்பதை நீங்கள் அறிந்து கொள்ளலாம்.
- மின்னல் தாக்கத்தின் போது தொலைபேசி, மின் சாதனங்கள், கம்பி வேலிகள், மரங்கள், மலைஉச்சி ஆகியவற்றிலிருந்து விலகி இருக்க வேண்டும்.

செய்யக்கூடாதவை

- தரையில் சமமாக படுக்கும் போது மினனலின் தாக்கம் அதிகம் ஏற்பட வாய்புள்ளதால், தரையில் சமமாக படுக்கக் கூடாது.
- இடி மற்றும் மின்னல் தாக்கத்தின் போது மரங்களில் மின்சாரம் பாயும் என்பதால், மரங்களுக்கு அடியில் நிற்கக் கூடாது.
- ரப்பர் செருப்புகள் மற்றும் கார் டயர்கள் மின்னல் தாக்கத்திலிருந்து பாதுகாக்க உதவாது என்பதால் அவற்றை பயன்படுத்த வேண்டாம்.

பயணம் மேற்கொள்ளும் போது

- ைசக்கிள், மோட்டார் சைக்கிள் மற்றும் வேளாண் வாகனங்களில் பயணிக்கும் போது உடனடியாக பாதுகாப்பான தங்குமிடத்திற்கு செல் வேண்டும்.
- படகு சவாரி மற்றும் நீச்சல் மேற்கொள்ளும் போது, மின்னல் தாக்கம் ஏற்படின், உடனடியாக கரைக்கு திரும்பி பாதுகாப்பான தங்குமிடத்திற்கு செல்ல வேண்டும்.
- புயலின் தாக்கத்தின் போது, மீட்பு உதவி கிடைக்கும் வரை அல்லது புயல் கடந்து செல்லும் வரை உங்களது வாகனத்திற்குள்ளேயே இருக்க வேண்டும். வாகனத்திற்குள் உள்ள உலோக பாகங்களை நீங்கள் தொடாமல் இருந்தால், உங்கள் வாகனத்தின் உலோக கூரை உங்களுக்கு பாதுகாப்பாக அமையும்.
- வாகனங்களின் ஜன்னல்களை மூடி வைக்கவும், மரங்கள் மற்றும் மின் இணைப்புகளின் அருகில் வாகனங்களை நிறுத்த வேண்டாம்.

சிகிச்சை

மின்னல் தாக்கத்திற்கு உள்ளான நபரை உடனடியாக மருத்துவமனைக்கு அழைத்துச் செல்ல வேண்டும். இயன்றவரை அடிப்படையான முதலுதவி அளிக்க வேண்டும்.

- மின்னல் தாக்கத்திற்கு உள்ளான நபரது உடலில் மின்சாரம் இருக்காது என்பதால், காலம் தாழ்த்தாமல் அவரை உடனடியாக மருத்துவமனைக்கு அழைத்துச் செல்ல வேண்டும்.
- மின்னல் தாக்கத்திற்கு உள்ளான நபருக்கு எலும்பு முறிவு ஏற்பட்டுள்ளதா என்பதையும், செவித்திறன் மற்றும் கண் பார்வையிழப்பு ஏற்பட்டுள்ளனவா என்பதையும் பரிசோதிக்க வேண்டும்.
- மின்னல் தாக்கத்திற்கு உள்ளான நபருக்கு தீக்காயங்கள் ஏற்பட வாய்ப்புள்ளது. மின்னல் தாக்கத்திற்கு உள்ளான நபரது உடலில் எந்த பகுதியில் மின் தாக்கம் ஏற்பட்டுள்ளது என்பதையும், காயத்திற்கான அடையாளர்கள் உள்ளனவா என்பதையும் கண்டறிய வேண்டும்.

4. **வறட்சி**

வறட்சி காலங்களில் மேற்கொள்ள வேண்டிய வழிமுறைகள்

- வறட்சியைப் போக்க சிறந்த வழி தண்ணீரைச் சேமிப்பதுதான். எனவே தண்ணீரைப் பாதுகாப்பதை உங்கள் அன்றாட வாழ்க்கையின் ஒரு பகுதியாகவும் பொறுப்பாகவும் கருதி செயல்படுங்கள்.
- சொட்டும் குழாய்களை சரிசெய்யவும். நீரில் உள்ள தாதுக்கள் உங்கள் குழாய்களை சேதப்படுத்தும் நீரை மென்மையாக்கும்.
- குறைந்த நீரை உபயோகிக்கிக்கும் ஏதுவான இந்திய முறையிலான கழிப்பறைகளை பயன்படுத்தலாம்.
- உங்கள் வீட்டில் நீர் இறைப்பாணை (மோட்டர் பம்பு) அவ்வப்போது சரிபார்க்கவும். நீர் தொட்டியில் நீர் நிறைந்தவுடன் தானாகவே மோட்டாரை நிறுத்தும் வகையில் அமைக்கவும்.
- பாரம்பரிய விதைகள் / செடிகள் மற்றும்/அல்லது வறட்சியைத் தாங்கும் புற்கள், தரை மூடாக்குகள், புதர்கள் மற்றும் மரங்களை நட வேண்டும். இந்த தாவரங்களுக்கு அதிக நீர்ப்பாசனம் தேவையில்லை.
- 🕨 நடைமுறையில் இருக்கும் இடங்களில் மழைநீர் சேகரிப்பைப் பராமரிக்க வேண்டும்.
- உங்கள் மரங்கள், புதர்கள் மற்றும் பூக்களுக்கு சொட்டுநீர் பாசனம் போன்ற திறமையான நீர்ப்பாசன முறையைத் தேர்வு செய்யவும்.

- மண்ணில் ஈரப்பதத்தைத் தக்கவைக்க மரங்கள் மற்றும் செடிகளைச் சுற்றி தழைக்கூளம் பயன்படுத்தவும்.
- > தேவையில்லாமல் கழிப்பறையை கழுவுவதைத் தவிர்க்க வேண்டும். திசுக்கள், பூச்சிகள் மற்றும் பிற கழிவுகளை கழிப்பறைக்குள் செலுத்துவதற்கு பதிலாகக் குப்பையில் அப்புறப்படுத்துங்கள்.
- உணவு பாத்திரங்களை இரண்டு வகையில் உபயோகிக்கலாம் ஒன்று சோப்பு நீர் மற்றும் மற்றொன்று சிறிய அளவு குளோரின் ப்ளீச் கொண்ட நீர்.
- குழாயில் இருந்து நேரடியாக தண்ணீரில் சுத்தம் செய்வதை விட தண்ணீர் நிரம்பிய பாத்திரத்தில் காய்கறிகளை சுத்தம் செய்யலாம்.
- தண்ணீரை மறுசுழற்சி செய்யும் வணிக நீதியான சுத்திகரிக்கப்பட்ட நீரைப் பயன்படுத்தலாம்.
- அவ்வபோது, தெளிப்பான்கள் அல்லது தண்ணீர் குழாய்களை சுத்தம் செய்ய வேண்டும்.
- மோசமான வறட்சியில், புல்வெளிகள் காய்ந்தாலும் பரவாயில்லை மரங்கள் மற்றும் பெரிய புதர்களைப் பாதுகாக்க வேண்டும்.

5. சுனாமி

சுனாமியின் போது செய்ய வேண்டியவை மற்றும் செய்யக்கூடாதவை:

சுனாமி எச்சரிக்கை வந்தவுடன் செய்ய வேண்டியவை

- திடமான கான்கிரீட் ஹோட்டல் கட்டமைப்புகளில் நீங்கள் பாதுகாப்பாக மூன்றாவது மாடி மற்றும் அதற்கு மேல் செல்லலாம். சுனாமி எச்சரிக்கை மற்றும் பேரிடர் திட்டங்கள், வெளியேறும் வழிகள் இவற்றை அறிந்துகொள்ள வானொலிகளை கேட்கவும்.
- பள்ளி மீட்புத் திட்டத்தில் உங்கள் குழந்தைகளை பள்ளியிலிருந்து அல்லது வேறு இடத்திலிருந்து அழைத்து வர வேண்டும்.

சுனாமியின் போது செய்ய வேண்டியவை

- அதிகாரிகள் வழங்கிய குறைந்தபட்ச உத்தரவை பின்பற்றி உடனடியாக வெளியேறவும். உங்கள் விலங்குகளை உங்களுடன் அழைத்துச் செல்லுங்கள்.
- கடல் மட்டத்திலிருந்து 100 அடி (30 மீட்டர்) உயரமுள்ள பகுதிகளைத் தேர்ந்தெடுக்கவும் அல்லது கடற்கரையிலிருந்து 2 மைல் (3 கிலோமீட்டர்) வரை செல்லவும்.
- சனாமி வருவதை பார்க்க கடற்கரையில் இறங்காதீர்கள் (உங்களை நீங்களே காப்பாற்றுங்கள் - உங்கள் உடைமைகளை அல்ல).
- சிறப்பு உதவி தேவைப்படும் கைக்குழந்தைகள், முதியவர்கள், கருவுற்ற தாய்மார்கள், மாற்றுத் திறனாளிகள் இவர்களையும் பொருப்புடன் காப்பாற்றுங்கள்.

சுனாமிக்கு பிறகு செய்ய வேண்டியவை

- 🕨 உள்ளூர் அதிகாரிகள் அறிவுரைக்கு பிறகுதான் வீடு திரும்ப வேண்டும்.
- காயங்களுக்கு உங்களை நீங்களே சரிபார்த்து, தேவைப்பட்டால் முதலுதவி செய்யுங்கள்.
- யாராவது மீட்கப்பட வேண்டும் என்றால், சரியான உபகரணங்களுடன் பயிற்சி பெற்ற நிபுணர்களை உதவிக்கு அழைக்கவும்.
- சிறப்பு உதவி தேவைப்படும் நபர்கள் கைக்குழந்தைகள், முதியவர்கள், போக்குவரத்து வசதி இல்லாதவர்கள், சிறப்புத் தேவைகள் உள்ளவர்கள் மற்றும் அவசர சூழ்நிலைகளில் கூடுதல் உதவி தேவைப்படுவோருக்கு உதவுங்கள்.
- சமீபத்திய அறிவுரைகளுக்கு கடலோர காவல்படை அல்லது உள்ளூர் வானொலி பயன்படுத்துவதைத் தொடரவும்.
- 🕨 ஒரு கட்டிடத்தை சுற்றி தண்ணீர் இருந்தால் அங்கு செல்ல வேண்டாம்.
- காயத்தைத் தவிர்க்க, பாதுகாப்பு ஆடைகளை அணியுங்கள் மற்றும் காயத்தை சுத்தம் செய்யும் போது கவனமாக இருங்கள். நீளமான பேன்ட், நீளமான சட்டை மற்றும் உறுதியான காலணிகளை அணியுங்கள்.
- சுனாமியால் சாலைகள், பாலங்கள் அல்லது பிற இடங்களை சேதப்படுத்தியிருக்கலாம். எனவே கவனமாக பயணிக்க வேண்டும்.
- பேரிடர் சூழ்நிலைகளில் தொலைபேசி இணைப்புகள் அடிக்கடி பழுதாகும். எனவே அவசர அழைப்புகளுக்கு மட்டும் தொலைபேசியை பயன்படுத்தவும்.

- பூகம்ப நடவடிக்கையால் கீழ் உடைந்த அல்லது சேதமடைந்த பைப்புகளில் வாயுகசிவு இருக்கலாம், மற்றும் சுனாமி வெள்ளம் மின் சுற்றுகள், அல்லது மூழ்கிய உலைகள் அல்லது மின் உபகரணங்கள். எரியக்கூடிய அல்லது வெடிக்கும் சூழ்நிலை ஏற்படலாம்.
- 🕨 வெள்ளத்தைத் தொடர்ந்து, தீ விபத்து ஏற்படும் ஆபத்தும் வரலாம்.
- விஷவாயு கசிவை சரிபார்க்கவும். நீங்கள் வாயு வாசனை அல்லது வெடிக்கும் சத்தம் கேட்டால், ஜன்னல்களைத் திறந்து அனைவரையும் விரைவாக வெளியேற்றுங்கள்.
- பேட்டரி மூலம் இயங்கும் விளக்குகள் பாதுகாப்பான மற்றும் பயன்படுத்த எளிதானது, மேலும் குடியிருப்பாளர்களுக்கோ அல்லது கட்டிடத்திற்கோ தீ ஆபத்தை அளிக்காது.
- தீப்பொறிகள் அல்லது உடைந்த கம்பிகளைக் கண்டால் அல்லது எரியும் வாசனை வந்தால், முக்கிய மின் இணைப்பை துண்டிக்கவும்.
- முதலில் ஒரு மின்பழுது சரிசெய்பவரை அழைக்கவும். சேவைக்குத் திரும்புவதற்கு முன் மின்சார உபகரணங்கள் சரிபார்க்கப்பட்டு உலர்த்தப்பட வேண்டும்.
- கழிவுநீர் மற்றும் நீர் வழித்தடங்களுக்கு சேதம் உள்ளதா என சரிபார்க்கவும். நிலநடுக்கத்தினால் பூமிக்கு கீழ் கழிவுநீர் குழாய்கள் சேதமடைந்ததாக நீங்கள் சந்தேகித்தால், கழிப்பறைகளைப் பயன்படுத்துவதைத் தவிர்த்து, பழுதாளரை அழைக்கவும். பெரிய நீர் குழாய்கள் சேதமடைந்தால், குடிநீர் வடிகால் வாரியத்தை தொடர்புகொண்டு பழுதினைசரி செய்யுங்கள்.
- உள்ளூர் சுகாதார அதிகாரிகளால் பாதுகாப்பானது என்று கூறினால் மட்டுமே குழாய் நீரைப் பயன்படுத்துங்கள்.
- காட்டு விலங்குகள், குறிப்பாக விஷப் பாம்புகள் தண்ணீருடன் கலந்து நீந்தி \geq கட்டிடங்களுக்குள் வந்திருக்கலாம். ക്രപ്തവകതണ குச்சியைப் குத்த ஒரு காப்பீடு கோரிக்கைகளுக்காக, பயன்படுத்தவும். கட்டிடம் மற்றும் அதன் உள்ளடக்கங்கள் இரண்டையும் சேதப்படுத்தும் படங்களை எடுக்கவும். ஜன்னல்கள் மற்றும் கதவுகளைத் திறந்து கட்டிடத்தை உலர வைக்கவும்.

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பேரிடரில் முதல் நிலை மீட்பாளர்களுக்கான பயிற்சி

கையேடு



மாவட்ட அளவிலான மூன்றாம் நிலை ஒரு நாள் பயிற்சி

தமிழ்நாடு பேரிடர் அபாய குறைப்பு முகமை

எழிலகம் இணைப்பு கட்டிடம், 5-வது தளம், சேப்பாக்கம், சென்னை

-05.

பொருளடக்கம்

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1. மீட்புப் பணிகள்

- மட்பு பணி நாம் நினைத்து பார்க்காத அசாதாரண சூழ்நிலைகளில் நடைபெறும் பணியாகும். விபத்தில் காயம்பட்டவர்களை அகற்றுவதற்கு பயன்படுத்தப்படும் முறைகள் விபத்து மற்றும் அதில் காயம் அடைந்தவர்களின் பாதிப்புகள் பொருத்து இருக்கும். சில மீட்பு நடவடிக்கைகளில் உயரமான மாடி கட்டிடங்களிலிருந்து விபத்துக்குள்ளானவர்களை கீழே இறக்க வேண்டும். மற்ற அறைகளில் உள்ள ஓட்டைகளின் வழியாகவோ அல்லது கீழ் தரையில் இருந்தோ சில நுட்பமான அணுகுமுறைகள் மூலம் அகற்ற வேண்டும். காயம் அடைந்தவர்களை கையாளப்படும் போது காயங்கள் இன்னும் அதிகமாகாமல் கவனமாக பார்த்து கொண்டு அவர்களை அங்கிருந்து அகற்ற வேண்டும்.
- அபாயகரமான தூழலில் இருந்து அவசரமாக வெளியேற்றப்பட்டாலும் கூட, முக்கியத்துவம் வாய்ந்த பாதுகாப்பு அம்சங்களை அறிந்து கையாள வேண்டும். விபத்துகள் மற்றும் காயங்களின் நிலை மற்றும் சாத்தியமான சூழ்நிலைகளை கவனமாக மதிப்பீடு செய்வதுடன் மேலும் கண்ணுக்கு தெரியாத பொருட்களால் கூடுதல் சேதங்கள் ஏற்பட வாய்ப்புகள் உள்ளதா என்று ஆராய வேண்டும்.
- அதிக காயம்பட்டவர்களை ஆம்புலன்ஸ் மற்றும் முதலுதவி சேவை மையங்களின் ஒப்படைக்கும் பொழுது அவர்களை கொண்டு செல்லும் வழிகளில் உள்ள குப்பை குவியல்களையும், மேடு பள்ளமான நிலபரப்பை தாண்டி செல்ல வேண்டி வரும் அப்போது கவனமாகவும், பாதுகாப்பாகவும் காயம்படாதவாறு கையாள வேண்டும்.
- ❖ பாதிக்கப்பட்டவர்களின் காயங்கள் மற்றும் சூழ்நிலைகளில் அங்கு கிடைக்க கூடிய உபகரணங்களை நிலைபாட்டைப் பொறுத்து மீட்புப் பணி நடைபெறுகிறது. மீட்புப் பணியில், தலைமைப் பொறுப்பில் உள்ளவர்கள் இறந்தவர்களையும், சாதாரணமாக உள்ளவர்களை காயம்பபட்டவர்களைப் போல் பாவித்து செய்யும் போது குழுவினருக்கு மனதளவில் தன்னம்பிக்கையும் வரும். வழிகாட்டுதல்களை நன்கு புரியும்படி கற்றுக்கொடுக்க வேண்டும். அவசர காலநேரங்களில் முடிவுகளை உடனடியாக தீர்மானிக்கவும். பல்வேறு குழுக்களில் குழு உறுப்பினர்கள் புரிந்து கொள்ளும் வகையிலும் பயிற்சி அளிக்க வேண்டும். அது மட்டுமின்றி மீட்பு பணியாளர்கள் காயம்பட்டவர்களை நெடுதூரம் எடுத்த செல்ல தகுதியுடையவர்களாக பயிற்சிகள் வழங்க உருவாக்க வேண்டும்.

உபகரணங்கள் அல்லாத மீட்பு நடவடிக்கை:-

இந்த பாடம் இரண்டு தலைப்புகளின் கீழ் கொண்டு வரப்பட்டுள்ளது.

(a) ஒரு மீட்பாளர் கையாளும் நுட்பங்கள்.

(b) இரு மீட்பாளர்கள் கையாளும் நுட்பங்கள்.

பின்வரும் நுட்பங்கள் அவசர தூழ்நிலையில் பயன்படுத்தவும், தீவிரமாக காயம் அடைந்தவர்களை ஸ்ட்ரெச்சரில் வைத்து எடுத்து செல்ல வேண்டும் என்பதையும், தீ விபத்து அல்லது கட்டட வீழ்ச்சி (Collapsed Building) போன்ற அபாயங்களில் முதலில் சம்பவ இடத்திலிருந்து காயம்பட்டவர்களை அகற்ற வேண்டியது முக்கியமான பணியாகும். சில சந்தர்பங்களில் உயிர்காக்க தொடர்ச்சியாக முதலுதவி கொடுப்பதற்கு முன் இந்த செயல்களை செய்ய நேரிடும்.

Single Rescuer Tecniques:-

Single rescure Human Crutch (ஊன்றுகோலாக)



இவ்வேலையை செய்ய இந்த முறையை பொறுத்த வரையில் உயிர் தப்பியோடும் நபர்களுக்கு சில உதவிகளை வழங்குவதற்கு தீவிரமாகவும் திறமையுடனும் இருக்க வேண்டும். கீழே உள்ள படத்தில் Single Rescuer எவ்வாறு மனித ஊன்று கோலாக பாவிக்க வேண்டும் என்பதை காட்டுகிறது. மீட்பாளரின் கரங்களில் நிலைப்பாட்டை கவனிக்க வேண்டும். ஒரு கையால் விபத்துக்குள்ளானவரின் வலது கையின் மணிக்கட்டிலும் மற்றொரு கையினால் அவரின் இடுப்பு பகுதியில் உள்ள உடைகளை பிடித்து கொள்ள வேண்டும். விபத்துக்குள்ளானவரின் உடல் காயம் உள்ள பக்கத்தை மீட்பதற்கு மிக அருகில் இருந்து அவருக்கு உதவ வேண்டும்.

PICK A BACK



முறையாக மேற்கொள்ளும் போது இது ஒரு சிறந்த முறையாகும். விபத்துக்குள்ளானவர் தூக்குபவரை விட பாரம் குறைவாக தான் இருப்பார். காயம் அடைந்தவரை இடுப்பு மீது மீட்பாளர் தூக்கும் போது அவருக்கு காயங்கள் எங்கெங்கு இருக்கிறது என உறுதி செய்ய வேண்டும். முழுவதுமாக தூக்கும் போது மூச்சு திணறல் ஏற்படா வண்ணம் தூக்க வேண்டும்.

Fine Fignter Crawl:-



தீ மற்றும் புகை மூட்டமாக உள்ள ஒரு கட்டிடத்தில் இருந்து அதில் பாதிக்கப்பட்டவரை தனி ஒருவராக அப்புறப்படுத்தும் முறை - கீழே உள்ள படத்தில் காண்பிக்கப்பட்டுள்ள படி தீ எரியும் கட்டடத்தில் இருந்து வெளியேறும் போது மீட்பவர் மற்றும் விபத்துக்குள்ளானவரின் தலைகள் கீழ்நோக்கி தாழ்வான பகுதியில் இருக்க வேண்டும். ஏனென்றால் அப்பகுதியில் தான் தெளிவான மற்றும் குளிர் தெளிவான மற்றும் குளிர்ச்சியான காற்று இருக்கும். மேலும் விபத்துக்குள்ளானவரின் முழு எடையும் மீட்பாளரின் மீது இருக்காது. மேலும் காயம் அடைந்தவர்களின் காயம் மேலும் காயம் ஆகாமல் இருக்க மீட்பாளர் கை, தோள்பட்டை, தலை, காயம்பட்டவரின் கரங்கள் படத்தில் இருப்பது போல் இருக்க வேண்டும். மீட்பாளரின் கை காயம்பட்டவரின் தலையை தாங்கி கொள்வதற்கு உதவுவதோடு இழுப்பதனால் ஏற்படும் காயங்கள் தவிர்க்கப்படும்.

Removal Down stain Method:-



- ஒரு பெரிய விபத்தில் உள்ளவரை மாடியிலிருந்து கீழே இறக்கி மீட்கும் முறை. இந்த நேரத்தில் மீட்டெடுப்பவர் பாதிக்கப்பட்டவரை முதுகில் சுமந்து செல்லுதல் அல்லது பிற முறைகளை பயன்படுத்தி படிகளில் இறங்க முடியாது. இது போன்ற சமயங்களில் பயன்படுத்தப்படும் இந்த முறையை மாடிப்படிகளில் கொண்டு வருவதற்கு மட்டும் பயன்படுத்துவதோடு நிறுத்திக்கொள்ள கூடாது.
- பாதிக்கப்பட்டவர் கட்டிடத்தில் படுத்து இருந்தால் முதலில் Triangular Bandage அல்லது துணியை கொண்டு இரண்டு கைகளிலும் மணிக்கட்டு வரை கட்ட வேண்டும். மேலும் பாதிக்கப்பட்டவரின் தலை பக்கத்தில் இருந்து அவரை தூக்கி அமர வைக்க வேண்டும். பின்பு அவரின் பின் பக்கமாக இருந்து பாதிக்கப்பட்டவரின் கட்டப்பட்ட மணிக்கட்டில் அருகில் இரண்டு கைகளால் பிடித்து தூக்க வேண்டும். மாடிப் படிகட்டின் வழியாக செல்ல வேண்டுமென முடிவெடுத்துப் பின்பு அதிக வலிமையுடன் இழுத்து செல்ல வேண்டும். அப்போது பாதிக்கப்பட்டவரின் உடல் பகுதியை தாங்கி பிடித்து கொள்ள முன்னங்கால் பயன்படுத்தி ஒவ்வொரு படியாக இறங்கும் போது ஒரு முறை தளர்த்தி மற்றொரு காலால் தாங்கி பிடிக்க வேண்டும். மேலும் மாடிப்படிகளுக்கு அருகில் இருக்கும் வழுவான சுவர்களை நினைவில் கொண்டு பின்புறமாக அவரை மீட்க வேண்டும்.

இரண்டு மீட்பாளர் நுட்பங்கள்: Two Rescuer Human Crutch

கீழே உள்ள படத்தில் காணும் முறையானது ஒரு மீட்பவரை ஊன்று கோலாக பயன்படுத்துவதை போன்றது, ஆனால் இதில் பாதிக்கப்பட்டவரை இருபுறமும் தாங்கி பித்து அவரின் கைகளை தோள் மேல் போட்டுக் கொள்வதோடு மற்றொரு கையால் அவரின் பின்புறம் உள்ள அவரின் உடலை எதில்- எதிர் பக்கமாக பிடித்து அழைத்து செல்ல வேண்டும்.



Two Handed Seat:-

பாதிக்கப்பட்டவர் உட்கார்ந்து இருக்கும் நிலையில் மீட்பாளார்கள் இருபுறம் மண்டியிட்டு முழுங்காலுக்கு கீழே ஒரு கையை வைக்க வேண்டும். இவ்விரு கைகளின் மணிக்கட்டிகளில் இருக்கமாக பிடித்துக்கொள்ள வேண்டும். மற்றொரு கையை பாதிக்கப்பட்டவரின் முதுகுக்கு பக்கமாக இரு கைகளை கோர்த்து அவரை தூக்கி செல்ல வேண்டும். அப்போது அந்த குழுவின் தலைவர் தூக்குவதற்கும், நடப்பதற்கும் ஆன கட்டளைகளை கொடுக்க வேண்டும்.





Three Handed Seat:

இந்த முறையானது மீட்புக்கு நல்ல ஆதரவாகவும், நியாயமான முறையில் வசதியாகவும் இருக்கவும், இது இரண்டு மீட்பு குழுவினரின் கைகள் உறுதியாகவும் இருக்க பயன்படுகிறது.

இரு முதல் மீட்பாளர் தனது இடது கையின் மணிக்கட்டில் வலது கையால் பிடித்துக்கொண்டு, இடது கையினால் இன்னொரு இரண்டாம் மீட்பாளரின் ஒரு கையின் மணிக்கட்டை பிடித்து கொள்கிறார். அவர் முதல் மீட்பாளரின் வலது கையினால் மணிக்கட்டை பிடித்து ஒரு இருக்கை போல் அமைத்து அதில் பாதிக்கப்பட்டவரின் Buttock .ல் கொடுத்து தூக்க வேண்டும். கீழே இருக்கும் படத்தில் இருப்பது போல



Four Handed Seat:

இரண்டு மீட்பாளரும் தனது இடது மணிக்கட்டினை இருக்க பிடித்து உருவாக்கும் இருக்கை அமைப்பு ஆகும். அது பாதிக்கப்பட்டவரை வசதியாக தூக்கி செல்லவும், மீட்பாளருக்கு குறைவான சுமையாகவும் இருக்கும். இந்த கோணங்களில் பாதிக்கப்பட்டவர் போதுமான சுயநினைவோடு மீட்பாளர்களை இருக்க பிடித்துக் கொள்ள வேண்டும்.



The Four and Aft Method :-

இது மிகவும் எளிதான வழி அதில் இரண்டு மீட்பாளர்கள் மயக்க நிலையில் உள்ள ஒரு பாதிக்கபட்டவரை கையாளுதல். பாதிக்கப்பட்டவரை மாடியில் இருந்து தூக்கிக் கொண்டு செல்லும் முறை அப்பொழுது அவரது மணிக்கட்டுகளை ஒன்றாக கட்டவேண்டும். முதல் மீட்பாளர் பாதிக்கப்பட்டவரின் பின் பகுதியில் செல்ல வேண்டும். பின்பு குனிந்து அவரின் முழுங்கால்களுக்கு அடியில் பிடித்து தூக்க வேண்டும். அப்போது அதற்கு உண்டாக கட்டளைகளின் படி தூக்கி, இறக்க வேண்டும். ஒருவேளை காயம்பட்டவரின் கால்களில் காயம் இருந்தால், இரு கால்களையும் குறுக்காக ஒரே பக்கமாக படத்தில் இருப்பது போல் போட்டு மீட்பாளர் ஒரு பக்கமாக இருந்து தூக்கி செல்ல வேண்டும்.



The Four - Rescuer Techniques:-

முதுகுத் தண்டு அடிபடாத பொழுது, நான்கு பேர் கொண்ட மீட்பு குழுவினர் எவ்வாறு ஸ்டெரச்சர் பயன்படுத்த வேண்டும் என்பதை பற்றி விபரம் பின்வருமாறு:

- காயம்பட்டவரின் தலை அல்லது காலுக்கு அருகாமையில் ஸ்டெரச்சர் தயார் நிலையில் வைத்துக்கொள்ள வேண்டும்.
- அணித்தலைவரின் உத்தரவின் படி 03 மீட்பு குழுவினர் காயம்பட்டவருக்கு ஓர்புறம் மண்டியிட்டு இருக்க வேண்டும். பிறகு ஒரே விதமாக காயம்பட்டவரின் தலைக்கு அருகில் நெருங்கி இருக்க வேண்டும்.
- குழுத்தலைவர் மீட்பு குழுவினருக்கு எதிர் முனையில் காயம்பட்டவரின் இடுப்புக்கு அருகில் மண்டியிட வேண்டும்.
- காயம்பட்டவரின் மூன்று பக்கங்களின் மீட்பு குழுவினர் தங்கள் கைகளை வைக்க, அணித்தலைவர் காயம்பட்டவரை அவர்கள் கைகளில் ஏற்றி விட வேண்டும்.
- தலைவரின் உத்தரவுக்கு மற்ற மூன்று மீட்பு குழுவினரும் காயம்பட்டவரைத் தூக்க வேண்டும்.
- மீட்பு குழுவினர் காயம்பட்டவரை தங்கள் முட்டி அளவிற்கு உயர்த்தி முட்டியோடு தாங்கி பிடிக்க வேண்டும். அணித்தலைவர் ஸ்டெச்சரை காயம்பட்டவருக்கு அடியில் வைக்க வேண்டும்.

- கடைசியில் கொடுக்கப்படும் கட்டளைகள்: கீழே இறக்க தயாராகுதல், கீழே இறக்கி வைத்தல்.
- மூன்று மீட்பு குழுவினரும் அணித்தலைவர் உத்தரவின் படி காயம்பட்டோரை ஸ்டெரச்சர் இறக்கி வைக்க வேண்டும்.



Blanket Lift: - நான்கு அல்லது ஆறு

- Blanket Lift என்பது ஒரு குறுகலான இடத்தில் இருந்து காயம்பட்டவரை தூக்கி அல்லது நகர்த்த பயனுள்ள முறையாகும்.
- ஒரே ஒரு போர்வையை பயன்படுத்தி ஒரு ஸ்டெரச்சர் (Stretcher) தயார் செய்து கொள்ள வேண்டும்.
- போர்வையை நீளவாக்கில் அதன் அகலத்தில் பாதி அளவு நீளம் உருட்டவும்.
- மீட்பு பணியில் ஈடுபடும் இருவர் அல்லது மூவர் காயம்பட்டவரின் இருபுறமும் மண்டியிட வேண்டும். காயம்பட்டவரை ஒரு புறமாக திருப்பி போர்வையில் நடுவே படுக்க வைக்க வேண்டும்.
- சுற்றி வைக்கப்பட்ட போர்வையில் காயம்பட்டவரை திருப்பி போர்வையின் நடுவே படுக்க வைக்க வேண்டும்.
- காயம்பட்டவருக்கு பாதுகாப்பு வழங்குவதற்காக சேதமடைந்த உடலுக்கு நெருக்கமாக போர்வையை கொண்டு போர்த்தி கொள்ளுதல் வேண்டும்.
- வழி நடத்தி செல்பவரின் உத்தரவிற்கு, காயம்பட்டவரை ஸ்டெரச்சர் கொண்டு இடுப்பு உயரத்திற்கு தூக்க வேண்டும்.
- வழி நடத்தி செல்பவரின் உத்தரவிற்கு காயம்பட்டவரை ஸ்டெரச்சர் உடன் கீழே இறக்க வேண்டும்.



Clothing Life:-

- இது அவசர கால முறையாகும். காயம்பட்டவரை நெருகடியான சூழலின் போது மீட்க பயன்படுத்தப்படுகிறது.
- Blanket மூலம் ஸ்டெச்சர் தயார் செய்து காயம்பட்டவரின் அருகில் வைக்க வேண்டும்.
- சுயநிலை இல்லாத காயம்பட்டவரின் கைகளை முக்கோண கட்டு துணி கொண்டு கட்ட வேண்டும்.
- 🛠 காயம்பட்டவரை திருப்பி துணியின் நடுவில் படுக்க வைக்க வேண்டும்.
- காயம்பட்டவருக்கும் ஒரு புறம் மீட்பு படையினரும் மறுபுறம் ஸ்டெரச்சரில் வைக்கப்பட்டுள்ளது.
- சாதரண கட்டளை வார்த்தைக்கு ஒன்று போல் தூக்கி ஸ்டெரச்சரில் படுக்க வைக்க வேண்டும்.



Specialist Lifting / Loading Devices:-

தூக்க / ஏற்ற / அதற்கு சிறந்த சாதனங்களான மரத்துண்டு அல்லது செயற்கை ஸ்பைனல் போர்டு ஸ்கூப் ஸ்டெரச்சர் மற்றும் முதுகு தண்டுவடம் நகராத உறுதியான சாதனங்கள் மீட்பு உபகரணம் வழங்குபவரிடர் உடனடியாக கிடைக்கும். உற்பத்தியாளரது விபர குறிப்பு அல்லது பரிந்துரையின் படி இந்த சாதனங்களை பயன்படுத்தவும்.

Lashing the Patient to the Structure :-

- பல சந்தர்ப்பங்களில், கடினமான இடங்களில் காயம்பட்டவர்களை பாதுகாப்பாக கையாள இந்த வகை பயன்படுத்தப்படுகிறது. எந்த ஒரு கடுமையான அல்லது அவசர சூழுலில் காப்பாற்றும் போது யாரேனும் இறந்த போகாமல் இருக்க முடியாது. ஆயினும் சந்தேகமாக இருந்தால் மீட்பு தன்மைக்கு பதில் அளிக்க வேண்டும். ஸ்டெச்சரில் கட்ட பயன்படுத்தபடும் கயிற்றின் அளவு சுமார் 12 மி.மீ அல்லது 11 to 12 மிமீ இருக்க வேண்டும்.
- ஸ்டெச்சர் கட்டுவதற்கு முதல் ஒரு பக்க கட்டையில் Figure of Eight Loop போட வேண்டும் பின் D முறையில் மூன்று Half Hitch நோயாளியின் மீதும் Structure மீதும் போட வேண்டும்.
 - 1. மார்பு பகுதியில்
 - 2. இடுப்பு பகுதியில்
 - 3. முட்டிப்பகுதியில்
- முதலில் இரண்டு காலின் பாதத்தையும் வட்டமாக சுற்றி விட்டு பிறகு இந்த மூன்று முடிச்சுகளையும் நோயாளி படுத்திருக்கும் பகுதிக்கு எதிர்புறம் வருமாறு கட்ட வேண்டும். இறுதியாக உள்ள முணையின் Structure –ன் மேல் முனை கைப்பிடியில் கட்ட வேண்டும்.
- மேலே கட்டப்பட்ட Half Hitch மூன்றில் ஏதேனும் உடலில் ஏற்பட்ட காயத்தினை அழுத்தினால் அதனை அதற்கு மேல் அல்லது கீழே கட்டலாம். பெண்களின் மார்பு பகுதியில் கட்டும் கட்டினை அதன் கீழ் அல்லது மேல் புறம் கட்டுவது கவனிக்கதக்கது.
- Structure உருவாக்கும் போது கட்டைகளில் கீழே கல் அல்லது மரகட்டைகளை வைத்து அதன் பின் Structure உருவாக்கினால் மிகவும் சுலபமாக இருக்கும்.



2. கிராம பேரிடர் மேலாண்மைத் திட்டம்

பேரிடர்கள் குறித்த முந்தைய கால அனுபவங்களை தெரிந்து கொள்ளுதல்

பேரிடரிலிருந்து மக்கள் தம்மைக் காத்துக் கொள்வதற்குப் பேரிடர் பற்றிய அறிவும், அதைச் சமாளிக்கும் திறன்களும் பெற்றிருக்க வேண்டும. மக்களைப் பாதிக்கும் ஏராளமான பேரிடர்கள் உள்ளன. அவை அனைத்தைப்பற்றியும் முழுமையாகத் தெரிந்திருக்க வேண்டும் என்றத் தேவையில்லை, மாறாக, மிகச் சிறந்த பேரிடர் மேலாண்மைக்கு அவர்கள் தங்களைத் தாக்கும் மீண்டும் மீண்டும் பேரிடர்களைப் பற்றி அறிந்திருந்தாலே போதுமானதாகும். இதற்கு முன் எந்த விதமான பேரிடர்கள் தங்கள் பகுதியை அச்சுறுத்தியது / தாக்கியது அதன் தாக்கம் எந்த விதமான விளைவுகளை ஏற்படுத்தியது அதன் தீவிரம். அது ஏற்படும் இழப்புகளின் எண்ணிக்கைகள் முதலியவற்றைக் கொண்டு முடிவு செய்ய வேண்டும்.

கிராமத்தின் பேரிடர் மேலாண்மை திட்டம் தயாரித்தல்

சமுதாயத்தோடு தொடர்பு ஏற்படுத்தலில் அடுத்தக் கட்டம் சம்பந்தப்பட்டக் கிராமத்தின் வளங்கள் குறித்த வரைபடத்தை உருவாக்கல் ஆகும். இதில் கிராமத்தின் எல்வைகள் அதன் இயற்கைவளங்களும் குறிக்ப்பட குறிக்கப்படுவதுடன் வேண்டும். கிராமத்தின் சாலைத்தொடர்புகள், குடிநீர்வசதி அமைப்புகள் குடியிருப்புகள் வீட்டு வகைகள், பாலின, வயது பிரிவினை அடிப்படையில் கிராம மக்கள்தொகை விபரம் நிலப்பயன்பாடு, தகவல் தொடர்பு அனைத்துவித ஏற்பாடுகள், பொதுச்சொத்துகள், போன்ற விபரங்களும் படஉருவில் உருவாக்கப்படவேண்டும். பின்னர் தேவைப்படும் பயன்பாட்டிற்காக விபரங்கள் குறியீடுகள் மூலமாகவும் எழுத்து மூலமாகவும் குறிக்கப்பட வேண்டும். வரைப்படத்தின் முன் தயாரிப்புகள் தரையில் மக்கள் பங்கேற்புடன் உருவாக்கப்பட்டு பின்னர் தாளில் எடுத்தெழுதப்பட வேண்டும். வள வரைப்படம் மற்றும் பாதிப்புப் பகுதிகள்/ பாதுகாப்பு பகுதிகள் பற்றிய வரைப்படம் வரைவதற்கு முன் கிராமத்தில் அனைத்துப் பகுதிகளையும் நடந்து சென்று பார்த்து அந்தந்த பகுதி மக்களிடம் பாதிப்பிற்குள்ளாகும் இடங்கள் / பாதுகாப்பான இடங்கள், வழித்தடங்கள் வரைபடம் தயாரித்தல்.

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கிராமத்தின் முந்தைய பேரிடர்கள் பற்றி அறிந்து ஏற்கனவே கிராமத்தை முன்னர் பாதித்த பேரிடர்களையும் அவை பாதித்த பகுதிகளையும் குறிக்கவேண்டும். பேரிடர் பாதிக்காத பகுதிகளையும் கட்டமைப்புகளையும் பாதுகாப்பான இடங்களாக வரைபடத்தில் குறிக்க வேண்டும். பேரிடர் நிகழ்வின் போது மக்கள் பாதுகாப்பாகத் திரும்பி வருவதற்கும் ஏற்ற வழித்தடங்கள் மற்றும் மாற்று வழித்தடங்களையும் வரைபடத்தில் குறிக்க வேண்டும். வழித்தங்களை அதிக பட்சமாக பயன்படுத்தும் எண்ணிக்கை, பாதுகாப்பான இடங்களில் தங்கும் இடத்தின் அளவு, அவற்றை அணுகும் பாதை வழிகள் முதலியவற்றையும் குறிக்க வேண்டும்.

கிராமத்தை பேரிடர்கள் தாக்கும் வாய்புகளையும், பாதிப்புகளையும் நிர்ணயித்தல்

பேரிடர் வரலாற்றை அறிந்து கடந்த காலங்களில் சம்பந்தப்பட்ட கிராமத்தை எந்த விதமான பேரிடர்கள் பாதித்துள்ளன என்பதை கண்டறிய வேண்டும் இதற்காக முந்தைய எழுத்து மூலமான பதிவுகளையும், அனுபவம் வாய்ந்த கிராம மக்களின் வாய்வழியாக கிடைக்கும் தகவல்களையும் பயன்படுத்திக் கொள்ள வேண்டும. இப்பேரிடர்கள் எந்த அறிகுறிகளுடன் தோன்றின? என்ன முன்னெச்சரிக்கை சமிக்ஞைகளை வெளியிட்டன? எத்தனை முறைகள் ஏற்பட்டன? என்ன தீவிரத்துடன் தாக்கின. அதன் விளைவு என்ன? என்பது போன்ற தகவல்களைப் பெற்று அப்பேரிடர்கள் அந்த கிராமத்தை எவ்வளவு தீவிரமாக தாக்கியுள்ளன, அதை தணித்திட / தவிர்த்திட எந்தெந்த வகையிலான தயார்நிலை மற்றும் தணிப்பு முயற்சிகள் தேவை என இறுதி செய்ய வேண்டும்.

பணிக்குழுக்களை முடிவு செய்தல்

செயல்முறைகள்

 பங்கேற்பாளர்களைக் கொண்டு சம்பந்தப்பட்ட கிராமத்தின் பேரிடர் வாய்ப்புகளை வரிசைப்படுத்தக் கூறவும். இதற்கு இக்கிராமத்தின் பேரிடர் வரலாறு விபரங்களைப் பயன்படுத்தவும்.

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- கிராமப் பேரிடர் வாய்ப்பு எண்ணிக்கைக்குக் தகுந்தவாறு பங்கேற்பாளர்களைக் குழுக்களாக பிரித்து ஒவ்வொரு குழுவிற்கும் ஒரு பேரிடரைப் பற்றி விவாதிக்கக் கூறவும்.
- 3. ஒவ்வொரு குழுவும் தமக்குரிய பேரிடர் கிராமத்தைத் தாக்கும் போகு ஏற்படும் விளைவுகளையும் அந்த விளைவுகளைத் தவிர்க்க / குறைக்க / தப்பிக்க மக்கள் என்னென்ன வேண்டும் நடவடிக்கைளை எடுக்க ഞ பட்டியலிடக் கூறுக தண்ணீர் (உதாரணமாக இடம் கண்டு பிடித்தல், ஏற்பாடு செய்தல் போன்ற நடவடிக்கைகள் அனைத்தையும் வரிசைப்படுத்தவும்).
- 4. வரிசைப்படுத்தப்பட்ட நடவடிக்கைகளைத் தம்முன் ஒன்றிற்கு ஒன்று தொடர்புள்ளது போல தோன்றுவனவற்றைத் தொகுத்து வகைப்பரிவுகளாக ஆக்கவும். இந்த வகைப்பிரிவுகளுக்கு அவற்றின் நடவடிக்களைப் பொறுத்துத் தகவல் குழு மீட்புக்குழு போன்று பெயரிடவும்.
- 5. சம்பந்தப்பட்ட கிராமத்திற்கு எத்தனைப் பணிக்குழுக்கள் தேவை என்பதை முடிவு செய்யவும், மொத்தத்தில் அனைத்து வகைப் பேரிடர்களுக்கும் தகவல் குழு, வெளியேற்றும் குழு, இருப்பிடக்குழு, முதலுதவி மற்றும் சுகாதாரக்குழு, மீட்புக்குழு, சேதமதிப்பீட்டுக் குழு, சடலம் அகற்றும் குழு, ஆற்றுப்படுத்தல் குழு போன்ற குழுக்கள் தேவைப்படலாம் என எடுத்துக்கூறவும்.
- 6. இக்குழுக்கள் தமக்கு ஒதுக்கப்பட்ட பணிகளையும் பொறுப்புகளையும் திறம்படச் செய்ய வேண்டியது அவசியம் எனவும், அதன் வழிகாட்டுதலின் கீழ் பாதிக்கப்படும் மக்கள் ஒருங்கிணைந்து செயல்பட வேண்டும் என்பதையும் வலியுறுத்தவும்.

கிராம பேரிடர் மேலாண்மை திட்டத்திற்கான வழிமுறைகள் (Preparation of Village Disaster Management Plan)

தேவைப்படும் பொருள்கள்: தாள்கள், வரைபடத் தாள்கள், வண்ண எழுதுகோல்கள் வழிமுறை:

1. பங்கேற்பாளர்கள் ஒவ்வொருவரிடமும் வெள்ளைத்தாள்களைத் தரவும்

- ஒவ்வொருவரிடமும் தங்கள் கிராமம் அவர்கள் எட்டு அல்லது பத்து வயது சிறுவன் / சிறுமியாக இருந்த போது எப்படி இருந்தது என்பதை ஒரு படம் வரைந்து காட்டச் சொல்லவும்.
- கிராமத்தின் இயற்கை அமைப்பு, பிரதான நில அடையாளங்கள் (கோயில், பள்ளி நிலப் பயன்பாடு முதலியவற்றை முக்கியமாக குறிப்பிடக் கூறவும்).
- 4. அதே போல் வரைப்படம் காலத்திற்கு தற்போதுள்ள காலத்திற்கும் இடையே, மக்கள் தொகை, தொழில்கள், வாழ்க்கை முறை, பழக்க வழக்கங்கள், இயற்கை அமைப்பு, உணவு முறை போன்றவற்றின் ஏற்பட்டுள்ள மாற்றங்களையும் குறிப்புகளாகக் குறிக்க கூறவும்.
- 5. இவற்றைச் செய்ய 20-30 நிமிட கால அவகாசம் தரவும்
- 6. கால அவகாசம் முடிந்தபின் அவரவர் தாளில் தமது பெயரை எழுதக்கூறி தாள்களை சேகரிக்கவும்.
- 7. வேறுபாடுகள் / வித்தியாசங்கள் அதிகம் காணப்படச்கூடிய 3 அல்லது 4 வரைப்படங்களைத் தேர்ந்தெடுத்து சம்பந்தப்பட்ட நபர்களை அழைத்து மற்றவர்களுக்கு விளக்கிக் கூறச் செய்யவும்.
- 8. இவ்வாறே அவரின் கிராமத்தில் ஏற்பட்ட மாற்றங்களையும் எடுத்து கூறச் செய்யவும், மற்ற பங்கேற்பாளர்களின் சிறு கேள்விகளுக்கு விளக்கமளிக்கக் கூறவும் இவ்வாறே இதர வரைபடங்களுக்கும் வழி நடத்தவும்.
- 9. ஒவ்வொரு சமர்ப்பிப்பின் போதும், இன்னும் என்னென்ன விபரங்களை வரைப்படத்தில் கொண்டு வந்திருக்கலாம் என்பதையும் சாலைகள் போன்றவற்றை நேராக வரையாமல் உண்மைத் தோற்றத்திற்கு வரைவது நன்று என்பதையும், அடையாளங்களைப் பயன்படுத்துவதின் மூலம் விபரங்களை விளக்குவது எப்படி என்றும் விளக்கவும். வரைப்படத்தில் ஒவ்வொருவரும் மேற்கொண்டதால் நல்ல உத்திகளை எடுத்துக் கூறவும்.
- 10. கிராம மாற்றங்களை எடுத்துச் கூறியதின் மூலம் வரலாற்றை எப்படி நிரல்பட எடுத்துரைப்பது எளிது என்பதைக் கூறவும் தனது கிராமத்தைத் தவிர இதர கிராமத்தின் வரலாற்றைக் கண்டறிவதில் எந்தெந்த செய்திகள் குறித்து கேள்விகள் கேட்க வேண்டும். இத்தகவல்களை எந்த மாதிரியான நபர்களிடமிருந்து பெறமுடியும் என்பதையும் வினவவும்.

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- 11. பிறகு தமிழ்நாடு மாநில வரைபட்த்தை வரைந்து ஒவ்வொருவராக அழைத்து அதில் ஆறுகள் பயிற்கள், குளங்கள், தேசிய நெடுஞ்சாலைகள், இரயில்தடங்கள், முக்கிய கோயில்கள், அருவிகள் போன்றவற்றை ஏதாவது குறிகளைக் கொண்டு குறிக்கக்கூறகவும், பிறகு இக்குறீயீடுகளை வரைபடத்தில் பக்கத்தில் விளக்கமுடன் எழுதக்கூறி அதன் பயன்பாட்டு எளிமையை எடுத்துக்கூறவும்.
- 12. அனைவரும் சேர்ந்து வரைபடம் வரைவது புதிரானதல்ல என்றும், அனைவராலும் வரைய முடியும் என்பதையும் எடுத்துக்கூறவும்.
- 13. பின்னர் ஒரு கிராமத்தின் வளவரைப்படத்தில் என்னென்ன அம்சங்கள் இருக்க வேண்டும் என்று பங்கேற்பாளர்களிடமிருந்தே வினவிப் பட்டியலிடவும். மேலும் இயற்கைவளம், மனிதவளம், கிராமத் தொடர்பு வசதிகள், பொது நிறுவனங்கள், மக்கள் அமைப்பு நிறுவனங்கள், மக்கள் தொகை போன்ற வகைப்பிரிவுகளின் கீழ் என்னென்ன விபரங்களைத் திரட்டமுடியும் என்பதையும் வினவிப் பட்டியலிடவும்.
- 14. கிராம வளவரைபடம் தயாரிக்கையில் ஈடுபடுத்தப்பட வேண்டிண மக்கள் பிரிவினரையும் அவர்களிடமிருந்து எந்தவிதமான தகவல்ள் கிடைக்கும் என்பதையும் நிர்ணயிக்கவும்.
- 15. பின்னர் பங்கேற்பாளர்களைக் கிராமத்திற்கு இட்டுச் செல்லவும் பங்கேற்பாளர்களைக் குழுக்களாகப் பிரிக்கவும் முதல் குழுவை கிராமத்தின் சாலைகள் மற்றும் பிரதான அடையாளங்கள், பொதுச் சொத்துக்கள், வீடுகள், நீர் நிலைகள் போன்றவற்றை வரையும் படியும், இரண்டாம் குழுவைக் குடும்பங்கள் ஜனத்தொகை, ஆண் பெண் குழந்தைகள் வகைப்பிரிவு கிராமப்புற வசதிகள் (குடிநீர், மின்இணைப்பு, வீட்டு உபயோகப் பொருள், வானம் போன்றவற்றையும் மூன்றாவது குழுவை பள்ளமான இடங்கள், தீப்பற்றக்கூடிய குடியிருப்புகள், கழிவுகள் சேரும் இடங்கள், பயிற் செய்துள்ள இடங்கள் வோன்ற பேரிடர் பாதிப்பிற்கு உள்ளாகும் இடங்கள் / பொருள்கள் / கூட்டமைப்புகளையும், மேடான இடங்கள், பாதுகாப்பான இடங்கள், பாதுகாப்பான சாலைகள் போன்றவற்றையும் கண்டறிந்து பட்டியலிடும்படியும், மூன்றாவது குழு முன்பு இக்கிராமத்தைத் தாக்கியப் பேரிடர்களின் வகை அவை நடந்த ஆண்டு, பருவம், மீண்டும் மீண்டும் எத்தனை முறை தாக்கியது, அதன் தீவிரம் அதனால் ஏற்பட்ட பொருள் மற்றும் உயிர்சேதங்களின் எண்ணிக்கை, தாக்கிய பகுதிகள் போன்றவற்றை குறிக்கச் சொல்லவும்.

- 16. நான்கு குழுக்களின் இப்பணிக்குப் போதுமான கால அவகாசம் தரவும் பின்னர் ஒவ்வொரு குழுவிடமும் அவர்கள் வரைந்ததை சமர்பிக்கக் கூறவும், பங்கேற்பாளர்களின் சிறு வினாக்களுக்கு சமர்ப்பிப் பேரிடமிருந்து விளக்கம் பெறவும். வரைபடத்தயாரிப்வில் அவர்களின் அனுபவங்களையும் படிப்பினைகளையும் கூறச் செய்யவும்.
- 17. பின்னர் நான்கு வரைபடங்களையும் ஒன்றிணைத்து ஒரே வரைப்படமாக்கவும், இந்த வரைபடமே பேரிடர் மேலாண்மைக்கு திட்ட வரைபடம் என்பதை விளக்கிக் கூறவும்.

பேரிடர் வரலாறு

ഖ.	நிகழ்ந்த	நிகழ்ந்த	ஏற்பட்ட சேதங்கள்			
റൽ	பேரிடர்	ஆண்டு	சொத்து	உயிர்கள்		சேதமடைற்த
						பொதுச் சொத்து
1	வெள்ளம்	1972 ஐப்பசி	20 കേ.ഞ്യ	1பெண்	13	பாலம்
	(கன மழை)	மாதம்	வீடுகள் 10	2	ஆண்டுகள்	உடைந்தது,
			ஓட்டு	குழந்தைகள்	1மாடு	சாலை அரிப்பு,
			வீடுகள்			குளம்
						உடைந்தது
2	வெள்ளம்	1685	3 കേത്വ	-	5 ஆடுகள்	சாலை அரிப்பு
	(கன மழை)	கார்த்திகை	வீடுகள் 1			
		மாதம்	ஓட்டு			
			வீடுகள்			
3	புயல்	1990	60 കുത്വ	2 ஆண்கள்	17 மாடுகள்	சாலை அரிப்பு
		ക്യഖത്തി	வீடுகள்	1பெண்	5 ஆடுகள்	மின் கம்பங்கள்
		மாதம்	40 ஓட்டு			பள்ளிக்கூடம்
			வீடுகள்			
			10 ஏக்கர்			
			வாழை			

3. பணிக்குழுக்களுடனான ஒருங்கிணைப்பு (Co-ordination with Line Department)

பேரிடர் வரலாற்றிலிருந்து கிராமத்தின் பேரிடர் தாக்கும் வாய்ப்புகளையும் அதன் விளைவுகளையும் கண்டறிந்து நிர்ணயித்தபின், ஒரு பேரிடர் எச்சரிக்கையின் போது அல்லது பேரிடர் தாக்கத்தின் போது எந்த விதமான எதிர்வினைகள் தேவைப்படுகின்றன என்பதையும் அதற்கான சிறுசிறு நடவடிக்கைகள் எவை என்பதைப் பற்றியும் சிந்தித்துப் பட்டியலிட வேண்டும்.

செய்தி தெரிவித்தல், வெளியேற்றுதல் போன்ற எதிர்வினைகள் தம்முன் சிறுசிறு வேலைகளைக் கொண்டுள்ளன. அந்த வேலைகளை வரிசைப்பட உருவகித்துக் குறிப்பிட்ப் பேரிடரின் போது குறிப்பிட்டக் கிராமத்திற்கு எந்த விதமான வேலைகள் நடத்தப்பட வேண்டும் என்பதை முடிவு செய்ய வேண்டும். இந்த வேலைகள் பற்றியப் பட்டியலை உருவாக்குவது அக்கிராமத்திற்கு எத்தனைப் பணிக்குழுக்கள் தேவை என்பதையும், எந்த மாதிரியான பணிக்குழுக்கள் தேவை என்பதையும் முடிவு செய்யும்.

பேரிடர் சமிக்னஞகளைக் கண்டறிதல் அதன் உண்மைத் தன்மையை உறுதிப்படுத்தல், மற்றவர்களுக்கு தகவல் சாதனங்கள் மூலம் தெரிவித்தல், பாதுகாப்பு இடங்களைத் தயார்படுத்தல், மக்களைப் பாதுகாப்பிடங்களுக்கு கொண்டு செல்லல், தண்ணீர், ஏரிப்பொருள், உணவு, கழிப்பாறை வசதி செய்தல், நோய் தடுத்தல், சுகாதார ஏற்பாடுகளைக் கவனித்தல், காயம்பட்டவர்களை மீட்டல், முதலுதவி தருதல், வெளியேற்றுதல், இடிபாடுகளை நீக்குதல், சேதங்களை மதிப்பிடுதல், அரசு உதவிக்கு ஏற்பாடு செய்தல், ஆறுதல் செய்தல் போன்றவை பேரிடர் சூழலில் பொதுவாக தேவைப்படும் வேலைகளாகும்.

இவ்வேலைகளைத் தம்முன் தொடர்புள்ளவைகளை ஒன்றிணைத்து அவற்றை ஒருங்கிணைத்து செயல்பட ஏற்ற பணிக்குழுக்களை உருவாக்க வேண்டும். இப்பணிக் குழுக்களின் எண்ணிக்கை அக்கிராம பேரிடர்களின் வகையைப் பொருத்து அமையும்.

பேரிடர் வாய்ப்பிற்கு ஏற்பப் பணிக்குழுக்களை அமைக்க வேண்டும். பணிக்குழுக்கள் செய்ய வேண்டிய வேலைகளுக்கு ஏற்ப அதன் உறுப்பினர்கள் அமைய வேண்டும், உறுப்பினர் தகுதியை நிர்ணயிக்கும் போது சம்பந்தப்பட்ட பணிக்குழுவின் வேலைகளுக்கு அவரின் வயது, கல்வி நிலை, சமூக அந்தஸ்து, உடல்நிலை போன்ற கூறுகள் எந்த அளவிற்கு பங்களிக்கக் கூடும் எனக்கண்டு நியமிக்க வேண்டும்.

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அதேபோல் பணிக்குழுக்களின் பொறுப்புகளும் வரையறுக்கப்பட்டு, குழுவின் அனைத்து உறுப்பினருக்கும் அது தெளிவாக எடுத்துரைக்கப்பட வேண்டும். பொதுவாக அனைத்து வித பணிக்குழுக்களிலும போதுமான எண்ணிக்கையில் பெண்கள் பிரதிநிதித்துவம் இருப்பது மிக முக்கியம். ஒதுக்கப்படல் நிகழாது இருக்க (Exclusion) தலித் போன்ற மக்கள் பிரிவினரையும் உட்கொண்டு வரவேண்டும்.

செயல்முறை

- பங்கேற்பாளர்களைக் கொண்டு பேரிடர் வாய்ப்பிற்கு ஏற்பத் தேவைப்படும் பணிக்குழுக்களை முடிவு செய்யவும்.
- 2. பணிக்குழுக்களின் வேலையின் தன்மைக்கு ஏற்பக் குழு உறுப்பினர்களை முடிவு செய்யவும்.
- 3. மனித வள பட்டியலைப் பயன்படுத்தி ஒவ்வொரு குழு உறுப்பினரையும் முடிவு செய்யவும்
- பொருத்தமான தேவையான குழுக்களில் பெண்களை உறுப்பினர்களாக வைத்திருக்க அறிவுரை கூறவும்.
- அரசு தொடர்பு கொள்ளும் குழுக்களில் அதிகாரம் பெற்றிருப்போரை உறுப்பினராக்கி நிறுவனத் தொடர்புகளை உருவாக்கவும்.
- 6. பின்னர் ஒவ்வொரு குழுவின் பொறுப்பினையும் அவர்களிடம் இருக்க வேண்டிய பொருள்கள் / தகவல்கள் போன்றவற்றை விவரிக்கவும். (எடுத்துக்காட்டு)

ଢଜ	பொறுப்புகள்		இருக்க வேண்டிய பொருள்கள்
தகவல் குழு -	தகவல் பெறுதல்	-	கிராம வரைபடங்கள்
-	தகவலைச் சரிபார்த்தல்	-	பேரிடர் மேலாண்மைத் திட்டம்
-	தகவல் தரல்	-	அனைத்து தொடர்பு முகவரிகள்
-	தகவல் சாதனங்களை	-	தகவல் தொலைபேசி எண்கள்
	பராமரித்தல்	-	வெளியேறும் தடங்கள்
		-	பாதுகாப்பான இடங்கள் பற்றிய விபரங்கள்

பணிகுழுக்கான பயிற்சிகள்

ஒவ்வொரு பணிக்குழுவும் குறிப்பான வேலைகளை திறமையாகவும், சிறப்பாகவும் செய்ய பயிற்சிகள் மிகவும் தேவை. இப்பயிற்சிகள் தரம் வாய்ந்ததவையாகவும் தொடர்ந்து கிடைத்தும் வரவேண்டும். இப்பயிற்சிகளை பணிக்குழுக்களில் புதிதாக பொறுப்புக்கு வந்தவர்களுக்கும் வழங்கப்பட வேண்டும். இப்பயிற்சிகளை தலைமைப் பயிற்சி நிறுவனங்களிலிருந்து பெறுவதே கட்டுப்படியாகக்கூடியதும் மற்றும் நீடித்துச் செல்வதும் ஆகும்.

சுகாதாரத்துறை, தீயணைப்புத்துறை, அரசுத்துறைகள், செஞ்சிலுவைச் சங்கம் போன்றத் துறைகளையும் நிறுவனங்களையும் பயிற்சி மையங்களாகக் கொண்டு பணிக்குழுக்கள் பயிற்சியை ஏற்பாடு செய்ய வேண்டும்.

பல்வேறு கிராமத்தில் ஒத்த பணிக்குழுக்களை, ஒற்ணைத்துப் பயிற்சி தருவது, பயிற்சியின் செலவை மிகக்குறைவாக வைத்துக் கொள்வதுடன், மிகக் குறுகிய காலத்தில், அதிய நபர்களுக்கு பயிற்சியை விரிவுபடுத்த முடியும்.

- பங்கேற்பாளர்களைக் கொண்டு ஒவ்வொரு பணிக்குழுவிற்கும், அது ஆற்றவேண்டிய பொறுப்புகளைப் பொறுத்து எந்தவிதமான பயிற்சி தேவைகள் உள்ளன என முடிவு செய்யவும்.
- இந்தப் பயிற்சித் தேவைகளை, எந்தப் பயிற்சி நிறுவனங்களைத் தொடர்பு கொள்வதன் மூலம் நிறைவு செய்து கொள்ளலாம் என விவாதிக்கவும்.

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- 3. பயிற்சி நிறுவனங்களில் முதன்மையானவற்றையும் அரசு துறைசார்ந்ததையும் முதன்மைப்படுத்தவும் இலவசமாக பயிற்சி தரும் தொண்டு நிறுவனங்கள் மற்றும் சேவை அமைப்புகளையும் இப்பட்டியல் இணைத்துக் கொள்ளவும்.
- பயிற்சி பெறுவோருக்கான சரியான எண்ணிக்கையை முடிவு செய்யவும் இந்த எண்ணிக்கை வருவதற்கு வெவ்வேறு கிராமக்குழுக்களை ஒன்ணுணைத்துப்
- பயிற்சி நிறுவனங்கள் பயிற்சியளிக்கும் காலங்களை மனதில் கொண்டு குழுக்கான பயிற்சித் திட்டத்தினை தயாரிக்கவும்.
- பயிற்சிகளுக்குப் பொறுப்பானர்களை நியமிக்கவும் அவர்களின் செயல்திட்டத்தைக் கண்காணிக்கவும்.

COURSE MANUAL

Introduction to Disaster Management



Virtual University for Small States of the Commonwealth (VUSSC) Disaster Management Version 1.0

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Acknowledgements

What is the Virtual University for Small States of the Commonwealth (VUSSC)? VUSSC provides some of the smallest countries with stronger economic opportunities through improved access to quality education. Through the VUSSC, learners from island nations in the Caribbean, Pacific, Mediterranean and the Indian Ocean, as well as small countries in Africa, gain online access to open educational resources (OERS) designed to meet the development needs of participating countries. These non-proprietary course materials are used in the offering of credit-bearing qualifications at postsecondary institutions in the participating countries, strengthening their educational capacity and outreach. The courses will eventually be made more widely available for adaptation and use.

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About this course manual

Introduction to Disaster Management has been produced by the Virtual University for the Small States of the Commonwealth (VUSSC) team. All course manuals produced by the VUSSC team are structured in the same way, as outlined below.

How this course manual is structured

The course overview

The course overview gives you a general introduction to the course. Information contained in the course overview will help you determine:

- If the course is suitable for you.
- What you will already need to know.
- What you can expect from the course.
- How much time you will need to invest to complete the course.

The overview also provides guidance on:

- Study skills.
- Where to get help.
- Course assignments and assessments.
- Activity icons.
- Units.

We strongly recommend that you read the overview *carefully* before starting your study.

The course content

The course is broken down into units. Each unit comprises:

- An introduction to the unit content.
- Unit outcomes.



- New terminology.
- Core content of the unit with a variety of learning activities.
- A unit summary.
- Assignments and/or assessments, as applicable.

Resources

For those interested in learning more on this subject, we provide you with a list of additional resources at the end of each module; these may be books, articles or web sites.

Your comments

After completing Introduction to Disaster Management we would appreciate it if you would take a few moments to give us your feedback on any aspect of this course. Your feedback might include comments on:

- Course content and structure.
- Course reading materials and resources.
- Course assignments.
- Course assessments.
- Course duration.
- Course support (assigned tutors, technical help, etc.)

Your constructive feedback will help us to improve and enhance this course.



Course overview

Welcome to Introduction to Disaster Management

All communities are vulnerable to disasters, both natural and man-made. This first-year University level course was designed by experts from throughout the world to increase knowledge of disaster management, with the aim of reducing this vulnerability and improving disaster responsiveness. We hope that you will find these learning materials stimulating, enjoyable and useful.

Introduction to Disaster Management—is this course for you?

This course is intended for people who require an introductory-level understanding of the concepts underpinning, and practical processes involved in, the management of disasters.

You do not need any prior knowledge of the topic, although your own personal experiences or those of other people in your community will be very valuable in your learning.

Course outcomes

Upon completion of Introduction to Disaster Management you will be able to:



Outcomes

- Define and describe disaster management, hazard, emergency, disaster, vulnerability, and risk;
- Identify and describe the types of natural and non-natural disasters and the implications of disasters on your region and environment;
- *List and describe* the main hazards to which your region is, or may be, vulnerable;
- Define the various phases of the disaster management cycle;



- Explain the importance of disaster mitigation and disaster preparedness;
- Describe how disaster management can be integrated into public policy and how planning and design of infrastructure should take into account the vulnerability of communities;
- Develop and write an emergency operations plan (EOP);
- State and explain the importance of the Community-Based Approach to education and public awareness;
- Describe how a community-based action plan for disaster management can be actively implemented;
- Describe how and why training personnel to acquire skills and knowledge are essential in mitigating the impact of disasters;
- Recognise the contribution and participation of volunteer agencies;
- Define the contents of a school-based programme on disaster management;
- Define and explain how culture contributes to people's response to education and public awareness programmes;
- Compare the importance of indigenous knowledge in education and public awareness on disaster management;
- Define Emergency Management Systems (EMS);
- Identity how the EMS assists in hazardous material management, emergency medical services, and response and recovery operations;
- Explain how Global Information Systems (GIS) Global Positioning Systems (GPS) technology are utilised within all phases of the disaster management cycle;
- State the advantages and disadvantages of using Remote Sensing Systems (RSS) in disaster management;
- Explain the role of the media in disaster management;
- State the advantages and disadvantages of using Remote Sensing Systems (RSS) in disaster management;
- Identify the components involved in emergency medicine;
- Describe a suitable infrastructure and procedures in accessing emergency medicine services;
- Identify the main communicable diseases common in disaster situations; the risk factors that increase the likelihood of an outbreak and ways of preventing/minimising such outbreaks;



- *Explain* the importance of water sources and the minimum standards for water quality and quantity;
- Describe processes to monitor and evaluate vector control measures and environmental health programmes in emergency situations;
- State the impacts of a disaster on society;
- Develop contingency plans to minimise food distribution problems in the post-disaster period;
- Assess the impacts of disaster on people's income, earning capacity and overall social welfare;
- *Identify* the stages of disaster recovery and associated problems;
- Identify and list the most vulnerable groups in disaster and post-disaster times;
- *Describe* briefly how we can reduce the effects of disasters on vulnerable groups.

Timeframe



How long?

The expected total learning time for this course is 90 hours, over one semester, although the duration could be extended depending on the requirements of your institution.

Formal study time would be expected to be about 4 hours per module, or 56 hours in total.

Another 34 hours of self-study time is recommended.

Study skills

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As an adult learner your approach to learning will be different to that from your school days: you will choose what you want to study, you will have professional and/or personal motivation for doing so and you will most likely be fitting your study activities around other professional or domestic responsibilities.

Essentially you will be taking control of your learning environment. As a


consequence, you will need to consider performance issues related to time management, goal setting, stress management, etc. Perhaps you will also need to reacquaint yourself in areas such as essay planning, coping with exams and using the web as a learning resource.

Your most significant considerations will be *time* and *space* i.e. the time you dedicate to your learning and the environment in which you engage in that learning.

We recommend that you take time now—before starting your selfstudy—to familiarize yourself with these issues. There are a number of excellent resources on the web. A few suggested links are:

http://www.how-to-study.com/

The "How to study" web site is dedicated to study skills resources. You will find links to study preparation (a list of nine essentials for a good study place), taking notes, strategies for reading text books, using reference sources, test anxiety.

http://www.ucc.vt.edu/stdysk/stdyhlp.html

This is the web site of the Virginia Tech, Division of Student Affairs. You will find links to time scheduling (including a "where does time go?" link), a study skill checklist, basic concentration techniques, control of the study environment, note taking, how to read essays for analysis, memory skills ("remembering").

http://www.howtostudy.org/resources.php

Another "How to study" web site with useful links to time management, efficient reading, questioning/listening/observing skills, getting the most out of doing ("hands-on" learning), memory building, tips for staying motivated, developing a learning plan.

The above links are our suggestions to start you on your way. At the time of writing these web links were active. If you want to look for more go to <u>www.google.com</u> and type "self-study basics", "self-study tips", "self-study skills" or similar.



Need help?



Help

Is there a course web site address?

What is the course instructor's name? Where can s/he be located (office location and hours, telephone/fax number, e-mail address)?

Is there a teaching assistant for routine enquiries? Where can s/he be located (office location and hours, telephone/fax number, e-mail address)?

Is there a librarian/research assistant available? Where can s/he be located (office location and hours, telephone/fax number, e-mail address)?

Is there a learners' resource centre? Where is it located? What are the opening hours, telephone number, who is the resource centre manager, what is the manager's e-mail address)?

Who do learners contact for technical issues (computer problems, website access, etc.)

Assignments



There are seven assignments set for modules 2-7 and module 9 of this course. You will need to spend about two hours on each of these assignments.

Assignments

[How are the assignments are to be submitted?]

[To whom should the assignments be submitted?]

[What is the schedule for submitting assignments? End of each unit? Specific dates?]

[What is the order of the assignments? Must they be completed in the order in which they are set?]



Self-Assessments



Assessments

There is a self-assessment exercise for each of the 14 modules in this course which you can use to make sure that you have understood the key concepts in this course. You should spend about one hour on each self-assessment exercise.

Are they self-assessments or teacher-marked assessments?

When will the assessments take place?

How long will the assessments be?

How long will learners be allowed to complete the assessment(s)?

How long will it take a teacher to mark the assessment(s)?



Getting around this course manual

Margin icons

While working through this course manual you will notice the frequent use of margin icons. These icons serve to "signpost" a particular piece of text, a new task or change in activity; they have been included to help you to find your way around this course manual.

A complete icon set is shown below. We suggest that you familiarize yourself with the icons and their meaning before starting your study.

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Activity	Self- Assessment	Assignment	Case study
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Discussion	Group activity	Help	Note it!
0			Þ
Outcomes	Reading	Reflection	Study skills
/িট	ABC	\bigcirc	
Summary	Terminology	Time	Тір



Unit 1

Overview of Disaster Management

Introduction

This unit looks at definitions, terminologies, and types of potential hazards (including natural and non-natural disasters); understanding disasters, their causes and implications; and the contents of an effective disaster management plan.

Upon completion of this unit you will be able to:

- *Define and describe* disaster management, hazard, emergency, disaster, vulnerability, and risk.
- *Distinguish* between an emergency and a disaster situation.
- *Identify and describe* the types of natural and non-natural disasters.
- *List and describe* the main hazards to which your region is, or may be, vulnerable.
- Identify and briefly discuss implications of disasters on your region and environment.



Outcomes

Disaster Management:

Terminology

Is more than just response and relief (i.e., it assumes a more proactive approach)

Is a systematic process (i.e., is based on the key management principles of *planning*, *organising*, and *leading* which includes *coordinating* and *controlling*)

Aims to reduce the negative impact or consequences of adverse events (i.e., disasters cannot always be prevented, but the adverse effects can be minimised)

Is a system with many components (these components will be discussed in the other units)





Hazard:	"Is the potential for a natural or human-caused event to occur with negative consequences" (key words)
	A hazard can become an emergency; when the emergency moves beyond the control of the population, it becomes a disaster.
Emergency:	"Is a situation generated by the real or imminent occurrence of an event that requires immediate attention" (key words)
	Paying immediate attention to an event or situation as described above is important as the event/situation can generate negative consequences and escalate into an emergency. The purpose of planning is to minimize those consequences.
Disaster:	"Is a natural or human-caused event which causes intensive negative impacts on people, goods, services and/or the environment, exceeding the affected community's capability to respond" (key words)
Risk:	"Is the probability that loss will occur as the result of an adverse event, given the hazard and the vulnerability" (key words)
	Risk (R) can be determined as a product of hazard (H) and vulnerability (V). i.e. $R = H \times V$
Vulnerability:	"Is the extent to which a community's structure, services or environment is likely to be damaged or disrupted by the impact of a hazard" (key words)
Types of Vulnerability	Characteristics
Tangible/Material	People – lives, health, security, living conditions
(easy to see, value easily determined)	Property – services, physical property loss, loss of use
	Economy – loss of products and production, income
	Environment – water, soil, air, vegetation, wildlife
Intangible/Abstract (difficult to see; value difficult to determine)	Social structures – family and community relationships
	Cultural practices – religious and agricultural
	Cohesion – disruption of normal life
	Concision – disruption of normal me

Figure 1: Types of Vulnerability





Vulnerability	Contributing Factors
Poverty	People who are already in a depressed state are less able to recover. Some people are even more vulnerable – pregnant women, children and the disabled.
Population growth	Population has grown dramatically over the past decade
Rapid urbanisation	Growing concentration around the capital. For example, two-thirds of the Samoan population lives in Apia.
Transition in cultural practices	Increase in sub-standard housing in more heavily populated urban areas. Changes in traditional coping mechanisms – declines in self-reliance, food conservation and preservation, warning systems etc.
Environmental degradation	As resources are consumed, vegetation cover removed, water polluted and air fouled, a country is more vulnerable to a disaster.
Lack of awareness and information	When people and government officials are unaware or lack information about disaster management, they fail to take appropriate actions.
Civil Strife and unrest	Resources are consumed, people are in a stressed situation, and transportation is restricted.
Geographical isolation	Island countries are disadvantaged by their relative remoteness, particular their limited access to schools, health and cash.
High disaster impact	Limited economies (tourism, agriculture). Disaster impact can affect an entire economy.
Political uncertainties/instability	Changing government policies, changing personnel in the national focal point, economic weakness all can contribute to an effective national disaster management programme.

Figure	2.	Contributing	Factors	to	Vulnerability
rigure	4:	Contributing	ractors	w	vumerability



Distinguishing between an emergency and a disaster situation

An emergency and a disaster are two different situations:

- An *emergency* is a situation in which the community is capable of coping. It is a situation generated by the real or imminent occurrence of an event that requires immediate attention and that requires immediate attention of emergency resources.
- A *disaster* is a situation in which the community is incapable of coping. It is a natural or human-caused event which causes intense negative impacts on people, goods, services and/or the environment, exceeding the affected community's capability to respond; therefore the community seeks the assistance of government and international agencies.

Types of natural and non-natural disasters

Disasters are often classified according to their:

- a causes natural vs. human
- b speed of onset sudden vs. slow

An excellent summary of frequently asked questions can be found at the Global Development Research Centre's website (Srinivas, 2005).

A. CAUSES

1 Natural Disasters

These types of disaster naturally occur in proximity to, and pose a threat to, people, structures or economic assets. They are caused by biological, geological, seismic, hydrologic, or meteorological conditions or processes in the natural environment (e.g., cyclones, earthquakes, tsunami, floods, landslides, and volcanic eruptions).

a Cyclones, Hurricanes or Typhoons

Cyclones develop when a warm ocean gives rise to hot air, which in turn creates convectional air currents. Cyclones occur when these conventional air currents are being displaced. The term hurricane/typhoon is a regionally specific name for a "tropical cyclone". In Asia they are called 'typhoons'; in the Indian and Pacific Oceans they are called 'cyclones'; and over the North Atlantic and Caribbean Basin, they are called 'hurricanes'.

Tropical warning procedures:

- *i* Small crafts and fishing boats: approx 25-35mph winds.
- *ii* Wind advisory for the public: approx. 25-35mph winds.



- *iii Gale watch:* when a mature tropical cyclone has a significant probability to threaten a part of the country within 48 hours.
- *iv Gale force warning:* issued when wind speeds are expected to reach gale force intensity of (34-47knots) within the next 24 hours.
- *v* Storm watch: if a post tropical cyclone disturbance is a notable to threat to an area or the entire country within a 24 to 48 hour timeframe, a storm watch statement would be included with the gale warning.
- *vi Storm warning:* issued every three (3) hours when the average wind speeds are expected to reach storm force intensity of 48-63 knots within the next 12 to 24 hours.
- *vii Cyclone watch:* issued when tropical cyclone winds is expected to reach cyclone force winds of above 63 knots (or 70 mph) in 24 to 48 hours.
- *viii Cyclone warning:* issued every three (3) hours, when wind speeds are expected to exceed 63 knots within the next 12 to 24 hours.

b Earthquakes

An earthquake is a trembling or shaking movement of the earth's surface, resulting from plate movements along a fault-plane or as a result of volcanic activity. Earthquakes can strike suddenly, violently, and without warning at any time of the day or night. The following terminologies are associated with earthquakes: *epicentre, fault, magnitude* and *seismic waves*.

For practical purposes, earthquakes are usually defined by their magnitude (or quantitative energy released) which is measured using a logarithm scale of 1 - 10. This logarithm scale is referred to as the *Richter scale*. The magnitude is determined by analysing seismic data obtained from seismometers.

The intensity of an earthquake is measured using the *Modified Mercalli Intensity (MMI) Scale*, which is determined qualitatively by physical observations of the earthquake's impact.

c Tsunami

A tsunami is an ocean wave generated by a submarine earthquake, volcano or landslide. It is also known as a seismic sea wave, and incorrectly as a tidal wave. Storm surges (or *Galu Lolo*) are waves caused by strong winds¹.

The largest earthquake event recorded in Samoa was on 26 June 1917, measuring 8.3 on the Richter scale. The event originated in Tonga (approximately 200km south of Apia) and it triggered a tsunami of four to eight (4-8) metre run-ups in Satupaitea, Savaii. The tsunami arrived less than ten (10) minutes from its point of origin, meaning it travelled at

¹ Tsunami was known in Samoa as a *Galu Afi* but the National Disaster Advisory Committee (DAC) has now adopted SŪNAMI as its Samoan translation.



a speed of more than 1,000km/hr. Hence, when an earthquake occurs, you must heed the tsunami warning, for example, people living in low-lying coastal areas must relocate to higher and safer grounds immediately.

d Floods

This phenomenon occurs when water covers previously dry areas, i.e., when large amounts of water flow from a source such as a river or a broken pipe onto a previously dry area, or when water overflows banks or barriers.

Floods can be environmentally important to local ecosystems. For example, some river floods bring nutrients to soil such as in Egypt where the annual flooding of the Nile River carries nutrients to otherwise dry land. Floods can also have an economic and emotional impact on people, particularly if their property is directly affected. Having a better understanding of what causes flooding can help people to be better prepared and to perhaps minimize or prevent flood damage.

e Landslides

The term landslide refers to the downward movement of masses of rock and soil. Landslides are caused by one or a combination of the following factors: change in slope gradient, increasing the load the land must bear, shocks and vibrations, change in water content, ground water movement, frost action, weathering of shocks, removal or, or changing the type of vegetation covering slopes.

Landslide hazard areas occur where the land has certain characteristics which contribute to the risk of the downhill movement of material. These characteristics include:

- *i* A slope greater than 15 percent.
- *ii* Landslide activity or movement occurred during the last 10,000 years.
- *iii* Stream or wave activity which has caused erosion, undercut a bank or cut into a bank to cause the surrounding land to be unstable.
- *iv* The presence or potential for snow avalanches.
- *v* The presence of an alluvial fan which indicates vulnerability to the flow of debris or sediments.
- *vi* The presence of impermeable soils, such as silt or clay, which are mixed with granular soils such as sand and gravel.

Landslides can also be triggered by other natural hazards such as rains, floods, earthquakes, as well as human-made causes, such as grading, terrain cutting and filling, excessive development, etc. Because the factors affecting landslides can be geophysical or human-made, they can occur in developed areas, undeveloped areas, or any area where the terrain has been altered for roads, houses, utilities, buildings, etc.



2 Human-Made Disasters

These are disasters or emergency situations of which the principal, direct causes are identifiable human actions, deliberate or otherwise. Apart from "technological disasters" this mainly involves situations in which civilian populations suffer casualties, losses of property, basic services and means of livelihood as a result of war, civil strife or other conflicts, or policy implementation. In many cases, people are forced to leave their homes, giving rise to congregations of refugees or externally and/or internally displaced persons as a result of civil strife, an airplane crash, a major fire, oil spill, epidemic, terrorism, etc.

B. SPEED OF ONSET

- 1 *Sudden onset:* little or no warning, minimal time to prepare. For example, an earthquake, tsunami, cyclone, volcano, etc.
- *2 Slow onset:* adverse event slow to develop; first the situation develops; the second level is an emergency; the third level is a disaster. For example, drought, civil strife, epidemic, etc.

The main hazards a region is, or may be vulnerable to, will depend on the geographic location of the country. In Samoa, for example, the main hazards which may turn into disasters are:

- Cyclones
- Earthquakes
- Tsunami
- Flooding
- Landslides
- Epidemics

Implications of disasters on your region and environment

Cyclones have been a frequently occurring disaster in Samoa for the past decade; the impact of each occurrence has been devastating. The following list identifies a few of the unpleasant impacts:

- Infrastructure damage
- Telecommunication loss
- Flooding
- Landslides
- Power disruption



- Water problems
- Agricultural damage
- Loss/damage to housing
- Damage to inland and coastal environments
- Disruption of standard of living, lifestyle, etc.

Unit summary



Summary

This unit sets the scope for what disaster management entails. As an introductory course, the content focuses on definitions and descriptions of terminologies; articulating the concept of disaster management; distinguishing between emergency and disaster situations; identifying and describing the types of natural and human-caused disasters; listing and describing the main hazards your country is vulnerable to; and identifying and briefly describing the implications disasters can have on people and the environment.

Self-Assessment



Self-Assessment

- 1 Define the following:
 - *i* (a) Disaster management;
 - *ii* (b) Hazard;
 - iii (c) Emergency;
 - iv (d) Disaster;
 - v e) Vulnerability; and
 - vi (f) Risk
- 2 Differentiate between an emergency and a disaster situation
- *3* Identify and describe three natural disasters which you are familiar with; identify and describe three man-made disasters you have learnt about.
- 4 List and describe one main hazard to which your country is vulnerable to.
- 5 Identify and briefly discuss one adverse impact that a particular disaster has left behind on your lifestyle and environment



References

Srinivas, H. (2005) *Disasters: a quick FAQ*. Accessed on 24/01/08 at: <u>http://www.gdrc.org/uem/disasters/1-what_is.html</u>



Unit 2

Disaster Management Cycle – Phase I: Mitigation

Introduction

Disaster management is an enormous task. They are not confined to any particular location, neither do they disappear as quickly as they appear. Therefore, it is imperative that there is proper management to optimize efficiency of planning and response. Due to limited resources, collaborative efforts at the governmental, private and community levels are necessary. This level of collaboration requires a coordinated and organized effort to mitigate against, prepare for, respond to, and recover from emergencies and their effects in the shortest possible time.

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Outcomes

- Upon completion of this unit you will be able to:
- Define the various phases of the disaster management cycle.
- Explain the importance of disaster mitigation.
- Describe how disaster management can be integrated into public policy.
- *Explain* how planning and design of infrastructure should take into account the vulnerability of the communities.



Terminology

Disaster A cycle with phases that reduce or prevent disasters management cycle: Mitigation: Reducing or minimizing an impact of a hazard or disaster. **Risk management:** Consists of identifying threats (hazards likely to occur), determining their probability of occurrence, estimating what the impact of the threat might be to the communities at risk, determining measures that can reduce the risk, and taking action to reduce the threat. Vulnerability: A condition wherein human settlements, buildings, agriculture, or human health are exposed to a

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disaster by virtue of their construction or proximity to hazardous terrain.

Disaster Management Cycle

Disaster management is a cyclical process; the end of one phase is the beginning of another (see diagram below), although one phase of the cycle does not necessarily have to be completed in order for the next to take place. Often several phases are taking place concurrently. Timely decision making during each phase results in greater preparedness, better warnings, reduced vulnerability and/or the prevention of future disasters. The complete disaster management cycle includes the shaping of public policies and plans that either addresses the causes of disasters or mitigates their effects on people, property, and infrastructure.

The mitigation and preparedness phases occur as improvements are made in anticipation of an event. By embracing development, a community's ability to mitigate against and prepare for a disaster is improved. As the event unfolds, disaster managers become involved in the immediate response and long-term recovery phases.

The diagram below shows the Disaster Management Cycle.



Figure 3: Disaster Management Cycle

Mitigation: Measures put in place to minimize the results from a disaster. Examples: building codes and zoning; vulnerability analyses; public education.

Preparedness: Planning how to respond. Examples: preparedness plans; emergency exercises/training; warning systems.



Response: Initial actions taken as the event takes place. It involves efforts to minimize the hazards created by a disaster. Examples: evacuation; search and rescue; emergency relief.

Recovery: Returning the community to normal. Ideally, the affected area should be put in a condition equal to or better than it was before the disaster took place. Examples: temporary housing; grants; medical care.

An excellent source of more information can be found in the Global Development Research Centre's article, "The Disaster Management Cycle" (Warfield, 2005)

Disaster Mitigation

Mitigation refers to all actions taken before a disaster to reduce its impacts, including preparedness and long-term risk reduction measures. Mitigation activities fall broadly into two categories:

- 1 Structural mitigation construction projects which reduce economic and social impacts
- 2 Non-structural activities policies and practices which raise awareness of hazards or encourage developments to reduce the impact of disasters.

Mitigation includes reviewing building codes; vulnerability analysis updates; zoning and land-use management and planning; reviewing of building use regulations and safety codes; and implementing preventative health measures. (World Development Report, 1998) Mitigation can also involve educating businesses and the public on simple measures they can take to reduce loss or injury, for instance fastening bookshelves, water heaters, and filing cabinets to walls to keep them from falling during earthquakes. Ideally, these preventative measures and public education programmes will occur before the disaster.

From time to time some mitigation requirements may be outside of the scope of the disaster manager, however, this does not lessen the role to be played by mitigation. On the contrary, it is the responsibility of the emergency manager to avail him or herself with the requisite information to engage community involvement.

The primary focus of disaster management is to prevent disasters wherever possible or to mitigate those which are inevitable. Four sets of tools that could be used to prevent or mitigate disasters include:

- *a* Hazard management and vulnerability reduction
- **b** Economic diversification
- *c* Political intervention and commitment
- *d* Public awareness



The first two apply exclusively to disasters caused by natural phenomena while the latter are used to mitigate any other hazards.

Mitigation strategies

Two aspects of mitigation include:

- 1 Hazard identification and vulnerability analysis and
- *2* Various mitigation strategies or measures.

These are discussed in greater detail below.

Hazard identification and vulnerability analysis

A hazard can cause the full range of natural disasters, major man-made incidents, and resource crises that become the concern of the entire community, not just emergency management personnel. The ideal is for communities to be prepared at all times for all types of hazards. In practical terms however, this is not possible. Preparedness for one hazard or disaster may increase your risk to another. For example, structures designed to withstand hurricane force winds may incur or cause greater damage if there is an earthquake. The more logical solution would be to adapt best practices as much as possible for the most likely scenario.

But what about the hazards associated with our 21st-century lifestyle such as chemical spills, ecological disasters, explosions, major transportation accidents? Mitigation involves addressing both natural and man-made hazards, different as they are in many respects. A crucial first step in mitigation is deciding which hazards have the greatest potential to affect your jurisdiction.

The most critical part of implementing a mitigation strategy is a full understanding of the nature of the threat as the hazards faced vary between locations and from hazard to hazard. Some countries are prone to floods and drought; others have histories of tropical storm damage; and others are at risk from earthquakes. Most countries are prone to at least some combination of hazards and all face the possibility of technological disasters as industrial development progresses. The effects these hazards are likely to have and their potential damage is dependent on the risks, the people, their livelihoods and the existing infrastructure. For any particular location, therefore, it is critical to know which hazards are the most likely.

Furthermore, targeting mitigation efforts relies heavily on correctly assessing vulnerability – see tables in Unit 1. Vulnerability assessment can also be extended to social groups or economic sectors: People who rent houses rely on a landlord to repair any damage and are more likely to be rendered homeless in the event of a disaster. Correctly identifying the groups of tenants and establishing rights of tenure and landlords' obligations to repair may reduce the number of people rendered homeless in the event of a disaster. Similarly, food growers sending their produce to market through a single mountain pass will be unable to sell their

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produce if the pass is blocked. Developing an alternative route to market will reduce disruption of the agricultural sector. Thus, building or constructing a number of routes is very important because in a time of disaster it will be easier for the affected group or community to employ alternatives.

Mitigation strategies or measures

- Adjusting normal development programmes to reduce losses. For instance, varieties of crops that are more wind, flood or drought resistant can often be introduced in areas prone to floods, drought and cyclones.
- Economic diversification. In areas where the principal or sole source of the income may be threatened, attempts should be made to diversify the economy and introduce the economic activities that are less vulnerable. Diversification is extremely important where economies are dependent on a single cash crop.
- Developing disaster resistant economic activities. Some economic activities are relatively unaffected by disasters. For instance, situating warehouses in flood plains may be more appropriate than manufacturing plants in the same location. Coconut palms could be more suitable than other fruit trees in cyclone-prone coastal areas. Efforts should be made to identify and encourage the development of enterprises that are less vulnerable to the hazards.

An excellent overview on disaster mitigation can be found in one of the FEMA emergency management training modules – see the Reference List at the end of this unit.

Disaster Mitigation and Infrastructure

Investment in infrastructure for the management of hydrological hazards – such as cyclones and floods – has significantly reduced the loss of life from an annual average of 100,000 persons during the past 50 years to 41,000 persons during the past 15 years. Investment in disaster management infrastructure falls into two categories:

- Investment in infrastructure to support sustainable socioeconomic development; and
- 2 Investment in infrastructure for reconstruction and recovery.

Source: ESCAP, 1995. Asian and the Pacific Report on Natural Hazards and Natural Disaster Reduction.



Considerations

a Operations

To maintain operations during a disaster, ensure that a backup generator is available in case of power failure and that a battery-operated radio is at hand as well as a back-up supply of critical goods/needs – a continuous supply if at all possible.

b Critical Information and Communication

Ensure that there is a backup copy of all critical information – namely employee data, customer list, production formulas, a list of software and hardware and logon and passwords – in an accessible yet safe place; regularly update the backup copy of all files.

c Insurance

Ensure that all critical assets, including business interruption are insured and be aware of the content of the insurance policy.

d Infrastructure planning

For most infrastructure projects, natural hazard mitigation should be addressed during the conceptual development of the project. The preliminary design should take into consideration the prevalent hazards and methods to avoid or to minimize the effects of the extreme natural events. These factors include:

- Situating the facility to avoid flooding, soil erosion, exposure to high winds and unstable soils, and to minimize exposure to storm surge and high waves for harbours, docking facilities and coastal buildings;
- Designing the shape of the buildings and structural systems to minimize effects of high winds and earthquake effects, tornados, and, in the case of protection works, to avoid unwanted effects such as beach erosion, accretion, or negative impact on coral reefs and wetlands;
- Construction materials that are corrosion resistant and of appropriate durability and strength.

Furthermore, targeting mitigation efforts relies heavily on correctly assessing vulnerability. Vulnerability assessment can also be extended to social groups or economic sectors: People who rent houses rely on a landlord to repair any damage and are more likely to be rendered homeless in the event of a disaster. Correctly identifying the groups of tenants and establishing rights of tenure and landlords' obligations to repair may reduce the number of people rendered homeless in the event of a disaster. Similarly, food growers sending their produce to market through a single mountain pass will be unable to sell their produce if the pass is blocked. Developing an alternative route to market will reduce disruption of the agricultural sector. Thus, building or constructing number of routes is very important because in a time of disaster it will be easier for the effected group or community to employ alternatives.



e Mitigation Activities at Home

Homes can be destroyed by high winds. Flying debris can break windows and doors, allowing high winds and rain into your house. High winds can also cause weaker places in your home to crumble. Strengthening vulnerable areas such as roofs, exterior doors, windows, and garage doors; clearing debris from possibly affected areas; and building a safe room in your home can all contribute to personal mitigation strategies. It is also very important to encourage people to learn more about other protective measures that fall within the purview of their local building code.

Additionally, in areas that are prone to strong winds, there is a need for a number of other measures to be considered such as engineering structures to withstand wind forces; including wind load requirements in building codes; planting windbreaks; planning forestry areas upwind of towns; and the provision of wind-safety buildings, for example providing strong village halls for community shelter in vulnerable settlements.

Disaster and Development

Disasters and development are closely linked in that disasters can both destroy development initiatives and create development opportunities and that development schemes can both increase and decrease vulnerability.

The prevailing attitude has been that disasters, especially natural ones, were an act of nature and as such were beyond human control; accepting death and damage to property was part of the costs. With such an attitude, most development plans were designed without consideration for the effect disasters would have on community plans and vice versa. When a disaster did occur, the response was directed at meeting emergency needs and cleaning up. Now it is realized that much more can and need to be done to reduce the severity of hazards and disasters.

A growing body of knowledge on the relationships between disasters and development indicates four basic themes as follows:

- *3* Disasters set back development programming, destroying years of development initiatives.
- 4 Rebuilding after a disaster provides significant opportunities to initiate development programmes.
- 5 Development programmes can increase an area's susceptibility to disasters.
- 6 Development programmes can be designed to decrease the susceptibility to disasters and their negative consequences.

Decision-makers who ignore these relationships between disasters and development do a disservice to their people, who place their trust in them. Increasingly forward-thinking Ministries of Planning and Finance, with



support from the United Nations and other non-governmental officials, are assessing development projects in the context of disaster mitigation. Projects are thus being designed to include disaster recovery programmes and with long term development needs in mind.

Development requires institutional and structural transformations of societies to speed up economic growth, reduce levels of inequality, and eradicate absolute poverty. Over time, the effects of disasters can seriously degrade a country's long-term potential for sustained development and cause governments to substantially modify their economic development priorities and programmes.

At the same time, disasters often provide opportunities for development. They can improve the atmosphere in favour of change and create a rationale to establish development programmes such as job training, housing construction and land reform. However, poor management of the relief and rehabilitation responses may have severe negative implications for development for years to come, and may even increase vulnerability to future hazards.

The impact of disasters on development programmes

Disasters can significantly impede the effectiveness of development resource allocation. The damage is done in many ways and the impacts can be as complex as the economy itself. It is for specific reasons that practitioners explore the issues of lost resources to determine what will no longer be available to the country after a disaster such as assessing the effects of programme interruptions and the switching of crucial resources to other, shorter-term needs as disasters often change the political, economic and social conditions within a country. There will also be a need to consider the negative impacts on investment climates (of the now declared disaster zone) to determine what opportunities will be left to attract local and international investment capital to the area or country that has been devastated by the disaster. And lastly, in what state will the disruption of the non-formal sector leave the disaster area in terms of citizens proceeding with their lives in ways closest to conditions before the disaster. This non-formal sector may involve the way private citizens conduct business in their lives after the disaster.

Vulnerabilities caused by development

Lack of access to education and information often has wider implications and local people may be simply unaware of the options open to them in reducing their vulnerability. Poor people, for example, have fewer assets to invest in resources which may reduce their vulnerability; they may also be unwilling to make any significant investment without clear and obvious benefits. Poor people are also less likely to be in a position to organize collectively to reduce common risks, partially because these groups are usually have a higher proportion of women, young children, elderly people, the sick and disabled. Furthermore, after a disaster, the



effects of malnutrition and chronic illness put people at additional risk. Although in aggregate terms development will usually contribute to a reduction in vulnerability to natural disasters, any development activity may substantially increase particular types of vulnerability. Illustrations of such development activities are as follows:

- Urban development often leads to an influx of low-income groups such as large-scale settlements on marginal land or in high densities with poor quality housing. Buildings may be situated on earthquake faults, in flash-flood zones, or on slopes prone to landslides.
- Marine and coastal zone development leads to concentrations of populations exposed to possible storm-surges, high winds, flash floods, and landslide risks. Tourist development can increase potential vulnerability substantially when low-lying beach areas are targets for infrastructure and capital investments. Tsunamis and tropical storms can quickly destroy these improvements as well as placing tourists and workers at substantial risk to death and injury.
- Construction of transportation lines and poorly managed forestry programmes will often lead to deforestation and increased risks of landslides.
- Water resource management projects, including dams and irrigation schemes, potentially increase risks to large populations, either by displacing natural habitats, increasing risks of severe flooding, or by increasing the risk of dam failure.
- Investment in poorly controlled hazardous industries may lead to concentrations of population around the plant; increases in air and water pollution; and exposure to hazards from both chronic and catastrophic release of toxic materials.
- Livestock development projects can lead to severe loss of vegetation cover and conditions of near-desertification around specific natural points such as wells.
- Agricultural projects promoting cash crops may reduce the production of staple foods.

Each of these examples illustrates the importance of including risk assessment as an integral part of programme planning and evaluation, and highlights the critical importance of training and education in these areas.

Development programmes can decrease vulnerability

The term mitigation is increasingly applied to measures which reduce economic losses, as well as those which reduce death and injury. The distinction between the two types of mitigation is as follows:

Structural mitigation includes measures to reduce the economic and social impact of hazardous agents and involve construction programmes, especially dams, windbreaks, terracing and hazard resistant buildings.

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Non-structural mitigation is most commonly used to refer to policies and practices, including land-use policies, zoning, crop diversification, building codes, and procedures for forecasting and warning. In a broader context, non-structural mitigation can also include education, awareness, environmental understanding, community organization, and empowerment strategies.

Mitigation is most effective as part of a medium- to long-term development programme which incorporates hazard-reduction measures into regular investment projects. Under these conditions risks can be assessed analytically and explicitly in the context of national planning and investment programme reviews. The cost effectiveness of specific emergency preparedness measures and hazard reduction activities can be assessed. There are opportunities to build links between government and international organizations involved in relief and recovery and to provide opportunities for investment institutions to help governments gain access to new developments in hazard-reduction technologies. In regular investment project design and sector loans, attention can be given to early warning systems and other elements of emergency preparedness through financial or technical assistance.

Using development programmes to decrease vulnerability should increasingly be incorporated into every level of programme and project preparation and review within UNDP country programming as well as other financial and technical assistance projects. Structured review procedures should require that the disaster implications of new projects be explicitly taken into consideration.

There is a wide range of options for incorporating mitigation measures into regular development programmes. Each of the following examples suggests ways of protecting populations and critical economic assets against hazards and of reducing the overall impact of a disaster.

- 1 Strengthening urban utility systems and industrial support infrastructures is a common aim of development projects. This is achieved through a variety of external inputs including loans, technical assistance, and support for institutional development. "Lifeline systems" – such as water, electric power, transportation links and communications – can be made more effective as well as more selectively resistant to particular hazards.
- 2 Many other opportunities exist to incorporate hazard resistant building techniques in housing and other construction programmes. These opportunities are usually specific to the type of housing used in the region and the nature of local hazards. Such measures can substantially reduce injuries and deaths from earthquakes and tropical storms. Additionally, these programmes can protect high value economic resources, reducing the total costs of damage and improving the chances of more rapid recovery. On a wider scale, the application of building codes, associated training programmes, and more extensive use of zoning regulations in urban development reduce the risk for the local population, and the likelihood of damage to industrial facilities. Improved drainage systems and flood protection measures can further protect people and facilities in hazardous areas.



- 3 Investments in improving administration and strengthening the resource-base of public institutions will have a general positive impact on the effectiveness of preparedness arrangements, emergency responses and the quality of longer-term recovery planning. Training programmes in general, and especially those with a management or technical focus, can be expected to improve the implementation of mitigation and response measures.
- 4 Agricultural and forestry programmes provide a range of opportunities for mitigation. Reforestation programmes reduce risks of erosion, landslides and flash flooding. Changes in cropping patterns can also ameliorate erosion problems and losses due to floods and drought. The introduction of pest-resistant crops can reduce the economic and other impacts of infestations. Programmes for soil conservation, water harvesting and improving on-farm storage can mitigate the effects of drought.

Each of these examples represents an opportunity for mitigation. Each also requires investment of scarce resources.

According to USAID:

- The operation must be directed at restoring assets or productivity in a long-term development perspective not relief.
- The prospective economic returns should be high.
- The effects of the emergency should be significant.
- The event triggering the emergency should have a low probability of happening again soon.
- The need for an urgent response should be evident.
- Emergency lending is limited to cases where effective action can be felt in two to three years.
- There should be some prospect for future reduction in the hazard.

Developing a draft country-level disaster and development policy

Outlined below is a policy framework for bilateral foreign aid based on an example from USAID. The framework highlights three areas of concern for development initiatives for countries faced with disasters. These areas are as follows:

a Partnership:

Development cannot be unilaterally mandated and implemented. The success, or lack thereof, of development initiatives requires close collaboration among donors, governments, communities, nongovernmental organizations, the private sector, and universities. Partnerships build ownership and capacity and achieve significant results

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through joint efforts, based on comparative advantage and common objectives.

b Flexibility:

Local conditions for development vary widely and can change rapidly – for better or worse. Development agencies must be efficient and flexible; adaptable to local environments and capable of adjusting to changing conditions and seizing opportunities when they arise.

c Selectivity:

Development resources are limited relative to the world's needs. They are a public asset that must be invested prudently to achieve maximum impact. Assistance allocations among countries should be based on three criteria: need; the foreign policy interests of the country supplying the aid (e.g., the United States); and the commitment of a country and its leadership to reform. At the country level, resources should be invested where they have maximum impact in achieving priority strategic objectives.

Given the scope of the degradation to infrastructures, human and social systems, political and economical that a country can suffer from disasters to its development, no private individual or company will have the resources to take disaster preventative steps to manage its developmental growth. Therefore, the government of a country is to develop policies that will steer disaster prevention that will lead to sustainable development in the long term. Experts in the field of disaster and development policy recommend that the following action must be taken by government at the national, regional and local levels. The effect of disasters should be counteracted using policies aimed at sustaining development. If development polices are developed adequately, they can achieve the following:

- Permit governments to define rehabilitation and reconstruction methods in response and recovery in the disaster management cycle.
- Set standards to manage public and private resources and their distribution for recovery by disaster victims
- Back local laws and regulations, interagency cooperation and collaboration to benefits sustain the development.
- Provide for local communities to access resources for recovery that sustains development.
- Design risk reduction strategies for communities such as early warning measures.
- Allow government officials to use of hazard vulnerability mapping information to control relocation.
- Enforce land elevation and set procedures for compliance with zoning laws and regulations.



- Provide for the development of land preservation in danger zones.
- Establish the framework for disaster assistance in the form of loans and public assistance for immediate recovery.
- Set out procedures for land use including maintaining natural mangrove for storm surge protection.

Quarantelli (1997) claimed that "policies can be established and steps can be taken that will reduce and weaken some negative effects of the probable catastrophic disasters of the future." The policies mentioned above can reduce the catastrophic impact that disasters place on development initiatives, particularly in very poor countries.

Unit summary



The disaster management cycle – a continuous process – includes mitigation, preparedness, response, and recovery.

Mitigation refers to those measures and policies put in place to reduce the impacts of a disaster. The process involves hazard identification, vulnerability analysis, putting in place the right infrastructure and ensuring up-to-date logistics. Proper education and public awareness are useful tools to engage community involvement.

Disasters and developments are closely related. Disaster can both destroy development initiatives and create development opportunities. Development schemes can both increase and decrease vulnerability. Thus, links between disaster and development must be taken into account for sustainable socio-economic development.

Effective mitigation programmes incorporate risk reduction measures in regular investment projects. Financial institutions require that foreign aid be approved on the basis of appropriate risk reduction and mitigation policies at the national, regional and local scale developments.



Assignment



Are there any official policy measures or a legal framework to mitigate disaster in your country?

Assignment

Self-Assessment



Assessment

1 With the help of a diagram, explain the disaster management cycle.

- *2* Define mitigation?
- *3* List some of the practical things that you would do to secure your house against the threat of hurricane/ tornados.
- 4 Development can either increase or decrease the vulnerability of the community. True or False?

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Unit 3

Disaster Management Cycle – Phase II: Preparedness

Introduction

The goal of emergency preparedness programmes is to achieve a satisfactory level of readiness to respond to any emergency situation through programmes that strengthen the technical and managerial capacity of governments, organizations, and communities. These measures can be described as logistical readiness to deal with disasters and can be enhanced by having response mechanisms and procedures, rehearsals, developing long-term and short-term strategies, public education and building early warning systems. Preparedness can also take the form of ensuring that strategic reserves of food, equipment, water, medicines and other essentials are maintained in cases of national or local catastrophes.

During the preparedness phase, governments, organizations, and individuals develop plans to save lives, minimize disaster damage, and enhance disaster response operations. Preparedness measures include:

- Preparedness plans
- Emergency exercises/training
- Warning systems
- Emergency communications systems
- Evacuations plans and training
- Resource inventories
- Emergency personnel/contact lists
- Mutual aid agreements
- Public information/education

As with mitigation efforts, preparedness actions depend on the incorporation of appropriate measures in national and regional development plans.



Outcomes

Terminology

Upon completion of this unit you will be able to:

- Describe disaster preparedness.
- Explain the importance of preparedness in disaster management.
- *List* the four important levels at which all disaster preparedness activities must take place.
- Explain the importance of disaster risk reduction.
- Develop and write an emergency operations plan (EOP).

Emergency preparedness:	Actions taken before the onset of a disaster so that a government can successfully discharge its emergency management responsibilities, such as establishing authorities and responsibilities for emergency actions and garnering the resources to support them.
Logistical readiness:	A satisfactory state of readiness to mobilize resources in the most efficient and effective manner in order to minimize losses as a result of a disaster.
Memorandum of Understanding:	A legal document outlining the terms and details of an agreement between parties, including each party's requirements and responsibilities
Response mechanism:	The means by which disaster relief is coordinated and mobilized from governmental and non- governmental organisations to helpless victims of a disaster.

Disaster Preparedness

Disaster preparedness is defined as a continuous and integrated process involving a wide range of activities and resources from multi-sectoral sources. (Disaster Preparedness Training Programme; International Federation of Red Cross and Red Crescent Societies, IFRCRCS, 2005). In order that disaster preparedness is undertaken with rewarding outcomes, those involved in the process must approach it from a mitigative, response, recovery and business continuity perspective. That is, when considering disaster preparedness the phases of emergency management must be looked at carefully.



Disaster mitigation policies and measures will not stop a disaster especially a natural one from occurring and persisting. What mitigation policies and measures seek to do is reduce vulnerability to, or increase resilience to, the effects of the inevitable disasters to which a country is prone.

Basically disaster mitigation and preparedness go hand in hand. Disaster preparedness for example includes implementation of mitigation measures to ensure that existing infrastructure can withstand the forces of disasters or that people can respond in their communities and at the same time protect themselves. The collective capabilities of the country, people, and the government to deal with extreme hazards or adversities when they occur are measures of their cumulative preparedness. In local circumstances and because of historical proneness to disasters, mitigation is important, but preparedness is doubly important.

Disaster preparedness involves the preparation of people and essential service providers in their communities for the actions that they will take in case of disasters. If this is the case, consideration must be given to the manner in which the formal responders (Police and Fire Services, Emergency Medical Services personnel and the Military) prepare to respond to disasters. For example, the personnel in these response agencies may have to learn the use of new equipment, treatment methods for diseases or providing services to prevent the escalation of the effects of disasters that will further destroy lives and devastate property.

The International Federation of Red Cross and Red Crescent Societies (IFRCRCS, 2005) states that disaster preparedness requires global, national, community and individual inputs. Disaster preparedness incorporates all activities that will enhance the efficiency, effectiveness and impact of disaster emergency response mechanisms in the local community and throughout the country. The following are of particular importance:

- Develop and test warning systems regularly and plan measures to be taken during a disaster alert period to minimize potential loss of life and physical damage.
- Educate and train officials and the population at risk to respond to the disaster.
- Train first-aid and emergency response teams.
- Establish emergency response policies, standards, organizational arrangements and operational plans to be followed by emergency workers and other response entities after a disaster.

Others feel that disaster preparedness should be one that is particularly "community-based" through national or international efforts that will provide for strengthening community-based disaster preparedness through educating, preparing and supporting local populations and communities in their everyday efforts to reduce risks and prepare their own local response mechanisms to address disaster emergency situations.

Disaster Risk Reduction (DRR)

Natural hazards need not be natural disasters. Preventive action is possible, especially when advance knowledge of the nature and occurrence of such hazards are available to the general public.

Human vulnerability is the relative lack of capacity of a person or community to anticipate, cope with, resist and recover from the impact of a hazard. Factors that increase human vulnerability to disasters include rapid urbanization, population growth, and lack of knowledge about how to effectively resist the effects of disasters and poverty. Of all the factors, poverty is perhaps at the root of what makes most people vulnerable to the impact of most hazards. An understanding of human vulnerability provides us with an understanding of the significance of what physical measures should be naturally favoured in the various circumstances. Disaster Risk Reduction (DRR) forms the pillar of disaster preparedness, that is, it forms the action plan to be implemented before, during and after disasters. So, what is risk reduction? The IFRCRCS defines risk reduction as physical measures to reduce the vulnerability and exposure of infrastructure to natural hazards as well and to provide coping and adaptive infrastructure in case of a disaster event.

Some DRR recommendations for countries which do not have a robust disaster preparedness plan are:

- Policy, planning and capacity building in disaster management
- Physical prevention; example, building sea-walls against storm surge or flood shelters during flood events
- Capacity building at institutional and systemic level in disaster preparedness

The above policy and planning of physical measures designed to reduce risks will have far reaching socio-economic and environmental benefits that will keep the country functioning at all levels; for example the continued provision of food, potable water and health care and at the same time there will be less damage to infrastructure.

Examples of DRR measures that countries can adopt into their planning and policy are listed below:

- Proper planning to mitigate flooding in flood prone areas and alternate infrastructure for the provision of food and potable water.
- Provision of raised flood shelters as those constructed in Bangladesh.
- The improvement of water supply systems in rural areas to provide sufficient potable water supply during floods or droughts.
- The construction and use of drainage pumps as an example of strengthening the capacity to cope with floods.



- Enhance community-based disaster preparedness by focusing more on the roles of women.
- Improve wireless communication that is robust and integrated with both electronic and manual system.
- Train farmers to diversify food crops as a strategy to survive in the event of disaster.
- Set up a Memorandum of Understanding (MOU) locally and internationally to provide for the acquisition of resources which can be depleted by disaster and or become scarce.

Further information can be found in the UN Disaster Management Training Programme's publication, "Building Capacity for Risk Reduction" (1997).

The Emergency Operation Plan (EOP)

At the national level, an Emergency Operation Plan (EOP) needs to be established to set out the scope of activities required for community preparedness and response. It must declare what the community can realistically do. The EOP allows the community to respond to threats and engages responders in the short-term recovery and must be flexible to be valuable in real and potential emergencies. EOPs are general and do not include the administrative plan, the mitigation strategy, the long term recovery or the Standard Operational procedures. Those areas of disaster management are contained in separate documents.

Developing and Writing the EOP

Within existing organizational structures the EOP works to ensure things are done systematically. Existing legislation and other memorandum of agreement forms the backbone of what the EOP aims to do. Basically, the EOP consists of a promulgation/broadcast statement signed by the Chief Executive Officer authorizing the Plan; description of the planning process, abstract of contents, implementation; table of contents; instructions about the use of the Plan; purpose of its sections, and its distribution.

For more information on EOPs, see "FEMA Document, Unit 4 -- Preparedness". Some organisations call this a "Preparedness Plan" – see the excellent "UN Disaster Management Training Programme".

1 Structure of the EOP

The EOP is specific in its layout as follows:

i Statement of Purpose – This is what the Plan seeks to achieve for citizens.

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- *ii* Situation and assumptions Statements of the emergency events, actual and potential, and describe the warning methods and any situations that may be peculiar/unusual to the community.
- iii Organization and assignment of responsibilities Dealing specifically with how the jurisdiction will assign the emergency functions to carry out the Plan by roles of local officials in the emergency management structure.
- *iv* Concept of operations This section describes the roles and relationships of government agencies, the private sector and how they interact with each other.
- Administration and logistics The management of resources, general support requirements, and availability of services and support for all phases of emergency management and the policies set up to make these activities occur.
- vi Plan development and maintenance This involve activities to keep the plan current and reflect changes that result from actual experiences in emergency management, changing emergency situations and assumptions, and modifications in the community's profile.
- vii Authorities and references These authorities and references apply to those statutes, executive orders, regulations, and formal agreements that pertain to any type of emergency.
- *viii* Definition of terms This provides for a common understanding of the terms that will use in communication, directing and control in disasters.

2 Functional Annexes

An EOP is incomplete if it does not contain functional annexes that provide specific information and direction on operations and the roles and responsibilities to be performed by responders. General terminologies are included in the annexes along with the identification of actions that not only ensure effective response, but also aid in preparing responders for emergencies and disasters.

EOPs address matters such as direction and control (who is in charge); communications (information exchange); early warning (warning to the public); public information (orders of evacuation, mass care, health and medical services and resource management). The EOP includes considerations for other functions to be performed such as damage assessment, search and rescue, emergency services, aviation operations, transportation and other miscellaneous services that are necessary to manage a disaster.

3 Exercising the EOP

EOPs are tested by having response agencies exercise them. The exercises carried out involve preparatory training that helps orient staff to the procedures that they may be required to know, to function during a disaster. Another way of testing an EOP is a table-top exercise that mainly focuses on responders' familiarization with their roles and responsibilities in the emergency management system. In the tabletops

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responders sit around a table and talk their way through scenarios to complete exercises.

As familiarity is gained with contents of the EOP, more involved exercises are conducted such as functional drills which take place in an enclosed setting arranged to look like an Emergency Operations Centre (EOC). They involve complex simulations using verbal and written communication, telephone and radio messaging. Scenarios for the exercises comprise messages like real events to which the players respond. Near-to-real exercises called field drill are conducted where players perform the work order in some of the specialized facilities present, such as the EOC and the communications centre. Finally, there is the full-scale exercise, all players respond to the emergency with equipment and support as in a real situation. Civilian participation is sometimes used to simulate injured victims.

4 Publicizing the Plan

Completed EOPs are published and made public to communities and through the use of public awareness programmes. In this case they serve to increase awareness of citizens to emergencies or disasters. Information about the EOP can be obtained from the local news media, government offices, community talk groups and hand outs and brochures.

5 Resource inventories

The EOP requires considerable resources such as people, equipment, systems and supplies to use in its operations. These resources are needed for emergency response and at the same time, the social comfort of personnel working there for long hours during disasters. Allocation of resources needed to deploy the Plan come from the government, the community and the private sector. Resource assessments are frequently needed to identify weaknesses, strengths and needs.

Mainstreaming Child Protection and Gender in Emergency Planning

It is high time that women take an active role when designing mitigating plans and activities so that appropriate gender issues are mainstreamed. Women are not always well-represented in decision-making. Experts agree that involving women broadens the range of ideas proposed for and incorporated into disaster planning initiatives and results in plans that are more disaster-resilient.

Gender mainstreaming in disaster preparedness, relief and construction include mapping of existing forms and sources of gender discrimination in each context while making disaster preparedness plans. It is also necessary to involve community based women's organizations of marginalized groups in preparedness, relief and reconstruction planning and pressing for accountability in implementation.

Besides, by offering children the opportunity to participate more fully in disaster situations, we cease to be interpreters of their needs and thoughts,

and instead begin to accompany them in the design of actions and adequate strategies that strengthen their capacity to reflect, contribute, and lead their own development processes. This in turn increases the possibilities of sustainable educational processes on disasters and their prevention. It also contributes to the democratization process through the formation of young leaders with a vision and knowledge of development.

Further information can be found in "Children in Disasters, A report for Plan UK, 2002".

This sub topic is addressed in more detail in *Unit* 14 – *Vulnerable Groups in Disasters*.

Unit summary



Summary

This unit looks at emergency preparedness as part of disaster mitigation. History has shown that hazards, especially natural ones, cannot be stopped but what history has also shown is that the more prepared people are to a hazard, the more likely that the hazard does not become a disaster. Preparedness is defined and activities to achieve this are outlined. The unit also provides recommendations for disaster risk reduction (DRR) in countries where disaster management is deficient. The Emergency Operation Plan (EOP) and its importance are discussed and issues relevant to child protection and gender are mentioned.

Assignment



Write a two (2) page report on the disaster preparedness process/plan in your country, if any. If none exists, discuss the need for one and how it could be developed.



Self-Assessment



1 What are the four levels of input needed for disaster preparedness?

2 Why is crop diversification recommended as a disaster preparedness method?

Assessment

- *3* Why are gender issues important in the disaster preparedness plans?
- 4 What is the relationship between preparedness and mitigation?
- 5 List one DRR measure which would be appropriate for your region in each of the three categories recommended for countries which are developing their disaster preparedness plans.

Solutions: 1 Global, national, community and individual levels.

- 2 Different crops possess varying degrees of resistance to damage from different disasters. By diversifying crops instead of relying on just one, a farmer will have the resistant crops to depend on despite the destruction of the susceptible ones. For example, taro (Colocasia esculenta var. esculenta) is more resistant to floods while yam (Discorea spp.) is more resistant to cyclones.
- 3 Gender issues are important and must be included in all plans of the disaster management cycle to make it more effective and efficient. For instance, the inclusion of women in the formulation of plans may result in more relevant and speedier delivery of relief responses to affected children given their natural proximity to them.
- 4 Mitigation and preparedness work together. Mitigation aims to reduce vulnerability to disasters such as building cyclone resistant houses. Preparedness is the whole country's readiness to deal with a disaster, including the implementation of mitigation measures. Preparedness is broader and includes issues such as the training and management of people and stockpiling food at strategic locations.
- 5 The three categories referred to are: Policies and planning, physical prevention projects, and capability building.

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Unit 4

Disaster Management Cycle – Phases III and IV: Response and Recovery

Introduction

Disaster response is the sum total of actions taken by people and institutions in the face of disaster. These actions commence with the warning of an oncoming threatening event or with the event itself if it occurs without warning. The focus in the response and recovery phases of the disaster management cycle is on meeting the basic needs of the people until more permanent and sustainable solutions can be found.

Developmental considerations contribute to all aspects of the disaster management cycle. One of the main goals of disaster management, and one of its strongest links with development, is the promotion of sustainable livelihoods and their protection and recovery during disasters and emergencies. Where this goal is achieved, people have a greater capacity to deal with disasters and their recovery is more rapid and long lasting. In a development oriented disaster management approach, the objectives are to reduce hazards, prevent disasters, and prepare for emergencies.

Upon completion of this unit you will be able to:



Outcomes

- Define disaster response and recovery.
- State the aims of disaster response.
- Explain typical disaster response activities.
- *Explain* the difference between modern and traditional response.
- *Give* examples of modern methods.
- Explain activities of disaster recovery.

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Terminology

Development:	A step or stage in growth or advancement in society, economics or in politics for a better lifestyle.
Evacuation:	Removal from hazardous place to another that is safe.
Humanitarian	The act of promoting the welfare of humanity, especially through the elimination of pain and suffering.
Logistics	The branch of civil defence or agency that have to do with procuring, maintaining, and transporting materiel, personnel, and facilities
Recovery:	The return of buildings and infrastructure to a normal or improved state after a setback or loss.
Relief:	Private or public help in the form of money, food, clothing, shelter, or medicine, provided to people who are temporarily suffering from the effects of disaster and are at the time completely helpless.
Remittance:	Sending of money to pay for resources or services to help people in need after a disaster.
Reconstruction:	A community or structure that has been reorganized, reformed, or restored after being impacted by a disaster or other hazard.
Rehabilitation:	To restore buildings, or parts of towns, to their former condition or better.
Response:	Actions taken in reaction to a disaster or similar hazards.
Security:	Safety measures that provide a sense of protection against loss or harm from disaster or uncertain circumstances.
Volunteerism:	The practice of using volunteer workers, especially in community service or disaster organizations and programmes.
Warning:	Advice given to somebody or persons to be careful of impending danger.



Disaster Response

The aim of emergency response is to provide immediate assistance to maintain life, improve health, and to support the morale of the affected population. Such assistance may range from providing specific but limited aid, such as assisting refugees with transportation, temporary shelter, and food, to establishing semi-permanent settlement in camps and other locations. It also may involve initial repairs to damaged infrastructure. The focus in the response phase is on meeting the basic needs of the people until more permanent and sustainable solutions can be found. Humanitarian organizations are often strongly present in this phase of the disaster management cycle.

During a disaster, humanitarian agencies are often called upon to deal with immediate response and recovery. To be able to respond effectively, these agencies must have experienced leaders, trained personnel, adequate transportation and logistic support, appropriate communications, and guidelines for working in emergencies. If the necessary preparations have not been made, the humanitarian agencies will not be able to meet the immediate needs of the people.

This section identifies the principal activities of disaster response. Each activity is (formally or informally) governed by a set of policies and procedures, typically under the auspices of a lead agency. In the end, disaster response activities are implemented by multiple government organizations, international and national agencies, local entities and individuals, each with their roles and responsibilities.

Aims of disaster response

The overall aims of disaster response are:

- To ensure the survival of the maximum possible number of victims, keeping them in the best possible health in the circumstances.
- To re-establish self-sufficiency and essential services as quickly as possible for all population groups, with special attention to those whose needs are greatest: the most vulnerable and underprivileged.
- To repair or replace damaged infrastructure and regenerate viable economic activities. To do this in a manner that contributes to long-term development goals and reduces vulnerability to any future recurrence of potentially damaging hazards.
- In situations of civil or international conflict, the aim is to protect and assist the civilian population, in close collaboration with the International Committee of the Red Cross (ICRC) and in compliance with international conventions.
- In cases involving population displacements (due to any type of disaster) the aim is to find durable solutions as quickly as possible, while ensuring protection and assistance as necessary in the meantime.

Disaster Response Activities

The following are typical activities of emergency response:

1 Warning

Warning refers to information concerning the nature of the danger and imminent disaster threats. Warnings must be rapidly disseminated to government officials, institutions and the population at large in the areas at immediate risk so that appropriate actions may be taken, namely, either to evacuate or secure property and prevent further damage. The warning could be disseminated via radio, television, the written press, telephone system and cell phone.

2 Evacuation and migration

Evacuation involves the relocation of a population from zones at risk of an imminent disaster to a safer location. The primary concern is the protection of life of the community and immediate treatment of those who may be injured.

Evacuation is most commonly associated with tropical storms but is also a frequent requirement with technological or industrial hazards. For evacuation to work there must be:

- A timely and accurate warning system,
- Clear identification of escape routes,
- An established policy that requires everyone to evacuate when an order is given,
- A public education programme to make the community aware of the plan.

In the case of a slow onset of a disaster, for example severe drought, the movement of people from the zone where they are at risk to a safer site is not, in fact, evacuation, but crisis-induced migration. This movement is usually not organized and coordinated by authorities but is a spontaneous response to the perception by the migrants that food and/or security can be obtained elsewhere.

3 Search and rescue (SAR)

Search and rescue (SAR) is the process of identifying the location of disaster victims that may be trapped or isolated and bringing them to safety and medical attention. In the aftermath of tropical storms and floods, SAR usually includes locating stranded flood victims, who may be threatened by rising water, and either bringing them to safety or providing them with food and first aid until they can be evacuated or returned to their homes. In the aftermath of earthquakes, SAR normally focuses on locating people who are trapped and/ or injured in collapsed buildings.



4 Post-disaster assessment

The primary objective of assessment is to provide a clear, concise picture of the post-disaster situation, to identify relief needs and to develop strategies for recovery. It determines options for humanitarian assistance, how best to utilize existing resources, or to develop requests for further assistance.

5 Response and relief

When a disaster has occurred response and relief have to take place immediately; there can be no delays. It is therefore important to have contingency plans in place.

Relief is the provision on a humanitarian basis of material aid and emergency medical care necessary to save and preserve human lives. It also enables families to meet their basic needs for medical and health care, shelter, clothing, water, and food (including the means to prepare food). Relief supplies or services are typically provided, free of charge, in the days and weeks immediately following a sudden disaster. In the case of deteriorating slow-onset emergency situations and population displacements (refugees, internally and externally displaced people), emergency relief may be needed for extended periods.

6 Logistics and supply

The delivery of emergency relief will require logistical facilities and capacity. A well-organized supply service is crucial for handling the procurement or receipt, storage, and dispatch of relief supplies for distribution to disaster victims.

7 Communication and information management

All of the above activities are dependent on communication. There are two aspects to communications in disasters. One is the equipment that is essential for information flow, such as radios, telephones and their supporting systems of repeaters, satellites, and transmission lines. The other is information management: the protocol of knowing who communicates what information to whom, what priority is given to it, and how it is disseminated and interpreted.

8 Survivor response and coping

In the rush to plan and execute a relief operation it is easy to overlook the real needs and resources of the survivors. The assessment must take into account existing social coping mechanisms that negate the need to bring in outside assistance. On the other hand, disaster survivors may have new and special needs for social services to help adjust to the trauma and disruption caused by the disaster. Participation in the disaster response process by individuals to community organizations is critical to healthy recovery. Through these appropriate coping mechanisms will be most successfully developed.

9 Security

Security is not always a priority issue after a sudden onset of disasters. It is typically handled by civil defence or police departments. However, the protection of the human rights and safety of displaced populations and refugees can be of paramount importance requiring international monitoring.

10 Emergency operations management

None of the above activities can be implemented without some degree of emergency operations management. Policies and procedures for management requirements need to be established well in advance of the disaster.

11 Rehabilitation

Rehabilitation consists of actions taken in the aftermath of a disaster to enable basic services to resume functioning, assist victims' self-help efforts to repair dwellings and community facilities, and to facilitate the revival of economic activities (including agriculture). Rehabilitation focuses on enabling the affected populations (families and local communities) to resume more-or-less normal (pre-disaster) patterns of life. It may be considered as a transitional phase between (i) immediate relief and (ii) more major, long-term reconstruction and the pursuit of ongoing development.

12 Reconstruction

Reconstruction is the permanent construction or replacement of severely damaged physical structures, the full restoration of all services and local infrastructure, and the revitalization of the economy (including agriculture). Reconstruction must be fully integrated into ongoing longterm development plans, taking account of future disaster risks. It must also consider the possibilities of reducing those risks by the incorporation of appropriate mitigation measures. Damaged structures and services may not necessarily be restored in their previous form or locations. It may include the replacement of any temporary arrangements established as a part of the emergency response or rehabilitation. Under conditions of conflict, however, rehabilitation and reconstruction may not be feasible. For obvious reasons of safety and security, activities in rehabilitation and reconstruction may need to wait until peace allows them.

Modern and traditional responses to disasters

The responses to disasters may employ a mix of approaches from traditional to modern with these approaches moving back and forth depending on the nature of disaster in term of their scope. The scope of disasters has influenced responses in the following ways:

- Humanitarian (aid to relieve pain and suffering),
- Remittance (Cash sent to victims),
- Relief assistance (food, medication, tents),
- Networking (contacting organizations),



- Volunteerism (internal and external groups of people volunteering help or community- based approach) and
- Mutual aid agreements (pre-drawn up agreements to provide resources)

As disasters continue to occur, people affected by them sometimes need external assistance in order to survive and recover. Response can be either modern or traditional to the extent that assistance is transferred to individuals in the disaster. The assistance can either be provided in-kind, in the form of food aid, shelter materials, seeds or blankets, or it can be provided in cash, enabling people to decide for themselves what they most need, and to buy in local markets.

A striking means of response to disasters has been remittances where people residing outside the disaster area channel sums of money or goods over long distances to those affected. The terms used to describe this response are most commonly understood to refer to transfers between migrants and their places of origin.

In many countries the community-based approach to emergency response has been the Community Emergency Response Team (CERT), organized in communities to work closely with the local government and the community members themselves to identify community needs and priorities for any disaster situation.

Other examples of response are:

Local Partnerships: One charitable organization, (World Vision) has a rich network of local partnerships with churches, community organizations and government agencies that come to us when families in their community suffer a disaster. Local police precincts and politicians' offices often call on World Vision to assist them after an emergency.

Gifts-in-Kind: Charitable organisations actively solicit corporate partners to donate needed new products to assist disaster survivors in their recovery and supervise the distribution of these products. Their goal is for every Storehouse to have a constant supply of emergency resources to be distributed at a moment's notice. Products will include such things as water, blankets, medical supplies, latex gloves, and kits containing enough hygiene and paper products, and other necessities to supply a family of four for up to four days.

Civil Service: World Vision as one of the charitable organisations works to be a voice in the community by serving on planning committees such as National and State Volunteer Organizations Active in Disasters (VOAD), Office of Emergency Management (OEM), FEMA, Red Cross, Salvation Army and Habitat for Humanity (H4H). These relationships allow organisations to serve as a liaison to the community and be a voice for the children and families they serve.

Specific Needs: In the aftermath of an emergency, families have many needs. Because of the large variety of donations that are received and distributed, World Vision is able to meet these special needs. New clothes, shoes, furniture, mattresses, school supplies, building materials and

cleaning supplies are only a few of the unique offerings that it is able to offer.

Modern methods of disaster response

New technologies can be very useful and powerful tool in disaster response, namely:

- 1 Cell phones: cell phones as warning devices can be very useful. Short messages can be sent to recipients warning of imminent threat of tropical storms, wind storms or any severe weather likely to cause damage.
- 2 Spatial information use of satellite imagery. The emergency management community is keenly aware of the potential of mapping technologies such as geographic information systems (GIS), remote sensing (satellite imagery), and global positioning systems (GPS) in support of emergency response operations.

Increasingly, geographic technologies are being utilized for hazard mitigation as well as response efforts. These range from damage assessments mapping the event and affected areas to search and rescue, risk assessment, risk perception (Hodgson and Palm, 1992), and risk communication (Hodgson and Cutter 2001). There is more information on the role of technology for managing disasters in *Unit 8*.

3 Social media and social networking – social media and social networking can be used as a tool to emergency response communications. Text messaging such as Twitter and the social networking system such as Face book can be used as a channel of communication in disaster response.

Examples of suggested applications of social media and social networking include:

- Use blogs to rapidly publicize the need for assistance grants.
- Create geo-tagged photo groups to document damage.
- Publicize volunteers willing to share recovery-relevant expertise.
- Use map-based mashups (combinations of data in webpages) to display relevant local information.
- Immediately share "lessons learned."
- Integrate volunteer directories with social networks to simplify information sharing.
- Distribute weather information via methods that support geographic targeting.
- Encourage sharing of resource information among corporations that will most likely be involved in recovery work.
- Use the assistance application process as basis for voluntary sharing of information among affected populations.



Disaster Recovery

As the emergency is brought under control, the affected population is capable of undertaking a growing number of activities aimed at restoring their lives and the infrastructure that supports them. There is no distinct point at which immediate relief changes into recovery and then into longterm sustainable development. There will be many opportunities during the recovery period to enhance prevention and increase preparedness, thus reducing vulnerability. Ideally, there should be a smooth transition from recovery to on-going development.

Recovery activities continue until all systems return to normal or better. Recovery measures, both short and long term, include returning vital lifesupport systems to minimum operating standards; temporary housing; public information; health and safety education; reconstruction; counselling programmes; and economic impact studies. Information resources and services include data collection related to rebuilding, and documentation of lessons learned. Additionally, there may be a need to provide food and shelter for those displaced by the disaster.

Recovery activities are classified as short-term and long-term.

During response, emergency action was taken to restore vital functions while carrying out protective measures against further damage or injury.

- *a* Short-term recovery is immediate and tends to overlap with response. The authorities restore interrupted utility services, clear roads, and either fix or demolish severely damaged buildings. Additionally, there may be a need to provide food and shelter for those displaced by the disaster. Although called short-term, some of these activities may last for weeks
- *b* Long-term recovery may involve some of the same activities, but it may continue for a number of months, sometimes years, depending on the severity and extent of the damage sustained. For example, it may include the complete redevelopment of damaged areas. The goal is for the community to return to a state that is even better than before the emergency.

This is an ideal time to implement new mitigation measures so that the community is better prepared to deal with future threats and does not leave itself vulnerable to the same setbacks as before. Helping the community to take new mitigation steps is one of the most important roles during the recovery phase.

The Recovery Plan

The recovery process should be understood clearly and it is important to have a general plan for recovery which should be appended to emergency operation plans.

The primary purpose of the plan is to spell out the major steps for managing successful recovery. For each step you will also designate key partners and their roles and steps to mobilize them. The plan should have at least the following seven steps:

- 1 Gathering basic information
- 2 Organizing recovery
- *3* Mobilizing resources for recovery
- 4 Administering recovery
- 5 Regulating recovery
- 6 Coordinating recovery activities
- 7 Evaluating recovery

For the majority of disasters, local communities are able to provide the assistance needed for recovery. However, for a major disaster, it may be necessary to obtain assistance from the government and other sources. Therefore, preparations must be made to request outside aid if a major disaster occurs. This will mean informing and convincing decision makers, especially those outside the affected area. Documenting the effects of the disaster is the best way to carry this out.

Documentation involves providing evidence of what happened. Photographs of the damage provide irrefutable evidence. Take pictures of the damage, the repair work, and completed restorations. You cannot take too many pictures.

There can be a good documentation if the following five simple steps are followed:

- Take pictures of damages and repairs. More is better than too little. Private citizens may have excellent shots to supplement your own.
- 2 Take notes on damages and repairs. Again, more is better than too little. If there is too much to write at one time, dictate your notes into a tape recorder for later transcription.
- *3* Clip and file newspaper reports and stories. If you can get video footage from the television stations, do that also.
- 4 Record all expenditures carefully and keep all receipts and invoices.
- 5 Make sure anyone acting on behalf of the jurisdiction does the same.

Disasters as opportunities for development initiatives

Disasters can be a vehicle for major development programmes. The political impact of damage and disruption can be a real catalyst for change. Disaster inspired development initiatives are influenced in a number of ways, but two aspects are especially important. First, disasters can highlight particular areas of vulnerability, for example where serious loss of life has occurred, or where the economic damage is disproportionate to the strength of the impact. The outcome of this is usually to highlight the general level of underdevelopment. Second, for a few weeks or months, the political environment may favour a much higher



rate of economic and social change than before, in areas such as land reform, new job training, housing improvements, and restructuring of the economic base (note however that this may involve a transfer of resources from other areas and sectors). The value of direct international assistance given after disasters may partially compensate for economic losses, although the amounts are usually rather small in relation to the total loss.

There may also be longer-term benefits from a drastic restructuring of the economy as a result of a disaster. For example, small island economies which were previously dependent on a single crop may expand their economic base, often with international assistance. The extent to which development opportunities can be followed up after a disaster will usually be constrained or otherwise influenced by donor investment policy for emergency loans. It is illustrative to review the current World Bank criteria for emergency lending for post-disaster investment. (Stephenson and DuFranc, 2002)

Unit summary



Summary

Unit 4 provides information on disaster response and recovery likely to be made by institutions or agencies and residents during the management of disasters. The focus of the disaster response is shown to be the survival and medical assistance to disaster victims in a timely fashion to save lives. Disaster response is a sub-division of disaster management that takes into consideration acts of recovery and self-sufficiency; reconstruction and rehabilitation that can be carried out in the short and long term in the best interest of people involved before, during and after disasters.

Mitigative strategies such as evacuation, early warning, search and rescue have been methods of disaster response aimed at reducing the impact of disasters on people. They have been highlighted with the view to show the importance of their use in disaster management. Relationships between the disaster response and resources, security and communication in disaster management are highlighted to demonstrate the ways that people cope and survive disasters.

The modern versus traditional methods of responding to disasters are described to show distinctions and commonalities between the methods of humanitarian, remittance, networking, volunteerism and mutual aid agreements that disaster responders may choose to use, depending on the scope and magnitude of disasters experience by communities and the resource assessment made.

Assignment



Research the disaster management response and recovery components of the disaster plan in your country. You are expected to discuss with appropriate resource people to answer this assignment.

Assignment

Self-Assessment



Assessment

- Protection of life and treatment of persons are reasons for evacuation. True or False
- 2 The traditional response to disaster can in some cases contribute to the modern method. True or False
- *3* Reconstructions after a disaster should be carried out so that they are better than before a disaster. True or False
- 4 Recovery measures are short term only. True or False.



Solutions:

- 1 True
- 2 True
- *3* True
- 4 False

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Unit 5

Education and Public Awareness – Part I: Community-based Initiatives

Introduction

Every country is at the risk of exposure to some type of disaster, whether natural or man-made. In order for each country to prepare for any kind of disaster, it must inform its citizens about the different types of disasters. The local residents must also be aware of how they can effectively participate in preparing for a disaster, mitigating potential impacts of a disaster and the recovery process after a disaster.

One of the most effective mechanisms for a country to prepare for a disaster is by conducting education and public awareness programmes at the local community level. Public awareness in disaster management is a process of educating and empowering the population through sharing knowledge and information about the various types of disasters and their potential risks as widely as possible so that people act appropriately when a disaster happens.

Upon completion of this unit you will be able to:



- *Identify* the different stakeholders involved in the Community-based Approach.
- Categorise the stakeholders according to their roles and responsibilities.
- *Identify and explain* the different methods that can be used to assist communities in reducing disaster risks.
- Describe how a community-based action plan for disaster management can be implemented actively.
- Identify and compare the advantages and disadvantages of the Community-based Approach.



Outcomes

ABC	Public awareness:	the process of transmitting information to the general population to increase their levels of consciousness about disaster risks so they can prepare appropriately to cope with a disaster
Terminology	Community-based approach:	a method of education and public awareness in disaster management in which community members are involved in the planning and implementation of the awareness programmes
	Hazard Map:	a map which shows areas that are vulnerable to particular hazards such earthquakes, cyclones, flooding, volcanic activity
	Community Disaster Management Organisation :	a national organisation which ensures that planned activities for disaster management are implemented within a given timeframe

Rationale for a Community-Based Approach

All governments are responsible for protecting their citizens and endorsing the 2005 Hyogo Declaration which states that: "strengthening community level capacities to reduce disaster risk at the local level is especially needed, considering that appropriate disaster reduction measures at that level enable the communities and individuals to reduce significantly their vulnerability to hazards."

Members of a community are the immediate victims of adverse effects of a disaster. They have the best knowledge about their local surrounding in terms of the most disaster-prone areas, the demography of their community and their social and traditional organisation. It is important that they have the capacity to cope with the impacts of a disaster and are involved in the development of disaster management activities right from the initial planning stages. Community participation can also make them more confident in their capabilities to act in the event of a disaster leading to a self-reliant community (Newport & Jawahar, 2003).

Every community has members who can be ignorant of events around them especially when these events do not affect them directly or more frequently. This type of attitude can also be gradually changed by involving members of the local community in decision-making processes such as planning national disaster management plans or even designing awareness programmes. This bottom-up, participatory approach can make community members more receptive of new knowledge and information presented to them. Local residents who speak or understand their native language only may be hesitant to accept non-native people conducting education and awareness programmes for them.



Stakeholders' Roles and Responsibilities

An effective and successful community-based approach in reducing disaster risks is often attributed to the spontaneous participation and involvement of the following stakeholders:

- Government
- Non-governments (NGOs)
- Regional and International Organisations/Donor Agencies
- Island council (Local government)
- National/Local Organisations (women committees, youth groups, schools, etc)
- Community workers
- Trainers
- Disaster Managers (Local and National)
- Policy Makers
- Grass-roots people
- Religious Denominations

There is a need for coordination in the Community-Based Approach among all the stakeholders. The parameters for participation by each of the stakeholders need to be clearly outlined at the national level to avoid overlap and confusion. The focus for all of the stakeholders should be the local people, who are at risk of being potential victims and who should also assume responsibility in managing that risk. The stakeholders must:

- develop a strong governance framework through legislation and policies;
- mainstream disaster risk management and capacity building into decision making, the budget process, and sector, provincial and community development plans;
- strengthen, empower and support local and national structures; and
- understand and recognize that disaster management and disaster risk reduction are environmental, humanitarian and developmental issues, so there is a need to coordinate the implementation, monitoring and evaluation of the approach.

Categories of stakeholders

Government

To have an effective and sustainable impact on the community-based disaster programmes, policy makers should consider incorporating community- based disaster programmes into their drafting of appropriate acts and regulations in order to implement them effectively. The governments have a prime responsibility for managing disasters and for taking into consideration the roles taken by different people in the community in terms of developing and providing approaches and strategic actions which can be used to manage the consequences of disaster within the community. Community-based disaster initiatives produce results so long as there is also government support.

Non Government Organisations (NGOs)

NGOs are the appropriate organisations to conduct community-based disaster activities at the different communities and with different stakeholders. They consist of professionals, activists and grass-roots people who have wide networks which facilitate their capacity in programme development.

Regional and International Organisations / Donor Agencies

Selected donor agencies, regional and international organisations assist the communities in terms of initiating the community-based disaster programmes and providing financial assistance and sometimes resource people for the programmes.

Island Councils / Local Government

The most common elements of the community-based disaster involvement are partnership, participation, empowerment and ownership by the local people. Thus, it is the responsibility of the local government and/or island council to ensure there is an effective partnership in place, plus participation, empowerment and ownership by local people in their communities towards disaster reducing initiatives and programmes.

Community Workers

Community workers are the most reliable arms of the local government/island council in the implementation stage of the disaster policy and reduction initiatives. They have experience in handling disasters, hazards, emotional problems and coping mechanism and uncertainties. They assist the local government/island council in establishing a strong cooperation and understanding among diverse stakeholders including the local government, local NGOs, government, regional and international organisations. If this cooperation is effective, every person involved in all community-based disaster programmes is benefited, but the actual ownership still remains with the concerned community. This will be considered as a successful model for sustainable community-based disaster recovery, especially when the regional and



international agencies leave. The community workers should also know that the timing of any activity is important. Therefore their responsibility is to make sure the timeframe of any community-based disaster reduction activity is followed otherwise the involvement of the people in the community will be reduced.

National/Local Organisations

National and local organisations such as women's committees, youth groups, schools, religious groups, etc. should consider adapting the community-based disaster initiatives provided by the government, regional and international organisations as part of their overall disaster risks management. They are the main bodies in the community that can assist in the implementation of the community-based disaster programmes effectively.

National and Local Disaster Managers

Disaster Managers are the disaster professionals and technical people in the national government, who are responsible for the implementation of the disaster management initiatives of the country. Since the communities are important parts of the national government, these disaster professionals and managers should be aware that the key aspect of community-based disaster initiatives is its sustainability. Therefore, it is the trainers, local managers and/or national managers' roles and responsibilities to train people in the community to understand the basic community-based disaster mitigation practices. While people in the community should own the problems, consequences, challenges of disaster mitigations and preparedness initiatives, it is still necessary for the trainers, local disaster managers and /or national disaster managers to take people's involvement further by training them to be aware of disaster policy and strategy. One of the roles and responsibilities is to empower all concerned stakeholders through awareness training to involve them in decision making. They work together with local government on the development of schemes to ensure the sustainability of disaster initiatives is always in place at the individual, community and island levels. They are responsible for the implementation of local disaster management initiatives. These include island, city, province, department officers and practitioners.

Trainers

Trainers provide training to the community leaders and agents. Through the facilitation process, the trainers provide awareness training which includes activities that aim at assessing the people's capacity and vulnerability in relation to community-based disaster happenings. Trainers' responsibility is also to develop and provide proposals about possible awareness activities aimed at the improving the assessed capacity and decreasing the vulnerability rate of the community residents. The other important responsibility for the trainers is to make sure that their training content is visible within the community and through the daily contacts with the residents. Training is a very important channel for the community, and ensuring that the whole community can better react to future disaster happenings.

Policy Makers

The policy makers are the ministers, permanent secretaries of the ministries and heads of the national disaster management units. There are also policy makers at the local government level, including island council presidents, city mayors and local politicians who prepare the island and/or city policies.

Grass-roots people

People at the grass-roots should understand their own disaster risks and be well versed in taking actions against such risks.

Methods of Dissemination

The methods of dissemination that can be utilized in the Community-Based Approach are varied and depend entirely on the needs of the community and the resources available on hand. As you go through this section, you may think of other methods more relevant or applicable for use in your community. This section focuses on the most common methods that can be utilized in almost any community.

The use of audiovisuals is one method of creating awareness and education at the community-based level. Audiovisuals typically used in developing countries are print based because of the unavailability of more highly advanced technically based mediums of delivery (e.g. television or the internet). Discussed here are the used of hazard maps and posters. The use of community theatre or drama is another method of communicating messages to the community on disaster preparedness and response.

The Simple Hazard Map

A common visual aid utilized in the Community Based Approach is the Simple Hazard Map. It is basically a map of the local community which points out safe escape routes and safe refuges as a guide to where people can run and where they can gather if there is a hazard event (Disaster! 94). Simple hazard maps generally map out areas of risk and lead to action to reduce risk in those areas. It enables people to take the correct escape routes and gather at safe places when disaster strikes. It helps save many lives, homes and belongings which would otherwise be lost in a disaster.

You must also be aware that there is another kind of a hazard map which is more detailed than the simple hazard map. This is the complex hazard map. The complex hazard map is not discussed here because it is used at a level higher than the community level by trained planners and disaster managers.





Montserrat Volcano Risk Map

Source:

http://www.juicygeography.co.uk/downloads/Montserrat%20resources/mo ntserrat%20MVO%20risk%20map%201997.doc

Figure 4: Simple Hazard Map

Posters and Videos

Posters and leaflets on natural, technical and manmade disasters and their impacts can be produced and distributed or put up on community notice boards. The production and viewing of videos on past disasters can also be shown to communities to highlight important issues in preparation for or in response to disaster.

Community Theatre (Drama)

A different but exciting method used in the dissemination of information that you may have heard of is community theatre. The delight of theatre groups to dramatize disaster management awareness message is a medium that is very powerful. During the awareness meetings a mobile travelling theatre group or a local group can highlight the event with classical important messages. This is also a highly effective means of creating awareness in developing countries as the majority of people often have no access to newspapers and television. Local theatre groups therefore provide entertainment for the local community to which they belong and simultaneously present issues that directly affect the people as themes for their drama. Community theatre groups from a disaster prone area can produce drama relevant to the kind of disaster their community is prone to. People watching the drama are not only entertained but also gain a great deal of information and are made more aware of preparedness for and prevention of disaster in their community.

Informal Training

The Community Based Approach to Education and Awareness in Disaster Management also uses informal training as an efficient tool to prepare communities in the event that disaster strikes. This training takes place not only outside of the formal curriculum but often even outside the setting of a formal learning or training institution. Informal training is sponsored by the government, NGOs or other donor funding agencies. It targets community leaders and covers important information for people in disaster prone communities.

The existing government and the local structures should form the basis for the facilitation and implementing of the awareness training programme, progress and process. It is imperative that whole process of awareness is mainstreamed across sectors. The integration and involvement of disaster management is everybody's business but the crucial focus should be within the communities. There should be a gradual shift from disaster response to disaster management. The awareness training based in the communities is geared towards supporting them to understand and manage their hazard to reduce and mitigate their risks. The responsibilities should not only rest on the communities as such but that the public and private sectors should cooperate and be partners to discourage risk contributing activities and factors.

Workshops

Workshops are excellent examples of informal training provided to the community. A week long workshop facilitated by experts in disaster management for community leaders covers enough information, examples, activities and discussion to adequately prepare them in the event that disaster strikes. In this situation, the Education Officers, teachers and schools will be involved within their own structure. The Government Officers which includes education staff, in the divisions form teams to organize the workshops to the communities. You see then that the dissemination of knowledge and awareness to community leaders is in turn transferred to other members of the community. This is done by gathering all the members of the community at a communal meeting place



(e.g. a community hall, church or other traditional meeting place) and imparting this information to the rest of the community. In so doing, the community at large is then aware and better prepared to cope in the event that disaster strikes in their community.

Mass Campaigns

The mass campaign is a huge undertaking whereby the entire Islands, countries and international donor agencies will be participating. The governments, the donor funding agencies, the non-government organizations (NGOs), the communities and other possible stakeholders need to cooperate fully by pooling resources. The outcomes must meet the objectives of the process so the planning of the entire operation is crucial.

- Church groups, meetings and gathering are also effective avenues to inform and advice their congregation to further the impact disaster have on and the importance of awareness messages of preparedness, response and recovery
- Women's groups: It is imperative that women's group should also play a leading role in the dissemination of information amongst their structures either within church women's organization or Ministry and Department responsible for Woman's Affairs and other sub women's groups.
- Youth Groups. Youth holds the future of disaster management in their hands. They are resourceful people who need guidance to display leadership skills to be spearheading the implementation stage.

Mock Exercises

Another kind of informal training given at the community level is the use of mock exercises in reducing disaster risks. Community leaders from high risk communities are encouraged to organize occasional mock exercises so as to familiarize their communities with escape routes, safe areas to gather, etc.

The Community Based Action Plan

Community leaders can also create Community Based Action Plans specific to their needs. This action plan incorporates the hazard map, mock exercises and other important methods, skills and information needed in preparation for a disaster. The implementation of a communitybased action plan involves a long process. The following describes how a community-based action plan (referred to here as a 'disaster management plan') can be actively implemented.

Implementation Actions

Through participatory planning a Disaster Management Plan can be formulated. In most cases it may include a few small scale activities whereas in other communities it may entail a comprehensive disaster management project. To oversee and monitor progress of implemented activities, there is a need for the establishment of a central management body. This body or organization will have numerous roles from planning, implementation, monitoring and review phases of planned activities.

Such a body or organization may differ from country to country or community to community and may have different names but its roles and responsibilities are essentially the same. For the purpose of this course this central management body will be referred to as the Community Disaster Management Organization (CDMO) and its primary role is to ensure the planned activities are implemented on time within the given resources.

The success of activities of the disaster management plan will depend on the successful operation of the CDMO and will include various tasks and processes e.g. tasking, mobilizing community resources, capacity building, monitoring and review and making necessary adjustments.

Tasking

The CDMO should be responsible for setting up appropriate committees to implement the various necessary risk reduction measures such as risk communication, health, evacuation, early warning, agricultural etc. The CDMO should ensure that committees responsible for risk reduction measure are clear on the roles assigned to them and each has access to individuals and groups with necessary skills and expertise to implement the tasks assigned to them.

To ensure that these activities can be carried out, the CDMO could mobilize the broader community and its resources. The CDMO should also assign at least one person to carry out each of the following roles

- Leadership role have overall responsibility for activities of the committee
- Management role ensure implementation of agreed activities
- Administrative role assist in management
- Technical role provides inputs
- Financial management role provides proper accounting
- Social mobilization to mobilize community resources

Capacity Building

To implement their respective tasks it is imperative that responsible individuals and committee members have the technical capability. Without capacity building, the quality of risk reduction measures will be compromised.



Depending on the local situation and the existence or non existence of a CDMO, capacity building can be done either before the start of participatory risk assessment and planning or during the implementation process. The CDMO once formed can get assistance from partner NGOs and government organizations or ministries.

Mobilising Resources

During the participatory disaster risk assessment and planning stages is when resource mobilization commences. To ensure the availability of resources at all times it should continue through to the implementation phase. Should there be a lack of required technical skills within the community, it is the responsibility of the CDMO to mobilize external partners and stakeholders e.g. relevant government departments and ministries, NGOs and local business organizations to meet the needs. It should also involve mobilization of resources to build capacity of the CDMO members and committees and mobilization of appropriate range of resources e.g. human, physical/material, natural and financial.

Monitoring

It should be a vital role of the CDMO to arrange participatory monitoring activities in order to track progress on implementation of the risk reduction measures. This includes monitoring of progress on activities, time frames, budgets, indicators, outputs and objectives and the impact of risk reduction measures. The CDMO should also monitor those who would be negatively affected and those who have dropped out and if so find out why. All stakeholders should be involved in the participatory monitoring system to ensure their particular needs are met in relation to what they would like to monitor, how and when data can be collected. This monitoring system will involve data collection, review meeting and reporting. It is essential that periodical review of the progress being achieved in the implementation of risk reduction measures.

Periodical reviews of progress should include all stakeholders and depending on the duration of the project reviews could be weekly, fortnightly, monthly etc. The requirements of the disaster reduction plan and concerns of stakeholders should be addressed. Reports from all implementing individuals and groups should be presented during this review. In addition to participatory review activities written reports can be used to monitor and document progress and these reports can be prepared to meet demands of donors and partners. Depending on the kind of information the stakeholders would like to report, the format can be designed to meet this need.

Such a report should cover the following:

- Date of report preparation
- Agency preparing the report
- Period covered by the report
- Progress on activities

- Achievements on indicators
- Achievements on objectives
- Problems faced
- Actions taken to address the problems
- Recommendations
- Financial Report

Advantages and Disadvantages of the Community-Based Approach

As with any other approach, the community-based approach has its pros and cons. The following are some that you should be aware of:

Advantages

The following are advantages of using the Community-Based Approach:

i Ownership and Sustainability

The Community Based-Approach involves people and gives them a sense of ownership of the materials created or methods incorporated in education and public awareness. Through ownership comes sustainability. The projects used as tools at this level become ongoing projects that can then be modified whenever the need arises.

ii Addresses the Immediate Needs of Communities

The Community-Based Approach is targeted specifically at particular communities and it addresses their immediate needs. This is because at the community based level, immediate needs are better identified.

iii User Friendly

Information is presented in such a way that people can easily understand or relate to, for example, the use of the language that people in a community are most familiar with.

iv Provides Knowledge and Skills

Finally the Community Based Approach empowers or equips people with the necessary knowledge and skills to help themselves in the first seventytwo (72) hours of a disaster. This is the most crucial time at the onset of a disaster when outside help is still on its way.



Disadvantages

These are some of its disadvantages:

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i Fear
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Communities are sometimes reluctant to expose the vulnerabilities of their localities to outsiders. This is because they fear that they will lose potential investors in their communities, e.g. tourists.

ii Lack of Resources

At the community based level, the lack or unavailability of resources required to effectively carry out awareness is also a disadvantage. Without the necessary resources, people have to improvise with what limited resources they have and this not only makes it very difficult for them but also impacts on the quality of work they have produced.

iii Misleading Information

When public awareness and education is not carried out properly at the community level, misleading information is disseminated to the rest of the community. This can lead to a chaotic situation and ultimately loss of lives at the onset of a disaster.

iv Lack of Proper Training

A further problem with this approach is also the fact that those utilizing the tools of the communicative approach may not have had proper training in what they are doing. This can also lead to distortion of information, thus misleading the rest of the community.

v Gender Bias

Last but not the least, there is a tendency in many developing countries not to involve women and young people in the creation of the tools of the Community Based Approach due to religious and cultural influences. Observation shows that too often those involved in public awareness and education at the community based level are males (middle aged and older). There are certain needs of communities that are overlooked by males (middle aged and older) but easily identified by women or youth.

Unit summary



In this unit you learned about the importance of a community-based approach in education and public awareness programmes in disaster management and the stakeholders involved. Community members should be involved in the planning and implementation phases of these awareness programmes as it makes them more receptive to new ideas and appropriate responses to a disaster. You also learned about various methods which communities can use to actively implement communitybased action plans to reduce disaster risks as well as identifying and comparing the advantages and disadvantages of a community-based approach to education and public awareness.

Assignment



Assignment

Critique

Go to your nearest Disaster Centre/Office and have a look at a Community-Based Action Plan for your community (or for other communities). Provide a critique of this action plan highlighting the presence or absence of the following major components:

- 1 The assigned tasks of individuals or groups within the community.
- 2 Risk reduction measures or activities. (What strategies have been put in place for risk reduction?)
- *3* Does the plan include training for education and public awareness at the community level?
- *4* Identify and describe any pros and cons of the Community-Based Action Plan.



Self-Assessment

	Provide short answers to the following questions.
	1 Why do you think it is important for education and public awareness to be carried out at the community level?
Assessment	2 In two paragraphs describe the roles and responsibilities of disaster managers and community workers in education and public awareness.
	<i>3</i> Explain why the community-based approach needs to take into consideration the availability of resources.
Solutions	Key concepts that should be included in your answers:
	1 Community members are the potential victims, and know their region best, including its terrain, hazards and vulnerabilities. They are also the experts in their language and culture. Involving them increases "buy-in", and enhances their self-reliance and confidence.
	<i>2</i> Policy-making input, leadership and organisational roles; fundraising and resource gathering; management at the local level; and dissemination of information.
	<i>3</i> Avoid promising more than can be delivered; know how to make best use of available resources and what outside aid may be required; know what capacity building and training may be needed.

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Unit 6

Education and Public Awareness – Part II

Introduction

Disaster management is everybody's business. The impact on the lives and livelihood of peoples as well as damage to infrastructure are huge. The communities must be more proactive towards preparedness and reduction of risks during disasters whether it is natural or man-made. We will depend a lot on the resources and the traditional knowledge we have to prepare in terms of subsistence, like planting the root crops three months before the cyclone seasons. The cutting down of branches of wood, pulling down flimsy constructions, constructing buildings that can withstand cyclones and following simple instructions are measures that if we take seriously will greatly reduce unfortunate tolls and damages. The design of risk reduction strategies is imperative. Therefore, personnel training and volunteer assistance, school-based programmes and hazardous materials on disaster management are main issues discussed in this unit.

Personnel training and volunteer assistance prepare people to improve and strengthen their capacity towards managing and reducing the impact of disasters. The preparation should begin with the assessing and identifying of the capacity needs of the communities. The hazards and vulnerability of the communities at risk should be assessed on how they will be affected technically, economically and socially.

Linking school activities and plans to the work of country coalition and local community networks reinforces the goal of creating of an environment and local norms of supportive attitudes towards disaster risks. In planning school-based programmes on disaster management, schools must reach out and link with the community and include work with the local coalition in the community in the work plan. Also schools must identify all the partners in disaster prevention, within as well as beyond the school system, and define their roles and responsibilities in the programmes. For example, parents play a very important role in providing social and environmental support for the school programmes on disaster management.

Public awareness of hazardous materials is also vital for disaster prevention. A hazardous material is a substance that on release or contact has the potential of causing harm to people (physical or health effects), property or the environment. Harmful physical effects include fire, sudden release of pressure, explosion, and other violent reactions. Harmful health effects include acute conditions and chronic conditions. Acute conditions develop soon after over-exposure to hazardous materials and include burns, rashes, respiratory distress, convulsions, and possibly even death.

Upon completion of this unit you will be able to:



- Recognise the contribution and participation of volunteer agencies assistance.
- Define the contents of a school-based programme on disaster management.
- Identify some appropriate school-based programmes on disaster management.
- Discuss and implement a school-based programme on disaster management effectively.
- Identify and discuss some types of hazardous materials.



Terminology

Hazard identification:	The process of identifying what hazards have threatened a community, how often specified hazards have occurred in the past, and with what intensity (i.e., damage-generating attributes measured by various scales) they have struck; the first level of hazard analysis sophistication.
Hazardous materials:	1. Any material that is dangerous to life, health, or property due to its chemical nature or properties. This group of chemicals is used in industry, agriculture, medicine, research, and consumer goods. Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. These substances are most often released as a result of transportation accidents or because of accidents in chemical plants.
Hazardous waste:	A solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may:

i cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible serious illness, or

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Outcomes



	<i>ii</i> pose a substantial presence or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.
Flammable liquid:	Any liquid that produces enough vapours to ignite if exposed to an ignition source.
Flammable solid:	A substance when ignited, will burn so vigorously that it creates a hazard.
Corrosive:	Something that will destroy or irreversibly damage a substance, including living tissue, by chemical action. The main hazards to people include damage to eyes, skin and tissue under the skin, but inhalation or ingestion of a corrosive can damage the respiratory and gastrointestinal tracts.
Poison:	A substance that is toxic to life or health.

Duties of Response Personnel

Each duty involves a series of tasks and steps that must be considered and resolved by decisions and actions. These duties when supported by the response communities are the framework of an appropriate, survival oriented response to hazardous materials incidents. Reasoned decisions based on this approach will minimize the harm resulting from a hazardous material incident and reduce the risk to responders.

Community Mitigation Goals

Hazardous materials are usually transported on the roads and railroad networks throughout countries. Some of these hazardous materials are stored and consumed by the community, in particular, gasoline for vehicles, propane for heating, and anhydrous ammonia for fertilizers. During disasters, the potential is high for release or spill of hazardous material into residential areas or areas frequented by communities. It is important therefore to raise and promote awareness of communities in the safeguard, handling, use and disposal of hazardous materials.

Pre-Disaster Mitigation Plan

To increase the public's awareness of the full range of man-made or technological hazards, it is recommended that education and outreach programmes are developed and implemented. Actions to take include:

- 1 Educating the public about the hazardous materials to which they are most frequently exposed.
- *2* Help homeowners identify Hazardous Materials from which they are at risk.

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3 Identify, publish and disseminate a procedures manual on the disposal of hazardous materials.

Personnel Training

Training personnel is the preparation of resource people to provide basic information on appropriate targeted goals. It provides premier world-class training, products and services through innovative methods and technologies that contribute to the protection of life and property in the environment. It is a training that develops resources based on the needs of people.

Purpose

The reason for disseminating quality information in the informal mode is very important to the communities. The obvious reason is to integrate the local skills and knowledge with modern technologies with the immediate resources that are available especially with regards to disaster risk management. The resource people in the government, NGOs and communities within the local government structure are driving the personnel training programmes.

Some types of Personnel Training

- Legislation, convention, policy framework and planning
- Health
- Rehabilitation
- Disasters, hazards and quarantine
- Organizational structure
- Establishment of disaster committee
- Resource personnel
- Leadership and discipline

i Legislation, convention and policy training

The communities need to know about legislations passed through the legislative body of the nation on how to mitigate not only in disasters but also related by products like hazards and quarantine. They also need to be informed of the conventions the government has signed to be part of the global and regional drive to manage disasters better. The importance of knowing these legislations and conventions are not only for their understanding but to take the necessary action when the time comes. The policies and plans are documents to guide the communities to be conscious of why disaster management is a developmental issue. It clarifies the government commitment.



ii Health training

There are many health issues affecting communities after events of disasters. The possible outbreak of epidemics caused by rotting animal carcasses, rotten leaves, tree trunks and unhygienic environment is very disturbing. The Health Department has all the relevant information and data to facilitate any training we seek to implement.

iii Rehabilitation training

This type of personnel training is to ensure that skilled personnel are available to serve the rehabilitation needs of individuals with disabilities in the aftermath of a disaster. The programme supports training and related activities to increase qualified personnel trained in providing rehabilitation programmes. The trainings are funded by donors under bilateral or multilateral agreements. This training also may introduce low cost housing packages- for example the one that is recommended by Habitat for Humanity International. However, buildings constructed out of local materials should also be reinforced to meet hurricane force winds.

iv Disasters, hazards and quarantine training

Communities are prone to different kinds of disasters. They take it for granted that whether they like it or not they cannot run away from disaster. What they sometimes do not understand is the impact of the disasters on them. It is better for them to shift their understanding from picking up from the aftermath to preparing for the worst prior to the striking of a disaster. Another point that links directly with disaster reduction is the positive response to warnings that are issued by the National Disaster Management Office or through the Meteorological Departments, especially on tsunami or cyclones. it is important that disaster warnings are taken seriously. Training on hazardous materials should also be integrated into the education of personnel involved in disaster management. Hazardous materials are substances that are potentially harmful and dangerous to living beings, animals and environment. Quarantine is also connected with disaster reduction. This refers to the enforced isolation of people or animals that may have been exposed to contagious or infectious diseases. Quarantine training is a measure to reduce risk. There are three things to know about quarantine measures.

- The enforced isolation of people and animals are kept at a safe place to prevent the spread of disease.
- A calculated period of time must be spent in the secluded area to ensure the prevention of the spread of the disease.
- The isolation may result in communities and government in avoiding another unnecessary disaster and expenditure.
 - v Organizational structure training

The communities that cooperate well in any event of disaster are ones that will recovery more quickly. This means that they have a disaster management committee in the communities. Not only do they have a disaster committee but that it is well constituted, in operational and fully functional. There is a continuous flow of information and communication as the structure to create human resource development is addressing disaster as a developmental issue shifting from the concept of rebuilding in the recovery stage to a more managerial commitment. The committee networks with the wider structures in the province and the national level to put in place a response and recovery plan and carry it out. In the event of a volcanic eruption, the evacuation of people out of the disaster area within the islands or crossing to other islands and emergency centres to coordinate relief is ready. The structure of providing personnel training is established to facilitate the accessing and channelling of funding and services that are available before, during and after the disaster strikes.

vi Resource personnel in communities training

The capacity needs visibility study so as to assess how to maintain, sustain and support continuous human resource. Each disaster is different in any given situation, however, the skills, tools, and technical expertise that is available needs to be supported and equipped. There are resource and skilful people in the communities who can be singled out to lead in areas or field they are experienced to facilitate in the training.

vii Leadership and discipline training

The type of personnel training in leadership and discipline is crucial. Quality leaders with sound discipline are needed to sustain and maintain the process and progress of disaster management. The chiefs and their communities must show responsibility, ownership and commitment. At the end of the day, the communities must have a livelihood to live for. So the establishment of disaster committees is essential to produce a set of relevant indicators as a monitoring and evaluation process to report progress, effectiveness and efficiency for relief supplies. It is essential to discourage politicized propaganda in the overall disseminating of information and relief supplies.

From here we can move to outside assistance to meet whatever means there are through the regular structure. It is also diagram is a sample and is subjected to be modified to suit the different situation and location. To facilitate the training, donors/Partners and volunteer assistance during relief, the structure needs to be established by legislation or Council of Ministers' (COM) approval. This is appropriate to the different situation in the region so as to facilitate not only the training programme but also the channelling of relief aid after the event of a disaster. The children need to know how, what, where and when to seek assistance before a disaster strikes.

Volunteer Assistance

A volunteer assistance is a group of people or organizations that are willing to give assistance on voluntary basis. This group of people or organization provide predictable, safe and sanitary environment in the aftermath of a disaster in the communities. They participate in the community organs and provide and liaise relief from the wider community. For example, the cultural values play an important role in assisting families receives materials and utensils if they have lost most or all of their well-being. The next level where volunteer assistance comes from is organizations from outside but within the national boundaries.

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Volunteer assistance comes from organizations like in country Red Cross Society that also have networks within the communities and government through the standing military forces. Donor countries like France, Australia, New Zealand and China and others provide volunteer assistance in assessing the situation through surveillance. For this kind of assistance to be continuous, the recipient countries and the donor agencies need to be bonded by some form of agreements or convention through becoming members of the global forum.

School-based Programmes

School-based programmes on disaster management are sets of activities that are dealing with disaster prevention strategies for the school. The development of all school-based programmes on disaster management should begin with a determination of which natural and technological disasters are possible in the school area. Make sure all the school communities do not assume they know all the disaster risks. School stakeholders may be surprised to learn that their school areas are subject to natural disasters they had not anticipated. Also, remember that disasters can have a cascading effect. For example, think about how transportation routes or other external factors may also affect the schools by asking "Are we near a major highway where hazardous chemicals are transported, putting our school in danger of a chemical spill?"

Once schools find out what disasters are possible in their areas, assess their structures. For example, falling objects, fires, and the release of hazardous materials, flying debris and roof collapse, cause most of the injuries and deaths related to disasters. Be sure, then, to look for such hazards when doing their assessment.

School-based programmes on disaster management consist of conducting survey in a systematic manner, making an inventory of all items that require attention. It may be possible to enlist volunteers from among their parents or emergency management community. Since prevention of disaster risks is everybody business, all school stakeholders must personally walk the school halls and classrooms to determine what risks exist. Before a disaster, schools should document their property, something that can be done as part of the hazard assessment. Schools that take photos and videos prior are far ahead in recovery with less hassle and more quickly restored than the schools where files are missing and records were not kept.

School-based preparedness disaster programmes for those with special needs

Schools should be prepared to deal with the special needs of physically and mentally challenged students in an emergency. Special needs of students and staff should be a consideration in all school safety plans. Local schools should identify their particular needs and how best to address these needs. Some schools will need to communicate with transport students and staff with mobility impairments while others must address the needs of blind or deaf students, or those with language barriers. The Ministry of Education should develop a model school

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safety plan, and this plan will contain a section on students and staff with special needs.

School-based drill programmes

Ideally, schools should conduct quarterly. At a minimum, drills should be conducted each term or semester, both trop remind the school community the appropriate procedures and to teach the students and staff. Drills can help the schools test their plan and identify their strengths and weaknesses.

Law enforcement in school-based programmes on disaster

Law enforcement and school-based security must have a relationship in place that has, at its core, the safety and welfare of students. In conjunction with other key players (e.g., education, emergency management, public health), law enforcement should be involved in every aspect of crisis plan development and implementation. They need to be at the table as the plan is developed; active participants in drills and practices; and part of the team that regularly reviews and makes changes to the plan.

Sufficient school supplies

School programmes should focus on such issues as where students will sleep and which rooms are the safest. It is also important that each school has sufficient supplies for use during an emergency including:

- food
- stored water
- flashlights with batteries
- first aid kits
- blankets
- battery-powered radio
- other appropriate supplies.

After a disaster, schools may serve as the gathering place for hundreds of people who live or work nearby. Thus, schools' plans should address how school personnel are released and in what order. Some staff, for example, may live nearby and may be able to stay while others have small children and will need to get home in the case of an emergency. All staff, however, must have back-up family plans in case they cannot return home or must remain at the school following a major disaster.

While planning school-based plans on disaster prevention can be an overwhelming process, it may help to sketch out a chronology of what to do immediately following a disaster. Often the first decision will be to evacuate or to stay put. School plans will address both options. Their plan



must then address the following actions to take if there are people who will remain in the buildings:

- *i* Damage must be assessed and damaged portions of the building sealed off.
- *ii* Location of the school to be far from the coast where most disaster risks happen
- iii Injured students and staff must be attended to.
- *iv* All people in the buildings must be accounted for
- v Searches initiated for the missing.
- *vi* Small fires must be extinguished and utilities assessed and shut off, if necessary.
- vii Hazardous spills must be contained and sealed off.
- viii Of course, students need to be kept calm and reassured.
- *ix* Staff must be responsible for establishing contact with the outside and for handling media questions.
- x Someone the principal or designee, should be identified as the Incident Commander and in charge of the disaster scene
- *xi* Individual schools may use the term campus commander to differentiate from the top school district level incident commander.

Schools have to make sure that there are keys to ensure access to the supplies during an emergency, including access by programmes such as day-care and after-school events. Plan an annual inventory, replacing water and other items with limited shelf life as necessary.

Individual disaster kits

Some schools ask students to bring in their own kits. Student-assembled "comfort kits" typically include the following:

- a little food;
- some water;
- a space blanket or large plastic trash bag;
- a non-toxic chemical emergency light stick; and
- a letter or photograph from home.

These kits can be helpful, but require a great deal of time and supervision to assemble and check when they are brought to school. Sometimes parents include perishable items by mistake, and some parents do not send anything at all. The school will need a plan to make sure that each student has a kit. Vendors sell expensive individual kits as well, with much of the value in the packaging

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Hazardous Materials

A hazardous material is a substance that on release or contact has the potential of causing harm to people (physical or health effects), property or the environment. Harmful physical effects include fire, sudden release of pressure, explosion, and other violent reactions. Harmful health effects include acute conditions and chronic conditions. Acute conditions develop soon after over-exposure to hazardous materials and include burns, rashes, respiratory distress, convulsions, and possibly even death. There are many types of hazardous materials; however, only the following types of hazardous materials can be discussed in the unit.

Ways of storing and safely handling hazardous materials

Hazardous materials must be stored based on their compatibility, not simply in alphabetical order. Materials of the same hazard should be stored together i.e. flammables with flammables and oxidizers with oxidizers. Hazardous substances should be stored in an orderly manner with older products most accessible and the newer products least accessible. Good housekeeping must be practiced in areas where hazardous products are stored. All hazardous materials must be properly labelled including their exact contents, hazardous properties, date of receipt, and if appropriate, date of expiration. Hazardous substances should be stored in original containers in which they were packaged at the manufacturing plant. If this is not practical, these products should be transferred according to manufacturers' recommendations into containers that are constructed to withstand the effects of the product over the maximum storage time. Incompatible materials must not be stored such that they may come in contact with each other. Chemicals shall be stored separately from non-compatible hazard classes. The following are some recommended storage schemes to minimize incompatibility of chemicals:

- metals, hydrides.
- hydroxides, oxides, silicates, carbonates, carbon.
- sulphides, selenide, phophides, carbides, nitrides.
- acids, anhydrides, peracids
- alcohols, glycols, amines, amides, imines, imides.
- hydrocarbons, esters, aldehydes.

Liquids should be stored in unbreakable or double-contained packaging, or the storage cabinet should have the capacity to hold the contents if the container breaks. Avoid floor chemical storage (even temporary).Chemicals should be stored no higher than eye level and never on the top shelf of a storage unit. Shelf assemblies should be firmly secured to the walls. Avoid island shelves. Each shelf should have an antiroll lip. Store acids in a dedicated acid cabinet. Nitric acid may be stored there also, if it is kept isolated from the others. Store severe poisons in a



dedicated poison cabinet. All chemicals should be labelled and dated. Look for unusual conditions in chemical storage areas, such as:

- improper storage of chemicals
- leaking or deteriorating containers
- spilled chemicals
- temperature extremes (too hot or cold in storage area)
- lack of or low lighting levels
- blocked exits or aisles
- doors blocked open, lack of security
- smoking or open lights or matches
- fire equipment blocked, broken or missing
- lack of information or warning signs such as "No Smoking", "Flammable Liquids", "Acids", "Corrosives", "Poisons", etc.

Coping with Exposure to Hazardous Materials

- Do not purchase these compounds in quantities greater than can be used in the specified storage time period.
- 2 Ethers should be stored in the dark and under nitrogen if possible.
- *3* Always check for the presence of peroxides before distilling any peroxide former.
- 4 Consult safety references before working with peroxidizable compounds.

Whenever it is feasible, engineering controls must be used to reduce personal exposure to hazardous materials. The two most common engineering controls are the use of local exhaust and general ventilation. These measures limit a person's exposure to airborne contaminants.

When engineering controls are not available, or they fail to adequately reduce hazards, other personal protective equipment is required. Examples of personal protective equipment include: safety glasses, hearing protection, gloves, respirators, etc.

Personal protection devices must be provided and worn in accordance with the manufacturer's recommendations indicated on the label of the product or as stated in the Material Safety Data Sheet for the product. Hazardous chemical spills can be handled effectively when plans of action have been developed. Spill procedures should include the following:

- the potential location of possible spills
- the quantities of material that might be released
- chemical and physical properties of the material. This information may be obtained from the Material Safety Data Sheet or label
- hazardous properties of the material
- the types of personal protection equipment that may be needed for cleanup
- location and contents of spill kits that should be made available where possible.

The following general procedure may be used, but should be tailored to the individual needs of the handlers and the specific hazard associated with the hazardous material:

- If the spilled material is flammable, turn off ignition and heat sources.
- Attend to any person who may have been contaminated.
- Notify individuals in the area about the spill.
- Evacuate nonessential personnel.
- Avoid breathing vapours of spilled material. Establish an exhaust or ventilation, if it is safe to do so. Air handling units are not to be used because they re-circulate the hazardous vapours.
- If a spill is relatively large, or involves a highly toxic material, a carcinogen or flammable material, contact appropriate authorities for assistance in cleaning up the spill and disposing of the hazardous waste resulting from the cleanup.

Waste products must be clearly labelled with the complete names of the contents and they must be stored in non-leaking, safe containers. Local authorities may be contacted for pickup and giving the name of the products to be picked up, the location, the person in charge of the area, his phone number and the approximate quantity of the materials to be picked up. To minimize the risk of exposure to Hazardous Materials several steps can be implemented such as i) Buy only those amounts of hazardous materials which can be used before the expiration date of the material ii) Use up the hazardous material by using it for the purpose for which it is intended iii) Some Materials can have more than one usage. These materials can then be safely shared without stockpiling them and iv) Safe handling, storage and disposal procedures must be employed and within guidelines of manufacturers and governments. In the case of an accident e.g. spillage during a disaster the proper response (according to the nature of both exposure and hazardous Material) procedures must be employed.





Unit summary



In this unit you learned that through the education and public awareness programmes on disaster management, people recognize the need for specific attention to be given to planning ahead for the disasters and to reducing long term impacts in our countries that are prone to disasters. Many people from our disaster vulnerable countries have experienced that poverty and disaster vulnerabilities are intrinsically linked and that sustainable poverty and disaster reduction approaches must therefore incorporate risk reduction as one of the integral elements. The stakeholders in Disaster Management are conscious that natural hazards risks are predictable and foreseeable in many countries; therefore, each country's programmes, sectoral project resources and funding should give adequate consideration to managing and reducing disaster risks. The best way of doing this is to have education and public awareness through personnel training and volunteer assistance, school-based programmes on disaster management and awareness workshops on hazardous materials.□

Assignment



Describe a hazardous material that should be covered in personnel training for community and school?

Assignment

Self - Assessment



Assessment

1 Describe how volunteer organizations have assisted your country in the latest disaster

- 2 Name the different voluntary organizations that operate in your country
- 3 Can you add more phases in the recovery stages?
- 4 Does your community have a disaster committee?
- 5 Find out and describe how the disaster management office works in your country or province.
- 6 How do you identify a potential disaster event?
- 7 Once a threat has been identified, who do you contact, and in what order? This includes law enforcement, public health, other school officials, and the superintendent's office.
- 8 How will you contact students, parents or guardians?
- 9 How will you evacuate students or get them to safety?
- *10* How does the school's plan interact with the larger community emergency response plan?



Unit 7

Education and Public Awareness – Part III

Introduction

This unit completes the theme of education and public awareness for disaster management. We concentrate here on the role and influence of culture in Education and Public Awareness. Culture can be a useful resource for education and public awareness programmes on disaster management. It can also be a barrier to the development and effective implementation of these programmes. Local people know best about common and new diseases in their community, about the types of damage caused by previous disasters and about culturally accepted beliefs, rituals and desires which must be respected. A community response to education and awareness programmes can depend on their perspective of a disaster whether they consider it as an event or a process. If disaster is perceived as an event, a community tends to respond quickly by going through the stages of the disaster management cycle (Bankoff, 2002). Some of the most pertinent issues on the role of culture in preparedness for and response to a disaster are identified and described in this unit.

Upon completion of this unit you will be able to:



 Define and explain how culture contributes to people's response to education and public awareness programmes.

- *Discuss* important issues in relation to societal norms and values during education and public awareness.
- *Identify and compare* the roles that people play in preparation for a potential disaster as defined by their culture.
- Compare the importance of indigenous knowledge in education and public awareness on disaster management.



Culture:

Taboo Word:

The behaviours and beliefs characteristic of a particular social, ethnic or age group and transmitted from one generation to another.

Terminology

A word that is forbidden or not acceptable to use in everyday language.

Ostracise:	To expel from a community.
Backlash:	A strong unsympathetic reaction due to fear of a threatening situation.
Indigenous knowledge:	Generally refers to the matured long-standing traditions and practices of certain regional, indigenous or local communities.
Protocol:	A set of formal rules on which a community's way of living and operating is based.
Norms:	Standard patterns of behaviour of members of a community.
Ethnic Group:	A group of people identified as a specific class as they share common unique features such as culture, language, ancestry and nationality.
Oral Traditions:	Verbal dissemination of community knowledge on cultural history and ancestry from one generation to the next.

Understanding Culture

Culture is the way of life of a people. It is characterised by the people's language, beliefs, behaviour, norms and values. These cultural features are instilled in a society from generation to generation through learning. They have also enabled members of a society to cope with each other and with changes in their local surrounding.

Most countries have only one ethnic group and one language. However, there are some countries which have different ethnic groups with different languages and cultures. It is important to be aware of the different cultures in our communities so that we can predict or avoid potential cultural disputes before, during or after a disaster. Cultural understanding also enhances interaction and cooperation between all individuals affected by a disaster.

Appreciating Culture and its Contribution to Education and Public Awareness

Before carrying out education and public awareness, it is vital that agents carrying out the awareness are familiar with and appreciate the culture and protocol of the people they are addressing. When carrying out education and public awareness, they must be sensitive to cultural norms and values and they must incorporate this in the awareness. The role of culture in education and public awareness is seen here as being very significant. An outsider can not carry out education and public awareness campaigns without considering these cultural aspects of communities.

Culture becomes a barrier when training and awareness programmes are insensitive to beliefs, societal values and inappropriate use of language.



People may be reluctant to incorporate information and actions into their daily routines if they do not understand the language of communication or if translators are not provided during the training.

i Roles of different people

People's roles in preparation for a disaster can be determined by their culture. As mentioned earlier, if a culture perceives disaster as an event, the society will be more receptive of education and training programmes. Some cultural or ethnic groups place more value on certain members of their immediate community. These people must be knowledgeable about awareness programmes and should be part of the implementing delegation.

Indigenous community leaders (e.g. village mayors) – as these members know their community well, they may offer valuable opinions on the community needs, capabilities, and limitations. They may also be able to provide suggestions on ways of reaching out to their community. They can assist in the promotion of education and awareness programmes within their ethnic and lingual community as members may by more willing to listen to them and take up their advice compared to responses to strangers.

Religious leaders – most communities place religious leaders in high regard and are usually the most respected members of the community. Developers of education and public awareness programmes should include these leaders in the delivery of their programmes as community members will listen to them.

Teachers in local schools – as local schools communicate mostly in their native language, involving teachers in awareness programmes ensure that the essential information and actions are transmitted effectively to students. By educating students, they can also pass on important information to their families.

Extended families – Living in extended families is a norm in many countries especially those in developing regions. This communal setting has a hierarchical structure which persons at different levels being given certain responsibilities and roles within their family. It is therefore an obligation of planners of education and awareness programmes to understand the roles of the different members of an extended family so that adequate and suitable programmes are supported, promoted and implemented effectively.

The role of individuals according to gender and age – In the education and public awareness for disaster management, it is also essential that the roles of males, females, young people, children and old people are defined clearly according to the culture of the society.

In certain societies, the role of men and women are precisely defined. Men are given the freedom of education while women are denied this privilege. Hence, the women are deprived of crucial information to respond effectively to disasters. If they do receive the necessary information, it would be useless to them without a translator as they would be illiterate due to preferential treatment of the males. Also in some societies, it is taboo for women to associate with strange men or strangers, let alone touch them. It is taboo for them to expose body parts except for their face. For example, in some societies, the culture may be that women are only allowed to listen at important meetings. As such, the awareness campaigns should only be carried out by males. Such cultural restrictions can hinder their participation in education and public awareness programmes.

Another example can be seen in the fact that children, the youngest members of a community, are not involved in decision-making but are mainly the receivers of advice and implementers of instructions. Children can also play a role in education and public awareness through musical performances and drama.

ii Language

During education and public awareness campaigns, language has a great influence on community response. The local residents may be more receptive of training programmes if the training is conducted in their native language and appropriate terms/expressions are used. Accessible information must also be translated into their language and the trainers understand most, if not all aspects of their culture.

Which language do I use in my campaign?

It is advised that the language being used must be one that the targeted audience is very familiar with. As much as possible, the use of the community's mother tongue is advisable as the message will definitely be communicated effectively when presented in the mother tongue

Use of appropriate terms and expressions

The choice of words, terms or expressions must also be appropriate and structured in a manner acceptable to the people. People carrying out awareness campaigns need to be especially aware of the use of 'taboo' words. Taboo words or expressions are not openly used in day to day speech or in public. An example of this is seen in the anti HIV/ AIDS Awareness Campaigns in Papua New Guinea by the National Aids Council where the first line of the message is in Tok *Pisin* 'No ken kuap' (Do not have sex). The word for 'sex' that is being used here (*kuap*) is an extremely offensive or taboo word in Tok Pisin. As such, whenever that advertisement is aired on Papua New Guinean television or radio, parents are quick to turn their televisions or radios off because they do not want their children to be exposed to or using this word in their everyday language. A report entitled "HIV/ AIDS and Australia's International Approach" (2004) states the following about this awareness campaign:

In addition to promoting the questionable message of abstinence, the advertisement made HIV/AIDS a "dirty" topic in the community due to its associations with sex and bad language. This in turn has contributed to a social backlash which sees many carriers of the disease ostracised from their communities.

You can see that it is thus important to consult with the local community to ensure that the use of taboo words is avoided. Upon consultation



campaigners or educators can then be advised on how best to express themselves using a better choice of words. If taboo words are not used, people will accept the messages presented in the campaigns and respond positively towards them.

iii Accurate Translations

It is also important, especially when translating messages from one language to another that the translation is accurate and that the message is being accurately relayed to the people. Sometimes, an interpreter may not be quite proficient in either the source language or the target language. In this case, he/ she may not be communicating the intended message accurately, the meaning of the message becomes distorted or it is not received by the target audience.

Attire (Dress)

Another important cultural concern that must always be considered in education and public awareness is the presentation of agents involved in carrying out the awareness. They must be attired or dressed in a manner appropriate and acceptable to the society's culture so as not to offend people or cause them to lose interest in the message being given. For example, in some cultures women would be expected to dress modestly covering up most of their bodies. Females carrying out awareness campaigns in areas like this should dress in a similar way during the campaigns.

Medium of dissemination

The medium or tool chosen for education and public awareness can incorporate cultural methods that people are familiar with. For example, a traditional drum is beaten or a conch shell blown to bring together people for a meeting. In this way, more people are gathered because they are all familiar with this traditional signal. This ensures the success of awareness campaigns because more people are in attendance.

Indigenous knowledge systems

We can also discuss the importance of indigenous knowledge systems in preparation for or in response to a disaster. Societies have over time developed their own ways of preparing for and responding to disasters. Indigenous knowledge may also be integrated into an awareness programme to ensure that the locals are considered in training tools. The preservation and handing down of these knowledge systems can also be stressed and encouraged during education and public awareness.

The encouragement of Oral Traditions can also be stressed in relation to indigenous knowledge systems. In many developing countries, writing is an introduced concept used for documenting information. In the past, oral traditions ensured that indigenous knowledge was passed on from one generation to the next and this ensured its preservation for years on end.

Indigenous preventive knowledge of disasters

Communities have been exposed to disasters time and time again. Through this exposure, many have developed traditional strategies or preventive measures to prepare and deal with disasters.

For example, people in some mountainous areas of Papua New Guinea do not completely clear away fallen trees and logs before gardening. This is because their culture has adapted this strategy to prevent erosion and land slides.

Indigenous knowledge of edible fruits, nuts, plants and water sources

Indigenous knowledge of edible plants and the location of far away water sources can also prove very helpful in the time of a disaster. People must be encouraged to be aware of these traditional knowledge systems in education and public awareness.

Traditional Healing and Herbal Medicine

Traditional healing methods and herbal medicine are very useful forms of indigenous knowledge. Such traditional practices are worth holding on to and their practice must be encouraged during education and public awareness. For example, the locals know better about common traditional healing methods in their society, they can combine their traditional methods with modern medicinal knowledge to construct an effective training programme In cases when disaster strikes and outside help is delayed, the use of traditional healing methods and herbal medicine can help save lives.

Knowledge of the presence of indigenous sites and their protection

Finally, the knowledge of the presence of indigenous sites and their protection is also worth mentioning in education and public awareness. There are some sites within communities that are sacred and need to be protected. Communities must be made aware of this and take appropriate actions to protect their cultural heritage.



Unit summary



In this unit you learned about culture and how cultural beliefs and values determine people's responses to education and public awareness programmes on disaster management. Every society has unique cultural values, practices, social organisation and knowledge which can influence their perception of events, processes and concepts and which in turn determines how they respond to information presented to them. Agents conducting education and awareness programmes need to be sensitive to a society's culture especially if they are not members of the society. This can ensure that members of a society are more receptive of these programmes and are readily prepared to accept and implement them effectively.

Assignment



Assignment

Imagine you are part of a team carrying out awareness campaigns on disaster management. You are going to present an informative talk at your local community hall.

Task: Prepare a write-up of a short speech (800-1000 words long) highlighting at least three cultural issues for people to be aware of in preparation for a disaster.

The following marking criterion shows you how to organise and what to include in your write-up. It also shows how marks are distributed for your work.

Content/Mark

Introduction: Introduce the term/ idea of 'disaster management'. Give examples of disasters that audience is familiar with. State what your talk will be about. (4 marks)

Body: Cultural Issue 1 (Include elaboration and relevant examples) -(6 marks)

Cultural Issue 2 (Include elaboration and relevant examples) (6 marks),

Cultural Issue 3 (Include elaboration and relevant examples (6 marks)

Conclusion: Reiterate main points in a brief summary. (4 marks)

References and Visual Aids: Include references that you have consulted and attach copies of posters, leaflets or other informative aids you plan to distribute to your audience. (4 marks)

Total: 30 marks

Self-Assessment

	State whether the following statements are True or False.
1 Assessment 2 3 4 5	 Education and Public Awareness programmes are based entirely on people's cultures.
	<i>2</i> English must always be used to conduct effective education and public awareness campaigns.
	<i>3</i> People should be encouraged to preserve indigenous knowledge systems during education and public awareness campaigns.
	4 At Education and Public Awareness campaigns the use of herbal medicine during disasters needs to be discouraged.
	5 A person's culture greatly influences the way he/ she responds to a message in an education and public awareness campaign.
Answers	1 T; 2 F; 3 T; 4 F; 5 T.

References

"HIV/ AIDS and Australia's International Approach" (2004) Accessed on 26/01/08 at: http://www.aidwatch.org.au/assets/aw00616/HIV%20Final.pdf

Bankoff, G., (2002) Cultures of Disaster: Society and Natural Hazards in the Philippines. Routledge, London



Unit 8

The Role of Technology in Disaster Management

Introduction

While the role of technology could easily be integrated into various subtopics on emergency and disaster management (EDM) we present it as a stand alone unit. Quite often the role of technology in EDM is presented as an afterthought or simply omitted. In this unit we have tried to be as basic as possible. If you wish to delve deeper into this subject matter we have provided links for suggested reading and further study.

We start with a discussion of emergency management systems (EMS). EMS are merely technological tools that are expertly used to improve and enhance the EDM process. We will examine specifically the role that Geographical Information Systems (GIS), Global Positioning Systems (GPS) and Remote Sensing Technologies play in disaster management. While these subjects are presented individually, it is important to note that in reality these technologies are usually deployed in an integrated manner.

Upon completion of this unit you will be able to:

- Define Emergency Management Systems (EMS);
- Identify how the EMS assists in hazard materials management, emergency medical services, and response and recovery operations;
- Identify a key strategy that aids continuous improvements of emergency management systems;
- Define Global Information Systems (GIS);
- Identify four disaster-related activities to which a GIS application is useful;
- State the advantages and challenges of using GIS in disaster management;
- *Explain* how GIS is utilised within all phases of the disaster management cycle;
- Define Global Positioning Systems (GPS);

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Outcomes

Emergency

- Explain how GPS technology can be useful in disaster management;
- Define Remote Sensing Systems (RSS);
- Distinguish between passive and active RSS;
- Explain how RSS technology can be useful in disaster management;

The management of emergencies concerning all-

State the advantages and disadvantages of using RSS in disaster management.



Terminology

Management: hazards, including all activities and risk management measures related to prevention and mitigation, preparedness, response and recovery. Blackbody radiation: Refers to an object or system which absorbs all of the electromagnetic radiation that falls onto it; the object or system then re-radiates this energy. The energy that is re-radiated is characteristic of the radiating system from which it is emitted, not its original source. Electro magnetic The electromagnetic (EM) spectrum is the range of spectrum all possible electromagnetic radiation. Electromagnetic Method of travel for radiant energy, so called wave because radiant energy has both magnetic and electrical properties. Infrared radiation Electromagnetic radiation whose wavelengths lie in the range from 0.75 micrometer to 1000 micrometers. Infrared sensors This is an electronic device which measures infrared light radiating from objects in its field of view. LandSat A series of satellites that produce images of the earth. **Microwave radiation** Electromagnetic radiation composed of photons carrying less energy than infrared photons but more energy than radio photons. Radiation Energy that is radiated or transmitted in the form of rays or waves or particles. Sensor An electronic device used to measure a physical quantity such as temperature, pressure or loudness and convert it into an electronic signal of some kind.



Wavelength

The distance between identical points in the adjacent cycles of a waveform signal propagated in space or along a wire.

Emergency Management Systems

What is Emergency Management?

Emergency management is a discipline that involves the avoidance of risks, while simultaneously putting plans in place to deal with disasters and emergency situations if and when they do occur with a view to rebuild and restore society to a functional level in as short a time as possible after a disaster. Emergency management is therefore a shared responsibility between government and citizens of a country towards building a sustainable, disaster-resilient society.

The ultimate purpose of emergency management is to:

- save lives
- preserve the environment
- protect property
- protect the economy

What are Emergency Management Systems (EMS)?

Emergency management systems are technological aids that facilitate the effective management of disasters. EMS technology can assist in several areas that are critical to effective disaster management, such as:

- Drafting and testing of evacuation and general disaster plans (*Evacuation Plans*).
- Establishment of shelters as well as informing the public of shelter locations, items that should be taken to the shelter and general "shelter behaviour".
- Training personnel in effective shelter management, basic first aid and other "response" skills (*Manpower*).
- Establish a national warehouse and ensure that it is stocked with items for national survival in the immediate aftermath of the disaster, before the arrival of overseas help (*Materials*).
- Setting-up reliable communication systems, such as, the traditional two-way CB-type radios (*Communication*).

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 Putting transportation plans in place, which should include air transportation to facilitate air-lifts and rescues, delivery of food supplies to severely affected areas cut-off from vehicular traffic and comprehensive damage assessment activity (*Transportation*).



Figure 5: Diagram showing several disaster-related areas impacted by EMS

How useful is EMS?

EMS can also add tremendous value to disaster management in the following generic areas:

- Hazardous Materials Management
- Emergency Medical Services
- Response and Recovery





Hazardous Materials Management (HAZMAT):

EMS can be used to provide safe and secure transportation of hazardous material by air, sea and land. More specifically, devices can be used to track HAZMAT shipments and notify management centres when a shipment deviates from its intended route.

Emergency Medical Services:

Automated collision notification systems can be used to detect vehicle collisions or other incidents requiring emergency responders. The system notifies emergency personnel and provides them with valuable information on the incident.

Response and Recovery:

Sensors are used to help provide an early warning system to detect large-scale emergencies such as natural disasters. Systems also exist that facilitate the sharing of emergency information across multiple response agencies to facilitate greater cooperation and coordination among them.

Figure 6: Diagram giving specific examples of EMS at work

EMS and the Disaster Management Cycle:

It is important to note that the proper usage of technology can improve the effectiveness of disaster management systems to aid the process of prevention, mitigation, preparedness, response and recovery.

Prevention and Mitigation

Effective disaster management seeks to prevent hazards from developing into "full-blown" disasters and further reduce the impact of disasters if and when they occur. Inventory systems, Tracking, Detection, Driver authentication and Route planning software are technological tools that can be used to aid in the process of disaster prevention and mitigation.

i Inventory systems:

Databases exist to help monitor inventory levels of critical supplies and equipment on a continuous basis to ensure that adequate supplies are available to cover the upward surge in demand that generally accompany disaster and emergency situations.

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ii Tracking systems:

Vehicle-mounted hardware provide the capability to track Hazard Management (HAZMAT) cargo and support the notification of management centres when a shipment deviates from its intended route.

iii Detection:

Roadside detectors can monitor for the presence of hazardous cargo in sensitive areas and confirm that the cargo is on the expected route.

iv Driver Authentication:

Driver authentication technology can confirm that the individual operating a HAZMAT vehicle is authorized to do so and report operation by unexpected drivers to public safety entities.

v Route Planning:

EMS can provide assistance to commercial vehicle operators via electronic route planning services, ensuring compliance with HAZMAT shipment restrictions along planned travel routes.

Preparedness

The Preparedness component emphasizes the development of plans well in advance of the disastrous situation (or event), to reduce confusion and restore order in as short a time as possible when the disaster does happen. EMS can aid the preparedness process via technological systems such as Advanced Automated Collision notification systems (Advanced ACN) and Telemedicine.

- Advanced ACN: Advanced automated collision notification systems use vehicle-mounted sensors and wireless communication to notify emergency personnel and provide them with valuable information on incidents such as crashes or collisions, including the exact location and characteristics of the incident and possibly relevant medical information regarding the vehicle occupants in the case of a vehicular collision.
- Telemedicine: Telemedicine systems provide a link between responding ambulances and nearby emergency medical facilities, enabling doctors to advise emergency medical personnel regarding the treatment of patients en route to the hospital.

Response and Recovery

The Response Phase of the Disaster Management Cycle involves mobilization of emergency services to provide immediate assistance to people affected by disasters. Recovery, by extension, is concerned with issues and decisions that must be made after the initial needs resulting from the disaster are addressed. EMS technology can aid the response and recovery effort through the installation and utilization of Scheduling and Coordination software, Early Warning Systems, Evacuation and Re-entry Management, Response Management and Emergency Traveller Information systems.

 Scheduling and Coordination software: Intricate scheduling systems can simultaneously monitor and coordinate various response activities (such as search and rescue operations, emergency medical assistance,



evacuation and emergency public communication) to make the response process more efficient structured and organized.

- Early Warning Systems: The variety of sensors deployed on the transportation infrastructure can help provide an early warning system to detect large-scale emergencies including natural disasters (hurricanes, earthquakes, floods, winter storms, tsunamis, etc.) and technological and man-made disasters (HAZMAT incidents, nuclear power plant accidents, and acts of terrorism including nuclear, chemical, biological, and radiological weapons attacks). Early warning systems monitor alerting and advisory systems, ITS sensors and surveillance systems, field reports, and emergency call-taking systems to identify emergencies and notify all responding agencies of detected emergencies.
- Response Management: Response management may include the tracking of emergency vehicle fleets using automated vehicle location (AVL) technology and two-way communications between emergency vehicles and dispatchers. Integration with traffic and transit management systems enables emergency information to be shared between public and private agencies and the travelling public.
- Evacuation and Re-entry Management: Evacuation operations often require a coordinated emergency response involving multiple agencies, various emergency centres, and numerous response plans. Various communication technologies can support the management of evacuations, which may also include a variety of traffic and transit management activities.
- Emergency Traveller Information: Integration with traffic and transit management systems enables emergency information to be shared between public and private agencies and the travelling public. This communication and cooperation also enables the use of the variety of ITS information dissemination capabilities to provide emergency traveller information.

Who is responsible for EMS?

Emergency Management is a shared responsibility between government and citizens of a country towards building a sustainable, disaster-resilient society.

The Government usually exercises leadership at the national level. However, in an emergency, the first response is almost always by the municipalities or the local-governing authorities for the simple reason that disasters usually involve specific localized areas. However, should the local government require additional resources in an emergency or disaster response, then the federal government would respond quickly to any request for assistance from the local governing bodies.

The importance of partnerships

All levels of society should be involved in emergency management. Individual citizens, communities, municipalities, federal governments, emergency response personnel such as fire prevention and health workers, the private sector, volunteers, academia and international allies should all be involved in emergency management. Good partnerships based on effective collaboration, coordination and communication are a key component of emergency management systems.

Of tremendous importance, Emergency Management requires collaboration, coordination and integration to facilitate complementary action by all partners to facilitate timely and effective prevention and mitigation, preparedness, response and recovery measures to effectively deal with disasters.

EMS and Community Resilience

EMS aims to strengthen the resiliency of communities and nations by helping them to minimize the occurrence of disasters, reduce the impact and recover relatively quickly if and when disasters do occur. Resiliency minimizes susceptibility to damage from disasters by strengthening the capacity of the country to cope with, adapt to, respond, recover and learn from disasters.

Continuous Improvement

After emergencies or disasters occur, it is very important to take time to identify and document the lessons learnt from the experience. Doing so will increase future effectiveness and improve emergency management practises and processes. Recovery from any major disaster should be completed by documenting and internalizing the lessons learnt. If this is done, continuous improvement and a reduction in the recurrence of problems should result.

Geographic Information Systems (GIS) and Disaster Management

What does GIS mean?

Geographic Information Systems are information systems capable of integrating, storing, editing, analyzing, sharing, and displaying geographically-referenced information. In a more generic sense, GIS is a tool that allows users to create interactive queries (user created searches), analyze the spatial information, edit data, maps, and present the results of all these operations.



GIS Applications

GIS applications can be useful in the following activities:

- 1 To create hazard inventory maps: At this level GIS can be used for the pre-feasibility study of developmental projects, at all inter-municipal or district level.
- 2 Locate critical facilities: The GIS system is quite useful in providing information on the physical location of shelters, drains and other physical facilities. The use of GIS for disaster management is intended for planners in the early phase of regional development projects or large engineering projects. It is used to investigate where hazards can be a constraint on the development of rural, urban or infrastructural projects.
- *3* Create and manage associated database: The use of GIS at this level is intended for planners to formulate projects at feasibility levels, but it is also used to generate hazard and risk maps for existing settlements and cities, and in the planning of disaster preparedness and disaster relief activities.
- 4 Vulnerability assessment: GIS can provide useful information to boost disaster awareness with government and the public, so that (on a national level) decisions can be taken to establish or expand disaster management organisations. At such a general level, the objective is to give an inventory of disasters and simultaneously identify "high-risk" or vulnerable areas within the country.

GIS and the Disaster Management Cycle

Planning

The most critical stage of disaster management is the realization that there is a need for planning based on the risk that is present. The extent to which lives and properties will be spared the adverse effects of a disaster is dependent on the level of planning that takes place and the extent to which technology has been incorporated in planning efforts. GIS is useful in helping with forward planning. It provides the framework for planners and disaster managers to view spatial data by way of computer based maps.

Mitigation

The use of GIS in disaster management can help with structural and nonstructural mitigation. GIS allows you to spatially represent areas at risk and the level of risk associated with a particular hazard, which can be a guide in decision making. It will facilitate the implementation of necessary mechanisms to lessen the impact of a potential emergency. With GIS, disaster managers are in a better position to determine the level of mitigative structures that should be in place given the vulnerability of an area or population.

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Preparedness

As a tool, GIS can help with the identification and location of resources and "at risk" areas. It establishes a link between partners and critical agencies, which allow disaster managers to know where relevant partner agencies are stationed. In the context of disaster management, GIS maps can provide information on the human resources present in an Emergency Operation Centre as well as on the ground personnel such as security, health providers and other key responders. This is particularly useful since the technology can help with strategic placement of emergency personnel where it matters most. GIS helps to answer the question of who is to be based where and at what phase during the emergency. It can help to determine whether or not road infrastructure and communications networks are capable of handling the effects of disaster and, if necessary, guide in the placement of resources.

Response

GIS technology can provide the user with accurate information on the exact location of an emergency situation. This would prove useful as less time is spent trying to determine where the trouble areas are. Ideally, GIS technology can help to provide quick response to an affected area once issues (such as routes to the area) are known. In the case of a chlorine explosion for example, GIS can indicate the unsafe area as well as point rescue workers to resources that are closest to the affected areas. GIS can be used as a floor guide for emergency response to point out evacuation routes, assembly points and other evacuation matters.

Recovery

Mapping and geo-spatial data will provide a comprehensive display on the level of damage or disruption that was sustained as a result of the emergency. GIS can provide a synopsis of what has been damaged, where, and the number of persons or institutions that were affected. This kind of information is quite useful to the recovery process.

GIS and Emergency Shelters

GIS technology can be used by shelter operators to capture specific personal details of persons being housed at the shelter. It would also facilitate the process of stock demands and distribution. The technology would capture information on the general makeup of the shelter, that is, the number of children, adults, disabled or any other special occupants.

GIS and Distribution of Relief

"Food drops" in affected areas after a disaster is always likely to take place. The process can be helped with the use of GIS, as maps can be generated which identify the specific areas where clusters of victims are located and the unique needs of persons within these clusters.



GIS and Data Gathering

Special populations

With GIS, disaster managers are placed in a position where they have diagrammatic presentations of the specific location of disabled or elderly persons (for example) that reside within a community. This will make organized assistance on their behalf more efficient and time saving.

Most vulnerable areas

Maps can be produced to highlight more "high risk" areas that are particularly prone to disasters. This kind of information helps with planning (before the occurrence of the disaster) and also facilitates the coordination of efforts during and after the event.

Advantages of GIS

GIS as an innovative and interactive technology tool has more advantages than there are challenges.

- 1 GIS has the ability to represent spatial information over a wide geographic area. GIS accommodates 3-dimensional graphics which will provide a more detailed viewed of its contents.
- 2 GIS technology facilitates the integration of different geo-spatial information; which can include models, maps and other graphic forms.
- *3* GIS effectively analyzes, collects, manages and distributes up-to-date information.
- 4 GIS is versatile and easy to use this requires little training to get individuals involved in the process.
- 5 Attribute table which forms a database- Given that information from GIS can be easily tabulated, it provides a comprehensive pictorial overview of what is happening in the country. For example, GIS can show the exact location of shelters across the country, or the sites where search and rescue operations have taken place.

Challenges of using GIS in Disaster Management

- 1 Major impacts on life of people, economy and environment. In the context of emergency management, GIS can impact people's lives in a significant way as it reveals sometimes personal and people-specific information.
- 2 Crucial decisions- Based on the information obtained from GIS mapping, it may require taking critical (sometimes hard) decisions in the best interest of the affected area.
- *3* GIS being a technological tool can be complex and a bit difficult to grasp initially.

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- 4 Large amounts of information (input) is usually required to get useful output from the system.
- 5 Time is critical during an Emergency- The decision-making process may be stalled during an emergency due to:
 - I the large volume of information required by the GIS system; and
 - the vast amount of time require to analyze the information before a decision is finally made.

Who can use GIS?

GIS can be used in any area of disaster management. Among the professionals within the disaster management discipline who would find GIS useful are:

- Emergency Planners
- Meteorologists
- Geologists
- Telecommunications personnel
- Security personnel
- Health practitioners

Global Positioning System (GPS) and Disaster Management

What is GPS?

The term global positioning system (GPS) is used to refer to the Global Navigation Satellite System (GNSS) developed by the United States Department of Defence. The proper name is The Navigation System with Timing And Ranging Global Positioning System (NAVSTAR GPS) however the acronym GPS is typically used. Though initially intended solely for US military purposes the GPS system was extended for civilian use in the 1980's. Popular applications include automobile and marine navigation, tracking, farming and research.

GPS is a grouping of 24 well-spaced satellites that orbit the earth and make it possible for people with ground receivers to pin-point their exact geographic location with great accuracy. GPS equipment is widely used across the globe and is sufficiently "low-cost" so that anyone can own a GPS receiver.

Application of GPS to Disaster Management

GPS is particularly useful during disasters because it operates in any weather, anywhere and at all times. While it functions simply to give the location of the receiver, the level of precision of GPS makes it quite useful in disaster management. In many instances GPS data is integrated with



GIS to overlay real-time activity during emergency. GPS find its greatest utility during the response and recovery phases; however it can also be utilized during preparedness and mitigation phases.

An important application of GPS in EDM is tracking of emergency vehicles or supplies. In this application the GPS receiver attached to the vehicle and the location is overlaid onto a map. Other applications include the monitoring the height of waves. GPS units are fixed to buoys and the height of the units are can be determined to within centimetres any significant change in wave height or velocity can trigger an alarm for a tsunami or sea surge. Volcanoes can also be monitored using GPS. By measuring the deformation of the ground, inferences about volcanic activity can be made.

Remote Sensing and Disaster Management

What is Remote Sensing?

Remote sensing is the use of electromagnetic (EM) wave radiation to acquire information about an object or phenomenon, by a recording device that is not in physical or intimate contact with the object. In other words, Remote Sensing is the acquisition of information about an object by a recording device that is NOT in physical or intimate contact with the object.

As you read this material you are actually engaging in remote sensing; we do this so naturally that we seldom realize it. We could take this a step further - we use telescopes to view distant planets. We are definitely sensing objects remotely. In both cases the sensor is our eyes and the EM wave is light. If the term EM waves seems new to you it shouldn't. Everyday light, radio waves and microwaves and x-rays are examples of EM waves. EM waves transport energy and information from one place to another. They are used in cellular networks, microwave ovens, portable radios, x-ray machines and satellites systems.

Remote sensing in the context of disaster management usually refers to the technology that includes man-made sensors that are attached to aircrafts, or satellites. Instead of viewing a far away planet from earth, the sensing equipment is usually high above looking down at our 'distant' planet - earth. Distant in this context can mean just a few hundred feet overhead or miles above the earth's surface (*see Figure 7*).



Figure 7: Diagram showing how Remote Sensing is operated and utilized

Returning to our first example, what happens when we turn off the light and it is "completely" dark? We can no longer sense with our eyes. However, if we were to look through a pair of night vision goggles we would be able to see. We will explain why this is possible in the next sections.

Wavelength classification in Remote Sensing

Remote Sensing is classified by three wavelength regions:

- *i* Visible and Reflective Infrared Remote Sensing.
- *ii* Thermal Infrared Remote Sensing.
- iii Microwave Remote Sensing.

Visible and Reflective Infrared Remote Sensing

Visible and reflective infrared remote sensing uses 'everyday' light and infrared lasers, with wavelength ranging from approximately 0.4 to .0.8 micrometers. Usually 'regular' cameras or video recorders are attached to airplanes to provide aerial photos. This is the most common and inexpensive form of remote sensing. Visible remote sensing allows us to make before and after comparisons in the event of a disaster.

Thermal Infrared Remote Sensing

Night goggles are a made from a type of infrared sensor. Infrared sensors allow us to image temperature differences, such as thermal pollution in rivers which we cannot see with our naked eyes or to gauge the temperature differences near volcanoes. Infrared sensors exploit the fact that all objects emit a type of EM radiation called "blackbody radiation" at



a wavelength proportional to their surface temperature. These sensors allow us to see a particular part of the electromagnetic spectrum that we would not be able to see with our naked eyes. The term electromagnetic spectrum refers to the range of EM waves with different wavelengths. In terms of wavelength, EM waves range from Gamma Rays to radio waves.

Microwave Remote Sensing

Another type of remote sensing uses microwave radiation. An important property of microwaves is that they are seldom affected by atmospheric conditions. Another useful property of microwave radiation is that it can often image beneath or through objects (just like an X-ray – another type of EM wave that we use in everyday lives). Microwaves can also image differences in the earth's surface due to the absorption level of water or chemicals.

Passive versus Active Remote Sensing

Remote sensing can also be categorized into two broad categories: passive or active. Passive remote sensing makes use of sensors that detect the reflected or emitted EM radiation from natural sources (usually sunlight). Active remote sensing makes use of sensors that detect reflected responses from objects that are irradiated from artificially-generated energy sources, such as radars (*see Figure 8 below*).



Figure 8: Comparison of Active and Passive Remote Sensing

Remote Sensing Satellites

Many satellites are fitted with several sensors that can measure over two or three of the wavelength regions. An example of such a satellite is the LandSat 7 satellite, which is a part of the US Government's NASA LandSat Program. You are encouraged to visit <u>http://en.wikipedia.org/wiki/Category:Earth_observation_satellites</u> and read about other earth observing satellites.

Remote Sensing in Disaster Management

The data gathered from remote sensing can be used in a variety of ways to accomplish several objectives. It is usually combined with information from other data sources, and with information from on-the ground observations to get a full picture of water, land or ground activities. Remote sensing data is often integrated with GIS. There exist a wide variety of commercial and free software that allow users to view data collected from the many observing satellites referenced above.

As new technologies emerge, and with the increased incidents of natural and man-made disasters, it is necessary to employ as many of these technological advancements as possible to mitigate against the effects of disasters.

Remote Sensing and Flooding

Flooding is one of the most frequently occurring hazards. With flooding comes the risk of damage or disruption to normal living including communication, transportation, the environment and infrastructure. Given the magnitude of disruption that can take place, it may be difficult for disaster managers to gain access to remote areas or areas that have been cut off as a result of the disaster. Remote sensing as a technological tool would greatly assist this process as it would allow users of the technology the opportunity to view what is taking place in an affected area, without jeopardizing the safety of the user, since they will not actually be at the site.

It is always going to be difficult, if not impossible, for planners to identify all the areas likely to experience flooding in any location. The use of technology however, in determining flood potential could highlight features of the geography that could make the community susceptible to the hazard. Types of flooding such as flash flooding, which usually take place in a relatively short time, with little or no warning could prove potentially dangerous for disaster managers if they attempt to physically go into an area that has been experiencing continuous rainfall. While the task of providing assistance to victims is critical and time dependent, a physical presence in the affected area could increase the persons at risk. Using remote technology however, would allow response workers to stay away from danger zones while at the same time gather pertinent information to facilitate timely response, rescue and relief efforts.

Floodplain mapping is a useful indication of flood possibilities in an area and remote sensing can aid the process of identifying flood plains. The technology would generate satellite imagery of the area in question, which would allow for proper planning and timely rescue efforts should the need arise. The detailed photography produced from remote sensing provides accurate information and can restrict efforts to the affected area. Other characteristics that could be identified about a geographic region using



remote sensing include land-use classification, historical data, soil coverage, and soil moisture.

Remote sensing and Hurricanes

Hurricane forecasting over the last century has improved dramatically, with experts being able to estimate the likely number of storms for a given year, intensity and possible levels of destruction. Today, this process is made even easier with the use of remote sensing technology. Trackers are able, even while the storm is in progress, to go to the core of the system in search of information. This tool, at any stage of the hurricane threat is useful in mitigating against the deadly effects that could take place. Remote sensing can allow planners to ascertain data about the features of watersheds to include drainage and density. Once obtained, this is useful information as it provides information on the capacity of the watershed to deal with the volume of water-flow that could result from rains associated with the storm.

High resolution technology, a feature of remote sensing, is useful in providing spatial data on hurricanes. Because the scales of geographic areas in remote sensing can be manipulated, users will be in a position to zoom in on specific areas for study. Storm surges and coastal flooding, which often accompany hurricanes can be better mapped using remote sensing and provide information on the level of flooding that has been experienced.

Remote sensing and Earthquakes

Development in any area with high seismic risk is always going to be problematic. Given the high volume of fault lines that extend across the breadth of geographic areas, it is inevitable that there are going to be human settlements in these areas. Considering also that there is no early warning system in place for earthquakes, emphasis must be placed on hazard mitigation to reduce the likely impact from earthquakes on lives or properties. Extensive use of remote sensing (and especially the use of satellite imaging) is critical to the planning process for earthquake preparedness. This technology will help in identifying the structural and non-structural earthquake hazards that are present and employ the most appropriate tool for minimizing these risks. LandSat imagery is one tool that is effective for this purpose given availability and cost.

After an earthquake has taken place, visibility with the naked eye, as well as access to worst affected areas may be restricted. When this happens, it becomes difficult for emergency personnel to gain access to survivors in a short period of time. Using remote sensing technology, however, would significantly improve the timeliness and quality of aid that can be provided. Activities, such as search and rescue, are best affected after major earthquakes using remote sensing. Since there will be considerable amount of debris from collapsed structures, it would be advantageous to employ the service of remote sensing for deep searching.

Remote Sensing and Volcanic Eruptions

On-the-spot seismic monitoring of volcanoes is the most effective way to monitor volcanic activity. However, it may not be practical or safe to be on-site at all times. In light of this, remote sensing is crucial to the monitoring process. Remote sensing technology can allow disaster managers to observe volcanic activities on a continuous basis without being physically on site especially at times when it would be dangerous.

Remote sensing and Landslides

Landslides usually occur with other hazards, such as flooding, hurricanes and earthquakes, but can also happen independently. Once major portions of land shift out of place, access to and general visibility of the affected area is usually severely restricted. Remotely sensed images under these conditions are useful tools in assisting planners. It presents a picture of what has taken place, and aids in the decision making process regarding the future of the affected area.

Where assessment of an area is limited due to debris and mudflow from a landslide, remote sensing could penetrate dense areas to provide critical information.

Advantages of Remote Sensing

- Saves time
- Users of the technology do not have to be in direct contact with danger zones.
- Shows image of very large areas of land or space.
- Detect features at wavelengths not visible to the human eye.
- Data can be regularly and routinely acquired and archived.
- The most cost-effective dataset for monitoring change over large areas.
- Can assist with damage assessment monitoring.
- The imagery obtained, using remote sensing, can be useful for forward planning and reconstruction of an affected area.
- Helps to prevent the recurrence of the same disaster in the future.



Challenges faced using Remote Sensing

- It can be costly to build and operate a remote sensing system
- Small size activities cannot be delineated on remote sensing imagery or through aerial photography
- Data can be difficult to interpret and may require expert skills.
- Resolution is often coarse.



Reading

Additional reading material:

http://www.gisdevelopment.net/tutorials/tuman008.htm

http://en.wikipedia.org/wiki/Thermal_radiation

http://www.geog.ucsb.edu/~jeff/115a/remote_sensing/thermal/thermalirin fo.html

http://landsat.gsfc.nasa.gov/

http://en.wikipedia.org/wiki/Category:Earth_observation_satellites

http://worldwind.arc.nasa.gov/

http://en.wikipedia.org/wiki/Remote_sensing

Unit summary



Summary

In this unit you learned about the role of technology in disaster management and we examined the usefulness of Emergency Management Systems (EMS). In addition, we looked at the unique contributions of Geographic Information Systems (GIS), Global Positioning Systems (GPS) and Remote Sensing Systems (RSS) to aid in the effective management of disasters.

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Self - Assessment



Assessment

Instructions: Select the best answer:

- 1 Select the option which best defines Emergency Management Systems?
 - *a* Disaster-based work systems
 - *b* Any technical or technological aid that facilitates information sharing, coordination of critical resources and the effective management of disasters.
 - *c* Emergency policies that help governments to manage disasters by organizing the flow of work from one department to another.
 - *d* Technology-based systems that make the work of disaster management officials easier, by routing all information to a centrally controlled government computer.
- 2 EMS can assist in managing which of the following areas:
 - (I) Hazardous Materials Management
 - (II) Emergency Medical Services
 - (III) Response and recovery
 - (IV) Firemen, medical workers and other response officials
 - (V) The building of an intricate national stadium to strict international safety standards.
 - a I &111
 - b III & 1V
 - c I, II &V
 - d I, II & III
- *3* How can EMS help *prevent and mitigate* against disasters?
 - *a* Through Advanced Automated Collision Notification Systems (Advanced ACN)
 - *b* Through effective usage of Detection, Route planning and Tracking systems.
 - c Through Scheduling and Coordination software.
 - *d* All of the above



- 4 Which of the following strategies is the most important in helping to continuously improve the EMS system?
 - *a* Appoint the brightest and best talent to operate the system.
 - *b* Routinely debug the system to keep it free from dangerous viruses.
 - *c* Document the lessons learnt from each experience to reduce the recurrence of problems.
 - *d* Keep abreast with cutting-edge global technology as much as possible, without fail.
- 5 The GIS application is particularly useful for:
 - *a* The creation of hazard inventory maps, location of critical facilities and conducting vulnerability assessments.
 - *b* The creation of hazard inventory maps, building community resilience and providing critical disaster management information to emergency travellers.
 - *c* Policemen, firemen and disaster management officials to coordinate distribution of relief items after a disaster.
 - *d* The creation of an intricate disaster plan that is collaboratively drafted and supported by all response agencies.
- *6* GIS can be applied to the Disaster Management Cycle in the following ways:
 - *a* GIS can help broadcast critical post-disaster information to the public.
 - b GIS technology can be used to build flood warning systems at the community level to warn the residents whenever the river overflows its banks.
 - *c* GIS can assist in preparedness by identifying and locating important resources and by providing accurate information on the exact location of an emergency situation.
 - *d* GIS technology can aid recovery after a disaster by automatically posting requests for much needed international assistance on the internet.
- 7 Which of the following conditions interfere with GPS functions?
 - a Dense cloud
 - b Volcanic eruption
 - c Low fog
 - d Darkness
 - e None of the above

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- 8 Electromagnetic waves are NOT involved in;
 - a Radio
 - b X-rays
 - c Microwave ovens
 - *d* The sense of touch
 - e Seeing things

Instructions: Answer **True or False** in response to the following statements.

- *a* GIS is able to represent spatial information over a wide geographic area. _____
- *b* GIS technology integrates models, maps and other graphic forms of information.
- *c* GIS effectively accommodates three dimensional graphics to give a more detailed and comprehensive view of its contents.
- *d* GIS technology does not facilitate maps and other forms of graphic information and must be supported by GPS to be complete.
- *e* GIS is not very versatile and easy to use.
- *f* Emergency planners, meteorologists, geologists, film makers, chefs and small farmers will ALL find GIS useful in their specific areas of work.
- *g* Passive remote sensing makes use of sensors that detect reflected responses from objects that are irradiated from artificially-generated energy sources, such as radars.
- *h* Remote sensing is the most cost-effective method for monitoring changes over large areas.
- *i* Electromagnetic waves transport energy and matter from one place to another_____

Answers

Best answer: 1 (b); 2 (d); 3 (b); 4 (c); 5 (a); 6 (c); 7 (e); 8 (d).

True or False: a T; b T; c T; d F; e F; f F; g F; h T; i F.



References

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Unit 9

Media and Disaster Management

Introduction

The media forges a direct link between the public and emergency organizations and plays a very important role in disseminating vital information to the public before, during and after disasters. The media assists in the management of disasters by educating the public about disasters; warning of hazards; gathering and transmitting information about affected areas; alerting government officials, relief organizations and the public to specific needs; and facilitating discussions about disaster preparedness and response for continuous improvement. To help the media fulfil these roles, direct working relationships between the media and disaster management organizations should be established and maintained. Experience shows that regular interactions with the media before a disaster strikes, aids the effective flow of information and lays the groundwork for effective working relationships in the aftermath of a disaster.

Upon completion of this unit you will be able to:

- Identify the types of mass media..
- *Explain* the role of media in disaster management.
- Describe/discuss the positive and negative effects of managing media in disaster management...



Terminology

Mass Media:	dissemination of information to the public.
Electronic Media:	Channels that broadcast information to mass audiences by electronic means, through radio and television for example.
Print media:	Channels that disseminate information to the public in print format, such as newspapers, journals and magazines.
Satellite Radio:	A more sophisticated kind of radio that utilizes satellite technology to broadcast audio information from orbiting satellites directly to the receiver.



Outcomes



The Role of Media in Disaster Management

Types of Media

Two main types of mass media exist, namely, the electronic and print media.

1 The Electronic Media:

The Radio:

The radio is the most popular and widespread information tool used in disaster management due to its affordability and widespread reach. Radios are more readily available in homes, cars, schools and at the workplace and can quickly and easily transmit information to the public through disaster preparedness documentaries, commercials designed to build awareness, discussion groups and interviews, radio dramas and callin programmes. The radio takes information directly to people from all walks of life, quickly and easily, even the very poor in the most remote rural village.

Satellite radios can play a key role during the disaster warning and disaster recovery phases. Its key advantage is the ability to work even outside of areas not covered by normal radio channels. Satellite radio can also be of help when the transmission towers of the normal radio channels are damaged in disaster.

The Television:

The Television is a powerful tool in broadcasting disaster warnings, and is widely used in many countries, with growing popularity. The visual impact of the television provides tremendous opportunity for disseminating messages with great impact on the viewing public because of the realistic combination of picture and sound.

2 The Print Media:

The Newspaper:

The Newspaper is one of the oldest means of communication that can still be relied on. It can be used for both early warnings as well as for recovery messages. The good thing is that the newspaper is widely circulated and can be made to reach the most remote areas by using helicopters to aid the distribution process.

Other Printed Material:

Magazines and journals target a specific audience, for example contractors/builders, academics or farmers. It is therefore an effective way to reach targeted populations with specific disaster-related information.

Does the media play a special role in disaster management?

The media plays an integral and vital role in the management of disasters. Usage of satellite imagery facilitates speedy transmission of information around the globe, and this has put tremendous power in the hands of news reporters to influence global public opinion. Since disasters are a significant source of news and capture the attention of populations worldwide, the media provides tremendous visibility for disaster-related issues and, if used properly, can aid the process of disaster management in the following ways:

i Increased lobbying:

The media can increase lobbying for political commitment, to make national leaders more responsive to the unique needs of vulnerable communities and special populations (such as the elderly and disabled) by increasing visibility of related issues through consistent reporting. By applying pressure on public officials, the media can help effect positive change when for unique areas that would otherwise have been ignored.

ii Aid prioritization of Disaster Risk Issues:

The media can influence the government to prioritize disaster risk issues, thereby ensuring that "self serving" political interests are not emphasized at the expense of the wider population. For example, the media may expose excessive and inefficient expenditure to relocate persons from vulnerable areas just before a general election with a view to secure votes, while little or no attention is given to replenishing the stock of relief supplies in the national warehouse for distribution in the event of a disaster. This kind of exposure facilitates more prudent and balanced prioritization of disaster risk issues.

iii Facilitate creation of Early Warning Systems:

The media can help disaster mitigation experts create Early Warning Systems by providing information on risks and existing technologies that can aid the development of useful concepts and systems.

iv Increase international donations:

The media can trigger donations from the international community subsequent to the occurrence of national disasters, as well as push the government to increase budgetary allocations for disaster response programmes.

v Improve coordination of risk assessment activities:

The media can improve the coordination of risk-assessment activities between policymakers and donor communities. This integration of effort should result in increased availability of resources and improved work programmes geared towards saving lives of affected populations and vulnerable communities.



Impact of the media

The media is a mere tool in the hands of the disaster management professional and can, therefore, yield positive or negative results depending on how it is used.

Positive effects of the media:

- 1 The media is usually the first to define the event as an official disaster. They inform the public about it and therefore heighten awareness. This resulting awareness influences public opinion about how the disaster is being managed and often determines the level of attention that relief agencies pay to the particular disaster.
- 2 The media provides instantaneous information and are considered to be trusted sources especially at the local level, where the news media have a "vested interest" in the home town. The network's continuous and factual coverage of incidents and post-disaster events can aid decision making and response immediately after a disaster, thereby saving lives and property.
- 3 The media is an invaluable asset in times of a disaster by disseminating information about public safety, giving details useful details on areas such as impassable roadways and downed utility lines. Other important public health concerns are usually addressed by issuing water safety advisories and providing information about sites where medical help is available for the public.
- 4 In the absence of telephones and other mechanisms for communicating with the world outside an affected area, the news media provides:
 - the affected population with much needed information and
 - the outside world with a glimpse of what that affected community is dealing with.

Negative effects of the media:

By developing an awareness of both the positive and negative aspects of disaster coverage, you can be better prepared to view both the print and electronic media in a more realistic manner.

- 1 The media may exaggerate some elements of the disaster and create unnecessary panic.
- 2 The media's inaccurate portrayal of human behaviour during and after disasters may create a very dramatic and exciting, but only partially truthful story. For instance, it is not uncommon to see footage of people looting after a disaster on all news networks, but most viewers may not realize that all the networks were covering the same store being looted.

As a result, people may feel that widespread and uncontrollable looting is taking place in the affected area(s) which may not be true at all.

3 Influential politicians may manipulate the media for personal or

political gains. For example, Hurricane Dean significantly affected the island of Jamaica a few weeks before the 2007 general elections. The electronic media consistently showed members of a particular political party issuing relief items to the poor, which sent a subliminal message that the political party in question was more responsive to the needs of the people than the other. Incidentally, the political party (that was portrayed in a positive light by the media) won the elections and now forms the new government of Jamaica.

- 4 News reporters may provide biased coverage for purposes of sensationalism by capturing horrific devastation on a street, choosing to ignore that on the opposite side of the street all the houses are intact with minor damage. This kind of "irresponsible journalism" may lead to the deployment of unnecessary and inappropriate resources to moderately affected areas thereby depriving the more severely affected areas of well needed aid.
- 5 Media representatives often converge on a high-profile event creating tremendous "congestion" in the affected area. This influx of individuals with needs into an already burdened area can be overwhelming, which may hinder or compromise search and rescue operations, jeopardize rescuer safety and hamper the provision of care needed by the critically ill and injured.

We see from the above discussion that the media can play a very positive and important role in times of disaster, but can likewise hinder the response and recovery process. With this in mind, it is important to recognize that convergence of the media generally occurs after national disasters and, as such, a plan to effectively manage the media should be part of every disaster plan and standard operating procedures.

For more information on the relationship between the media and the disaster management team, see Burkholder-Allen (1999), and, for a journalist's view, see Otieno (2006).

An overview of the topic by Stephen Rattien can be found at the Annenberg Northwestern University's website (see reference list).





Unit summary



Summary

The media plays a unique role in disaster management. Humankind is not powerless when faced with the fury of nature. They can find means to reduce the impact of disasters and safe lives. Communication technology and media are essential means of saving lives, reducing property damage, and increasing public understanding, irrespective of location, population, or level of economic development. Such communication can educate, warn, inform, and empower people to take practical steps to protect themselves from natural hazards.

Assignment



Identify a recent national disaster in your country (*natural or man-made*) and discuss specific ways that the media helped and/or detracted from the:

- *a* Preparation and public education process before the disaster
- Assignment
- *b* Response and recovery effort after the occurrence of the event.

Self Assessment

	1	Select the two major types of mass media from the choices below:
		<i>a</i> Television and radio
A		b Radio and satellite radio
Assessment		<i>c</i> Electronic and print
		<i>d</i> Television and print
	2	Select the least accurate statement about the role of the media in disaster management.
		<i>a</i> The media can influence the government to prioritize disaster risk issues
		<i>b</i> The media can represent the unique needs of vulnerable communities and special populations and effect positive change.
		<i>c</i> The media can help in the creation of early warning systems.
		d The media can play a direct role in drafting emergency plans and standard operating procedures for Emergency Operations Centres.Instructions: Answer True or False in response to the following
		statements.
	3	The media is always a trusted source for disaster related information
	4	The media hardly influences the social climate in a country, since people are too intelligent to be swayed by the personal opinions of reporters
	5	The media usually converges on important, high-profile events, such as national disasters
	6	The media hardly ever exposes excessive and inefficient expenditure by government since it is a merely a mouth piece for rich and influential people
Answers:		Multiple Choice: 1 C; 2 D;
		True/ False 3 F; 4 F; 5 T; 6 F.

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Unit 10

Disaster Associated Health Issues – Part I: Emergency Health Services and Communicable Diseases.

Introduction

This unit briefly considers what is involved in Emergency Medicine. It identifies and describes risk factors for communicable diseases. When a disaster occurs, the general population expects the government and international agencies to rapidly mobilize the needed services with urgency. Preservation of life and health are of paramount importance to casualties. Immediately, medical professionals, First Aid and Emergency Medicine must be made available. As a consequence of disasters, it is also important to identify risk factors for communicable diseases and determine ways of minimizing these risks.

Upon completion of this unit you will be able to:



- Identify the components involved in emergency medicine.
- Describe a suitable infrastructure and procedures in accessing emergency medicine services. .
- *Identify* the main communicable diseases common in disaster situations.
- *Discuss* the risk factors that increase the likelihood of an outbreak of communicable diseases.
- Identify ways of preventing/minimising outbreaks of communicable diseases



Terminology

Acute Respiratory
Infections (ARI):Severe adenovirus infection of the respiratory tract
characterized by fever, sore throat, and cough.
such as bronchitis.Agent:An infections disease agent is constantly searching
for opportunities to multiply since their genes can
transform rapidly, enabling it to be spread quickly
to new locations, and infecting more vulnerable
populations.



Communicable diseases:	An illness that arises from transmission of an infectious agent or its toxic product from an infected person, animal, or reservoir to a susceptible host, either directly or indirectly. These include acute respiratory infections, diarrhoeal diseases, sexually transmitted diseases and vaccine-preventable diseases that can cause serious outbreaks.
Diarrhoeal diseases:	Occurs when the stool weight is above 300g per day. This is mainly due to excess water, which normally makes up 60–85% of faecal matter. In this way, true diarrhoea is distinguished from diseases that cause only an increase in the number of bowel movements (<i>hyperdefecation</i>), or incontinence (<i>involuntary loss of bowel contents</i>). Diarrhoea is also classified by physicians into acute, which lasts one to two weeks, and chronic, which continues for longer than 23 weeks. Viral and bacterial infections are the most common causes of acute diarrhoea, such as cholera and dysentery.
Endemic diseases:	Diseases that are prevalent in or peculiar to a particular locality, region, or people
Epidemic:	The occurrence of cases of a particular disease in excess of the expected. (Therefore, demanding that emergency control measures be implemented.)
Vaccine-preventable diseases:	Diseases such as measles, malaria and meningitis are able to be prevented through vaccinations

Emergency Health Services in Disasters

During the first few days following a disaster, the priority is usually to treat casualties and the sick or injured. Disasters like earthquakes often involve the management of mass casualties which normally requires the following activities: Search, rescue and first aid; Transport of health facilities and treatment; Triage; Tagging; and redistribution of patients between hospitals when necessary. Usually within 30 minutes of a disaster, up to 75% of the healthy survivors are actually engaged in urgent rescue activities.

The demand for curative care is highest during the acute emergency stage, when the affected population is most vulnerable to their new environment and before basic public health measures (e.g., water, sanitation and shelter) have been implemented. Thereafter, the priority should shift toward preventive measures, which can dramatically improve the overall health of the affected population. Otherwise, any prolonged



interruption in routine immunisations and other disease-control measures may result in serious outbreaks of measles, cholera etc.

Disasters call for a co-ordinated response between curative and preventive health services, including food supply, water and sanitation, etc. In order to minimise mortality and morbidity it is also necessary to organize the relief response according to three levels of preventive health measures; namely primary, secondary and tertiary prevention (discussed in more detail further on).

Infrastructure and procedures in accessing emergency situations

i Managing a Mass Casualty Incident (MCI)

A mass casualty incident (MCI) is any event producing a large number of victims such that the normal capacity of local health services is disrupted. Common causes of an MCI include floods, fires, explosions, industrial accidents, or conflict situations.

The response may be delayed after a MCI due to poor communication. Valuable resources at the disaster site are used up in attempts to save the most gravely injured victims who cannot survive, while those who are more likely to survive receive little attention. Inadequate transportation may decrease the survival of victims in critical condition. The following patients will frequently reach the health facility first:

- those nearest to the arriving ambulances;
- those who are first to be rescued; and
- those who are the most gravely injured.

If there is only one first referral health facility, it may quickly become overwhelmed. Limited resources are used to care for victims arriving first, even though most of them may have minor injuries. As a result, they tie up the personnel, examining rooms, supplies, etc. increasing the risk of death for critically ill victims whose survival depends on receiving prompt medical attention.

Understanding Triage

Triage is defined simply as sorting and prioritising patients for medical attention according to the degree of injury or illness and expectations for survival. Triage is carried out to reduce the burden on health facilities and it is normally done by the most experienced health worker assisted by competent staff on the triage team.

See also Wikipedia's article on triage (in references).

Triage is a continuous process that begins when patients arrive at the medical post and continues as their condition evolves until they are evacuated to the hospital.

By providing care to victims with minor or localised injuries, health facilities are freed to attend to more critical tasks. Triage is necessary where health facilities cannot meet the needs of all victims immediately, particularly following an MCI.

The goal of managing a mass casualty incident is to minimise the loss of life or disability of disaster victims by first meeting the needs of those most likely to benefit from services.

This goal can be achieved by setting the following priorities for triage:

Priority for transportation to the hospital is based upon referrals of priority needs of patients.

Priorities for care in the field are often identified by visible colour-coded tags that categorise patient needs. However it is important to note that different jurisdictions use varying systems and the use of colour-coded tags may cause some confusion. (See Nocera and Garner, 1999).

Management of MCI begins with being prepared to mobilise resources and follow standard procedures in the field and at the hospital. Hospitals with a limited number of emergency workers may find it difficult to hold regular training sessions on MCI management. Countries with limited resources should focus on the following:

- improving routine emergency services for sudden-impact, small-scale incidents (e.g., car accidents or accidents in the home). To avoid confusion, the same procedures that are necessary to save lives during an MCI should be performed as routine emergency services;
- co-ordinating activities that involve more than an emergency medical unit (police, fire fighters, ambulances, hospitals, etc.); and
- ensuring a quick transition from routine emergency services to mass casualty management establishing standard procedures for managing all incidents (small or large scale) — search and rescue, first aid, triage, transfer to hospital and hospital care.



Minimum	Requirements	for a	Standard Kit
			••••••••

List of Basic Needs			
Maps, stationery	Medical disaster kit: oxygen, airway, intubation set, ventilation bag, suction device, chest tube set, tracheotomy set, etc.		
Means for communication and transportation	IV fluids, drugs for shock, tourniquet		
Area lighting, flashlights	Dressing/splint kit: compresses, antiseptics, suture ser, splints, gloves		
Identification devices for area, staff and victims, : flags, arm bands, triage tags	Blood pressure cuff, stethoscope		
Stretchers, boards, blankets	Scissors, adhesive tape		
Protective devices: gloves, masks, etc.			

Figure 9

In addition to the basic supplies provided through such kits, an MCI situation requires the immediate arrival of appropriate personnel which will comprise of the following: the command post team, the evacuation team, the incident commander, the search and rescue team, the security team the Triage officer and the triage team.

Basic MCI management is composed of a series of steps that collectively meet the immediate health needs of disaster victims. It begins with search and rescue from the disaster site and ends with referral to the health facility or release for home care. A possible organisation of an MCI management centre is illustrated in the following figure:



Figure 10: Possible organisation of an MCI management centre

Each team operates within a specific area, aiming to remove all victims away from the disaster site, and to transport the critical cases to health facilities.

Procedures for transportation

Casualties should be treated near their own homes whenever possible to avoid social dislocation and the added drain on resources of transporting them to central facilities. If there are significant medical reasons for such evacuation, the relief authority should make provision to return the patient to his or her home.

Providing proper treatment to casualties requires that the health service resources be redirected to this new priority. Bed capacity and surgical services must be expanded by selectively discharging routine inpatients, rescheduling non priority admissions and surgery, and using available space and personnel fully. A centre, manned 24 hours a day to respond to inquiries from patients' relatives and friends, should be established and could be staffed by able lay people.



Transportation of Casualties

Evacuations of casualties may be organized when they are gathered at a First Aid post, a dispensary or any facility of the casualty-care chain, in which case they would have already been triaged and a priority category for evacuation has been assigned to each.

- i Evacuation is contemplated when means are available and reliable, routes and time-frames are known and security has been ensured.
 Prior to the moving of casualties it is imperative that personnel at destinations have been informed and are ready to receive the casualty(ies).
- ii Evacuation vehicles assigned for medical purposes must be used exclusively for the latter. Their availability and hygiene should be respected. Other vehicles should preferably be used to transport the dead bodies if at all possible. In all cases priority should be given to the living casualties.
- *iii* Proper lifting techniques are used to ensure comfort of the casualty and personnel responsible for lifting should be in good physical condition.
- *iv* All departures of evacuation vehicles should be reported to supervisors in charge of managing evacuations providing the following information: departure time, number and condition of casualties, destination, estimated travel time and route, number of first aiders aboard.
- v The means of transport should ideally be such that emergency and stabilization measures can continue and should be as safe as possible as it is important that the trip is not traumatic for the casualties.
- *vi* It should also be such that casualty can be accommodated in different lying or sitting positions depending on their condition.
 Furthermore it should be able to accommodate for a provider of care or a first-aider to accompany the casualty
- *vii* The means of transport should provide adequate protection against the elements (extreme temperatures, sun, rain, wind, etc.).
- *viii* Driving needs to be smooth and safe. Once a casualty has been stabilized it is unnecessary to drive at high speed and risk a road traffic accident. Extra care should be taken especially if the roads are bumpy or have potholes as hitting into them causes more pain to the casualty, may increase bleeding and displace traumatized limbs hence causing more complications.
- *ix* Casualties found on the roadside should be taken on board only if there is adequate space and no other alternative. If possible inform your team leader or the dispatch or command centre of the casualty care chain and ask for instructions. Occasionally "opportunistic casualties" i.e. people who, according to their triage priority, do not need to be evacuated at a given time, may be allowed on board an evacuation vehicle because space happens to be available.
- x On arrival at the hospital, every injured person should be reassessed, stabilised, and given definitive care. The colour-coded

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tags are strictly for field triage and field use. They should not be used for documenting health care in the hospital.

xi Hospitals should also regularly advise the Incident Commander about their health care capability and capacity so that the transfer of MCI victims is well organised. If the hospital's capacity or capability is low, patients and victims may have to wait a long time for treatment in surgical or intensive care units.

Communicable diseases common in disaster situations

The main communicable diseases are:

- 1 Diseases transmitted by contact Acute respiratory infections (ARI) which are common among people after a disaster especially among the children. These are spread through personal contact or being around people who are infected already. These include the common cold, influenza, bronchitis, diphtheria and pneumonia.
- 2 Vector transmitted diseases are caused by mosquitoes and these include, malaria, yellow fever, dengue, leptospirosis and chikungunya (common in the Seychelles). These infections become prominent when the balance of nature is disturbed as is the case in a disaster.
- *3* Disease can also be transmitted through faecal matter ingested orally as a result of drinking contaminated water or eating food and fruits that are contaminated. These diseases include cholera, typhoid fever, diarrhoea diseases, and leptospirosis. They can also be transmitted through poor personal hygiene or from a contaminated environment.
- 4 Diseases transmitted through breathing contaminated air or from germs that are airborne can be problematic after a disaster. These diseases include tuberculosis, measles, meningococcal meningitis and whooping cough.
- 5 Sexually transmitted diseases are on the rise in peaceful times let alone being in disaster mode. These diseases are transmitted through sexual contact with people who are contaminated with the different germs that are responsible such as HIV/AIDS, gonorrhoea, syphilis, Chlamydia and trichomonas.

Risk factors contributing to the spread of communicable diseases and outbreaks

Research has found that amongst developing countries there are patterns of communicable disease outbreaks that are similar. By studying these patterns we can begin to isolate and identify the risk factors that can lead to outbreaks of disease. Understanding the risk factors associated is essential in helping us to predict and prepare ourselves for combating communicable disease outbreaks.

Risk factors interact with each other in a variety of ways depending on the case and situation. Before appropriate intervention can be determined,



the risk factors must be identified. Five key factors are discussed however, it should be understood that there are many other risk factors.

Pathogenic Agents (bacteria, parasites, fungi)

Everyone everywhere has pathogenic agents and usually our bodies and environment learn to balance these out: however, under disaster situations, natural or man made (for example tsunamis and war), populations often need to migrate and find a new place to settle. When this happens, a health disaster is imminent as pathogenic agents too, find themselves in new environments and different populations. The primary victims of such incidents are often the displaced people given that they may have no immunity to new pathogenic agents they may confront. The local population may also be affected given that their susceptibility could be higher to new pathogenic agents.

Susceptibility of the Population

Populations can be understood by looking at 2 areas: the individual population and, the community population.

When disaster strikes, as in a war, the make-up or profile of community populations will change, for example post war populations always show a baby boom. When this happens, infectious agents who thrive better on the young and the very old, are likely to increase and can lead to an outbreak of disease.

Community populations are very much 'context sensitive' for example endemic populations where there is malaria, the at risk age level are infants less than two years. For non-endemic populations, everyone is susceptible to all forms of malaria.

For individual populations it is not feasible to determine each person's level of immunity however, it is possible to look at groups of individuals at risk i.e. those who are naturally most vulnerable to specific pathogenic agents. For example, in developing countries most children from 2-3 years of age will have been vaccinated or have had measles and therefore their immunity would be high. The children at risk or susceptible to measles would be the 4-5 years olds.

It is very useful to look at groups at risk or those specific populations who are naturally vulnerable to certain pathogenic agents for when these agents are identified then intervention can be planned and processed.

Increased transmission

Pathogenic agents are easily transmitted particularly in situations where there is overcrowding and hygiene conditions are poor. These conditions easily occur when there is lack of water, unsatisfactory waste disposal and all factors resulting in an absence of sanitation measures.

Deterioration of the Health Service

All levels are affected when there is an obvious lack of health services. For example, no vaccinations are given and little or no care is provided for the sick.

Climatic Events

The increased frequency and intensity of extreme climatic events is recognized as a key vulnerability issue associated with climate change. This climate change may pose threats such as:

- Flooding which can lead to increases in mosquito populations that transmit human diseases such as dengue fever.
- Extreme rainfall events resulting in overflow of sewerage systems leading to further spread of pathogenic agents.

The factors discussed in this section, contribute in varying degrees to communicable disease outbreaks. The importance of identifying the risk factors is therefore critical if effective intervention is to prevail.

Practical and effective disease control measures need to be developed collaboratively between relief agencies and local health authorities. These measures should be based on the national diseases control policies.

Preventing and reducing outbreaks of communicable disease in emergency/disaster settings

- Preventing communicable diseases outbreaks
- Intervention at the source to prevent the development of infectious agents that can attack susceptible individuals.
- Intervention to modify immune status (vaccination, general health status)
- Intervention at the biological stage (minimize opportunities to exposure)
- Intervention at the aftermath of a disease (managing communicable diseases outbreak).

1 Levels of intervention

- *a* Primary Prevention can be defined as the biological and clinical manifestations of an infection. For example immunization and sanitation as well as awareness education on basic hygiene and sanitation methods.
- b Secondary Prevention means preventing a harmless form of a disease from developing into a more serious form liable to cause death or complications. The use of oral rehydration salts (ORS) at



the beginning of a diarrhoeal attack, for example, prevents the development of dehydration. There are also indigenous medicines that can be given to the infected people to treat these conditions, in the absence of pharmaceutical provisions.

c Tertiary Prevention – covers rehabilitation following the illness (social re-integration, nutritional rehabilitation after measles, etc.)

2 Curative Actions

The following is a list of measures for communicable-disease control:

- The use of interviews for rapid assessment of communicable diseases in emergencies
- Immunization
- Tests carried out in the field
- Chemoprophylaxis
- Therapeutic
- Health education

The classic model of the natural cycle of communicable diseases involves:

- risk/exposure factors
- population's susceptibility to the disease
- biological manifestations of the disease
- clinical manifestations of the disease
- progression of the disease
- return to a non-disease state

Communicable Diseases Control

Before, during and after disasters, the government disaster management teams and the communities must work hand in hand to prevent the transmission of communicable diseases. In the event that the diseases has started there must be efforts put in place to control. A number of diseases must be prepared for; this section focuses on some common issues in the small states of the Commonwealth. You may develop a list of disease specific to your area. (*Please refer to table below*)

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Diseases	Description/Cause	Signs and Symptoms	Treatment
Tuberculosis (TB)	Bacterial infection that attacks the lungs	Cough-more than 3 weeks; coughing up blood; weight loss; night sweats	Several medicines including strong antibiotics must be taken for a long time. It is curable.
Leptospirosis	Caused by Leptospira agent. Enters the body through the mucous membranes; through exposure to water contaminated with urine of infected animals	Does not spread from person to person. Abrupt Fever. Flu-like Mimics dengue. Jaundice is common	Anti-microbial agents (e.g. penicillin, amoxicillin or doxycycline)
Acute Respiratory Illness (ARI)	Most common is pneumonia. Very dangerous in disaster because of overcrowding. Any series of infections involved in the upper and lower respiratory region.	Cough. Severe difficulty breathing. Fast breathing. Chest in drawing in	Supportive Care Antimicrobial treatment
Conjunctivitis	Bacterial or Viral infection or allergic reaction to dust and pollen etc. Persons can become infected with their hands, contaminated towels etc. after rubbing their eyes.	White yellowish discharge. Eyes stuck together. Watery eyes. Red and sore eyes. Burning and itching eyes	Keep hands clean to avoid spreading. Prescribed eye drop must be administered. In some countries local herbs might be used to treat the infection
Rashes	Caused by a number of pathogens, toxins etc. autoimmune conditions can cause rash in disaster evacuees.	Variety of rashes: Chicken Pox Measles Rubella Human papilloma virus Adenoviruses	Demonstration of topical creams. Supportive care. Calamine lotion, corn starch. Severe cases require antibiotics.
Diarrhoeal Disease	Caused by bacteria (e.g. salmonella, E-	Last several days, bowel weeps fluid.	Diarrhoea should be left to take its

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Diseases	Description/Cause	Signs and Symptoms	Treatment
	Coli.) Can also be caused viruses (rotavirus) and parasites. Chronic diarrhoea can cause under nutrition	Fluid in the bowel leads to liquid stools. Inflammation Cramping, abdominal pain, Nausea, and vomiting.	course. No medication only the use of oral rehydration salts (ORS)
Cholera	Acute intestinal infection that is spread through contaminated water and food.	Copious, painless, watery diarrhoea and vomiting. Severe dehydration	Oral rehydration salts and Intravenous fluids
Hepatitis	 Five types: A, B, C, D, and E. Type A and E – transmitted through contaminated food and water. Type B, C, D - by blood or serous fluids. 	Fever. Persistent vomiting. Jaundice-longer than 10 days Bleeding Dehydration Anorexia	No specific treatment. Maintain hydration, nutrition and adequate rest. Avoid Paracetamol, salicylates, and antihistamines
Malaria	Vector disease caused by various malaria blood parasites. The host is the Anopheles mosquito	Spontaneous night chills Fever at nights. Pain in the joints, nausea, vomiting, anaemia. Enlarged spleen	A combination of two anti-malarial drugs- it is more effective and if one does not work the other will. Patients who have severe P. falciparum malaria or who cannot take oral medications should be given the treatment by continuous intravenous infusion.
Typhoid Fever	Caused by salmonella, ingested in food and water contaminated with faeces.	Malaise, headache. Aching limbs. Cough, constipation or diarrhoea. Bronchitis and	Prevention: vaccination. Several antibiotics can be used

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Diseases	Description/Cause	Signs and Symptoms	Treatment
		delirium may develop	
Gonorrhoea	Sexually Transmitted Disease (STD) caused by a bacterium and flourishes in warm moist areas of the reproductive system.	Burning when urinating. White, yellow or green discharge. Men- swollen testicles. Some women get no symptoms	Gonorrhoea is treated with antibiotics (e.g. ciprofloxacin). Single injection, a single pill, or a week-long course of pills.
HIV	HIV (human immunodeficiency virus) is the virus that causes AIDS. This virus may be passed from one person to another when infected blood, semen, or vaginal secretions come in contact with an uninfected person's broken skin or mucous membranes		No cure. Antiretroviral drugs slow the progression of the virus and once started, they must be taken everyday for the rest of your life. (numerous side effects)

Figure 11

Monitoring and Evaluation of Communicable Diseases Control Programme

Emergencies are unstable and dynamic situations. Simply carrying out disease control measures after an initial assessment does not mean that communicable diseases will not cause problems among an affected population. Disease surveillance is useful for monitoring the incidence of communicable diseases as well as the effectiveness of disease control measures. This will determine whether selected control measures are appropriate and resources are adequate for preventing disease and preserving the health of the affected population.

Evaluation of the disease control program is vital because it measures effectiveness, identifies lessons for future programs, and promotes accountability. Communicable disease control programs can be evaluated in two ways:

a Internal Program Evaluation — This is normally carried out by program staff who regularly analyse and review monitoring information. They must also evaluate the effectiveness of all



control measures or compare these measures across different situations.

b External Program Evaluation — This may be part of a wider evaluation exercise by agencies and donors. It may be planned, for example, after the acute phase of the emergency.

The Sphere Project proposes minimum standards and key indicators that can be used to evaluate a communicable diseases control programme in emergencies.

The following minimum standards and key indicators of the Sphere Project may be used to evaluate a communicable diseases control program in emergencies. Minimum standards and key indicators of the Sphere Project for the following components may be used to evaluate the following control programme:

- i Measles Control
- *ii* Monitoring of communicable diseases
- iii Investigation and control of communicable diseases
- iv Human Resource capacity and training

i Measles Control

The following indicators are used to evaluate if a systematic response is mounted for each outbreak of measles within the disaster-affected population and the host population, and whether all children who contract measles receive adequate care:

- A single case (suspected or confirmed) warrants immediate on-site investigation which includes looking at the age and vaccination status of the suspected or confirmed case.
- Control measures include the vaccination of all children 6 months to 12 years of age (or higher if older ages are affected) and the provision of an appropriate dose of vitamin A.
- A community-wide system for active case detection using the standard case definition and referral of suspected or confirmed measles case is operational.
- Each measles case receives vitamin A and appropriate treatment for complications such as:
 - pneumonia, diarrhoea, and severe malnutrition, which cause the most mortality.
- The nutritional status of children with measles is monitored, and if necessary, children are enrolled in a supplementary feeding program.

ii Monitoring Communicable Diseases

The following indicators are used to evaluate the monitoring of communicable diseases:

- The responsible surveillance and disease control unit or agency is clearly identified and all participants in the emergency know where to send reports of suspected or confirmed communicable diseases.
- Staff experienced in epidemiology and disease control are part of the surveillance and disease control unit or agency.
- Surveillance is maintained at all times to rapidly detect communicable diseases and to trigger outbreak response.
 - iii Investigation and Control of Communicable Diseases

The following indicators are used to evaluate whether diseases of epidemic potential are investigated and controlled according to internationally accepted norms and standards:

- Diseases of epidemic potential are identified by the initial assessment; standard protocols for prevention, diagnosis, and treatment are in place and appropriately shared with health facilities and community health workers/home visitors.
- Case reports and rumours of disease occurrence are investigated by qualified staff.
- There is confirmation of the diagnosis.
- Outbreak control measures are instituted, which include attacking the source, protecting susceptible groups, and interrupting transmission of the disease.
- Qualified outreach personnel participate in the control measures at the community level by providing both prevention messages and proper case management according to agreed guidelines.
- Public information and health promotion messages on disease prevention are part of control activities.
- Community leaders and outreach personnel facilitate access to population groups and disseminate key prevention messages.
- Only drugs from WHO's Essential Drugs List (1998) are used.

iv Human Resource Capacity and Training

The following indicators can help evaluate whether the staff are suitably experienced and trained and that they are adequately managed and supported by their agency:

 Staff and volunteers involved in surveillance (as part of assessment, monitoring, or review process)are thoroughly briefed and regularly supervised.



- Staff responsible for communicable disease control have previous experience or training and are regularly supervised in the use of recommended treatment protocols, guidelines, and procedures.
- Carers are informed about priority prevention activities such as the need for vaccination, use of soap, bed nets, latrines and good health seeking behaviours.

The techniques and resources used for monitoring or evaluating must be consistent with the scale and nature of the disease control program. At the end of the evaluation, a report must be written which describes the methodology used and how conclusions were reached. This report should be shared with all concerned, e.g., the affected population, host authorities, donors, and other humanitarian agencies.

Rapid Assessment

Assessment undertaken after a major change, such as an earthquake or sudden refugee displacement. It provides information about the needs, possible intervention types and resource requirements. A rapid assessment normally takes one week or less. It is then followed by detailed assessments.

The use of interview as a rapid assessment method

Very often those involved in relief in emergencies may not always have access to sources of information which can allow them to determine the main communicable disease that are affecting the population. It is not uncommon that at the outset of a disaster, the only available source of information is the population itself.

Opportunities for direct investigation with a population are limited, and it is usually difficult to start off by running biological tests in order to diagnose the main communicable diseases. Initially relief workers will have to content themselves with the information they can collect through interviews with community members.

Such interview may prove adequate to indicate which measures need to be taken, depending on the data sought. For example, a relatively simple questionnaire permits a rapid assessment of the main causes of death among the children of the affected population. The procedure to follow can be summarized as follows:

- Draw up a list of syndromes which appear to be the main causes of death. In the case of communicable diseases, these would consist primarily of measles, diarrhoeal diseases, malaria, and meningitis.
- Describe the symptoms used to identify the communicable disease/s in question; the medical personnel and the individuals questioned may have markedly different interpretations of the same clinical manifestation. A minimal knowledge of local terminology is essential.

• Verify the information, this is difficult in the case of mortality, since the data receive cannot be confirmed except by information from other sources e.g. the cause of death for hospitalized children.

Health Education

Health education is not limited to the problem of communicable diseases. However, communicable diseases are a useful starting point for initiating health education in a disaster situation. The risks involved in communicable diseases must be well understood by the affected community, and the need for their participation in controlling them.

Health education should take into consideration other components that influences behaviour. For example, the place where people live, the people around them, the work they do; hence telling people what they can do to be healthy is insufficient

In emergency situations, relief workers rarely have much influence over the causes of the crisis. Unfortunately, they must settle for modifying or adapting the victims' behaviour to conform to their new living conditions- which will be temporary, at best – without exercising any real impact on the social environment.

The problems that confront an affected population may not be new to them, but present themselves in a different form. Moreover, the urgency of certain situations necessitates immediate action, before the population has a chance to understand its purpose.

A population confronted with an emergency in itself is obliged to change its behaviour quickly. Such changes, however, cannot be dictated by outsiders; they must be formulated by the people concerned, and disseminated by them as well, in their own words and should reflect the local cultural context.

Developing a Health Education Programme

On the basis of this principle, the following sequence might be proposed to begin the process of health education:

- *i* Identification of health problems by the community.
- *ii* Study of behaviours adopted to cope with these problems: should they be modified?
- iii Determination of the objectives of health education programme.
- *iv* Identification of practical measures acceptable to the community, to modify these behaviours.
- v Implementation of the measures.
- vi Evaluation of results.



Unit summary



This unit provides material which teaches the following areas: – Emergency Medicine – Risk Factors For Communicable Diseases – Coping With Communicable Diseases.

The unit outlines the important factors which contribute the spread of communicable diseases associated with disaster situations. It outlines and discusses risk factors associated with the management of communicable diseases in a disaster setting. The unit can inform those who enrol in this programme on the important factors that managers of disaster situations should expect in dealing with communicable diseases during times of disasters.

Self - Assessment



- 1 Describe all components involved in emergency medicine and write small notes on each giving examples where possible?
- 2 Draw a flow chart describing the different types of triage in emergency medicine.
- *3* What are the minimum requirements of a standard emergency kit? Provide pictures or illustrations of the kit.
- 4 What are the main signs and symptoms of the different communicable diseases commonly found in disaster situation?
- 5 Write a short essay on risk factors common in disaster situation and how these can be prevented and or treated.

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Unit 11

Disaster Associated Health Issues – Part II

Introduction

This unit discusses vector-related diseases and their control, and the safe handling of pesticides as well as discussions of challenges and constraints faced by disaster management personnel dealing with environmental health awareness during and after a disaster. The unit finishes with an outline of a sanitation programme to ensure the promotion of health and hygiene. The maintenance and monitoring of water quality and quantity as well as vector control measures and environmental health programmes in emergency situations.

Upon completion of this unit you will be able to:



Outcomes

- Identify potential vector-related species.
- Describe appropriate strategies for controlling vector species.
- Promote awareness on the safe use of pesticides.
- *List* the challenges & constraints of environmental health management in emergencies.
- *Promote* health & hygiene through implementing a sanitation programme.
- *Explain* the importance of water sources and the minimum standards for water quality and quantity.
- Describe processes to monitor and evaluate vector control measures and environmental health programs in emergencies.



Terminology

Contamination: Becoming impure or unusable due to contact or mixture with certain pathogens that are transmitted through faeces or urine.
 Faecal coliforms A category of bacteria that match the characteristics of bacteria found in the stool of warm blooded animals. Finding these bacteria in

	water indicates faecal pollution and the water sample potentially dangerous.
Minimum standards	A set of standards developed by international humanitarian agencies (e.g. Sphere Project) in response to concerns about the quality and impact of humanitarian assistance. It aims to govern the implementation of relief programmes. The minimum standards can be found in the Sphere handbook which can be viewed on the web at: http://www.sphereproject.org.
Pathogen:	Anything that causes disease, especially micro- organisms
Pesticide:	Any substance used to kill or control organisms which are considered to be pests
Water born diseases:	Diseases acquired by drinking contaminated water (e.g. diarrhoea, cholera, amoebiasis,)
Vector:	Any animal or arthropod capable of carrying disease pathogens from one host to another either mechanically or through its body functions

Potential vector-related species

In general the most potential vector-related species is the mosquito. There are different species of mosquitoes causing various diseases such as elephantitis, malaria, yellow fever, dengue, leptospirosis, and chikungunya (common in the Seychelles). Mosquitoes use a variety of different hosts such as small mammals as in rodents, human beings, monkeys and pigs.

There are also a number of different types of flies, such as, household flies (dysentery), sand flies (skin infections), black flies (river blindness) and tsetse flies (sleeping sickness).

Rodents can also be vectors for disease themselves – leptospirosis is spread in the urine of small mammals.

Appropriate strategies for controlling vector-related diseases

Strategies to control the infestations by rodents and insects are of paramount importance. The following are some of the possible control strategies:

To identify and distinguish between potential vector-related species



- To develop and implement an appropriate plan for controlling vector species.
- To promote awareness on the safe use of pesticides.
- To recognise the challenges & constraints of environmental health management in emergencies.
- To promote health & hygiene through implementing a sanitation programme.
- To explain the importance of water sources and the minimum standards for water quality and quantity.
- To monitor and evaluate vector control measures and environmental health programs in emergencies.

Promoting the safe use of pesticides

Vector control measures should address two principle concerns: efficacy and safety. They should be carried out according to internationally agreed methods and ensure that staff and the affected population are adequately protected.

There are three points about pesticide safety that should be emphasized in disaster settings, especially where evacuees are housed.

- 1 Safe Use and Storage of Pesticides: Extra precautions should be taken in choosing insecticides and deciding when, how, and for how long to apply them. Strict procedures must be followed when handling insecticides and other related equipment. Pesticides and the spray machines should never be transported in vehicles that are also used for carrying food. They must be stored in locked and ventilated buildings. There is an increased danger of pesticide poisoning among displaced populations. Poisoning may be unintentional, but the danger exists because of the lack of toys for children to play with, the novelty of the situation, and the traumatic experience of being displaced.
- 2 Safe Storage and Disposal of Used Insecticide Containers: Strict guidelines have been developed for this and they should be implemented to ensure that the displaced community cannot obtain used pesticide containers.
- 3 Safe Use of Sprayers: Prior training in the safe use of pesticides is essential, and operators must have access to protective clothing (uniforms, gloves, masks, etc). They must never smoke, drink, or eat during the job, and they should have access to good washing facilities after the job is done. There has also been the recommended discontinuance of the use of certain pesticides. It is suggested that each country follows the WHO guidelines provided for the Safe Use of Pesticides in Disasters.

Environmental health: challenges and main constraints

Environmental Health has its origins in the last century, when bad housing, poor water supplies, inadequate drainage and contaminated food caused disease and death. To recognize the challenges and addressing the main constraints of environmental health in relation to disaster management can present several challenges and constraints.

These challenges and constraints are as follows:

- Recognizing and responding to uncertainties, especially prioritizing treatment of different conditions.
- The different tasks involved that are performed by various personnel during a disaster and identifying those responsible for carrying out these tasks successfully and efficiently.
- Establishing baseline relationships between the various players, so each one knows their sphere of responsibility.
- Seeking evidence for early health effects and detection.
- The level of development of a country can either be a challenge or a constraint. Wealthy countries face disasters with a wealth of human and material resources, a well developed medical and health infrastructure, highly structured emergency planning, efficient transportation and communication systems. The presence of these factors facilitates responses to disaster, whereas by contrast poor countries lack these resources and constrained disaster response.
- Cultural variations within the countries are important and can present challenges and constraints to disaster management. This is due to each community evolving traditional ways of understanding and responding to disaster and these processes must be managed properly to facilitate high survival rates.
- Different cultural groups may respond in unexpected ways to medical and health professional personnel in times of disasters and these professional people should be empowered to handle these different situations.

Promoting health and hygiene through implementing a sanitation programme

The quantity and quality of the water that we drink is directly linked to health. If the water is contaminated with germs or chemicals, health will be affected. Outbreaks of diseases transmitted by water have a major impact on human health. This is a major concern after a disaster. When people defecate in the open, flies will feed on the excreta and can carry small amounts of the excreta away on their bodies and feet. When they touch food, the excreta and the germs in the excreta are passed onto the food, which may later be eaten by another person. During the rainy season, excreta may be washed away by rain-water and can run into wells



and streams. The disposal of excreta alone is, however, not enough to control the spread of cholera and other diarrhoeal diseases. Personal hygiene is very important, particularly washing hands after defecation and before eating and cooking.

Here are some rules for basic sanitations in public places:

- There should be sufficient toilet facilities for the maximum number of people using the area during the day. This normally means one toilet compartment for every 25 users. The toilet facilities should be arranged in separate blocks for men and women.
- Toilet facilities should not be connected directly to kitchens. This is in order to reduce the number of flies entering the kitchen and to reduce odours reaching the kitchen.
- There must be a hand washing basin with clean water and soap close to the toilet facilities. There should be separate, similar facilities near to kitchens or where food is handled.
- There must be a clean and reliable water supply for hand washing, personal hygiene and flushing of toilet facilities.
- Refuse must be disposed of properly and not allowed to build up, as it will attract flies and vermin.

It is important to make sure that information about health is available in public places. Such information should be displayed in an eye-catching, simple and accurate way. Where appropriate, large posters with bright colours and well chosen messages, put up in obvious places, are effective.

Health and hygiene messages may be passed on to the public using such posters in public places. These messages should include the promotion of:

- Hand washing
- Use of refuse bins
- Care of toilet facilities
- Protection of water supplies

Importance of water sources and the minimum standards for water quality and quantity

Sources of Water

Water sources fall into three general categories:

- 1 Rainwater: In general, rainwater, though pure, is not reliable or a sufficient source to provide for a large affected population and is rarely considered during emergencies.
- 2 Surface water: Surface water from lakes, ponds, streams, and rivers have the advantage of being accessible (water easily collected) and are predictably reliable and plentiful. They have the disadvantage of

generally being microbiologically unsafe, and therefore, requiring treatment.

3 Groundwater: Groundwater from wells, springs, etc. tends to be of higher microbiological quality (having undergone natural soil filtration underground). However, it is relatively difficult to extract. More technology and energy is needed (compared with other water sources) to bring water from within the earth up to the surface.

The following factors are important when selecting the type of water sources for a displaced population:

- The *reliability* of available water sources.
- The water needs in relation to population size.
- The intended *length of time* that the source will be required.
- The locally available skills and resources.
- The *capacity* of the implementing agency.

Water Quantity

The minimum standards of the Sphere Project states that at least 15 to 20 litres per person per day (l/p/d) is needed to maintain human health. While the availability of water is influenced by the situation, more water can almost always be obtained with more resources (more wells, trucks, or pipes). Because obtaining water in arid areas is expensive and the relationship between water quantity and health is not well understood, there is a tendency not to invest enough in water infrastructure when other demands seem more serious. This makes monitoring the availability of water during emergency situations an essential component of a public health program.

During the acute emergency phase, water consumption should be estimated weekly. Often, the utility company or relief organisation providing water to the affected population is aware of these estimates. It is important to realise that water consumption means what people receive not what the water team produces.

Disagreements may arise between "production" and "consumption" estimates because:

- Water can be lost or wasted during pumping and transport.
- Lack of water containers can prevent people from collecting enough water.
- Surveys or household interviews that document the amount of water collected at watering points or people's actual use of water are preferable to simply dividing the amount of water produced at a well or a plant by the number of people served. Cholera outbreak investigations have repeatedly shown that not owning a bucket puts families at increased risk of illness or death. Thus, not only should the average water consumption be 15 l/p/d or more, but there should not



be anyone in the population with very low water consumption (<7 l/p/d).

In addition, all families should be provided with suitable water containers for daily collection and storage of water. Special drainage pits should be constructed to manage runoff water at distribution points.

Water Quality

Water quality is usually measured by the presence of specific groups of micro-organisms. This indicates the possible presence of faeces. Because human faeces typically contain tens of millions of bacteria per gram, even the smallest trace of faeces in water is often detectable by bacterial monitoring. Faecal coliforms are a category of bacteria that match the characteristics of bacteria found in the stool of warm-blooded mammals. Other indicator bacteria, such as E. coli, faecal streptococci, or total coliforms, are maintained by the same premise — absence implies safe water.

The following table shows the recommended guidelines for assessing water quality.

Faecal Coliforms (per 100 mLs of water)	Interpretation	Recommendation
0-10	Reasonable quality	Acceptable
10-100	Polluted	Better protection and simple treatment
100-1,000	Very polluted	Treatable, but look for alternative source
Over 1,000	Grossly polluted	Source to be avoided

Guidelines for Water Quality (UNHCR)

Figure 12

Note: Water quality testing may be performed by a competent local laboratory (must be done within 6 hours of sampling), or by using field testing kits, e.g., the Oxfam/Del Agua Kit or Milliflex Kit from Millipore. However, these kits are expensive and require trained people to use them and interpret results.

The above table shows that no faecal coliforms in water is a good indication that there are no faecal-oral bacterial pathogens present, whereas finding low levels of faecal coliforms in water does not mean that the water is dangerous.

Note: Contaminated water sources should not be closed until equally more favourable sources become available.

While water sources may differ in water quality, it is how water is handled and stored by consumers that will finally determine whether the
water is safe for drinking. Studies have shown that dipping hands into household storage buckets causes considerable contamination and that water quality declines over time after the water is initially collected. The best way to keep water safe in the household is to add a chlorine residual to the water. This means that in unsanitary settings, or during times of outbreaks, it may be necessary to chlorinate otherwise safe groundwater.

Monitoring and evaluation of vector control measures and environmental health programmes in emergencies

To determine the effectiveness, efficiency and the extent of achievement of any implementation, a mechanism for monitoring and evaluation is essential. In general, an evaluation measures the performance/progress of an intervention program as well as serving as a steering device for the intervention itself. There are two levels of evaluation:

- *i* Monitoring and Impact Evaluation
- *ii* Monitoring Vector Control Measures

Suitable monitoring tools are developed and made available. A monitoring form will include the type of control measure for a particular vector-related species, the timeframe for monitoring and someone pinpointed to perform the monitoring. Immediate analysis of the data obtained will indicate if the controls provided were actually reaching and utilized by the target community as scheduled.

Humanitarian agencies would ensure that assistance they finance/provide does indeed get to the victims who need them. By virtue of its specific mandate, an agency will set three conditions before undertaking any relief action:

- Access to the persons requiring assistance, to observe their situation and to evaluate their needs;
- That it be present when the assistance is brought in; and
- That it be allowed to exercise administrative supervision in order to prepare reports on distributions made.

If authorities do not yield advance consent to the conditions set out above, humanitarian agencies may withhold assistance. The crucial point here is how urgent the victims' needs are. If the situation is critical, postponing humanitarian assistance is ethically questionable. In the time taken to negotiate with the authorities, the victims' conditions may deteriorate dramatically, the humanitarian agency is compounded by the accusation that it did not act early enough to prevent the crisis.

Impact Evaluation

Evaluation is a means of verifying whether the services provided correspond to what had been anticipated quantitatively and qualitatively. Accordingly, the quantity and quality of the services must be assessed. This involves making a value judgment concerning the quality of medical



and other needed service activities. For health-care professionals, the issue becomes one of medical ethics.

Impact evaluation is essential when evaluating the impact of an intervention. A humanitarian agency will seek authorisation to return to the scene in order to assess the impact of its work on the condition of the population in relation to the targets set.

Humanitarian agencies have a responsibility to carry out evaluations on a systematic basis. Objections may arise on the grounds that:

- It is too difficult (The institution of a surveillance system is certainly not easy, but it is not impossible)
- It is not a priority (first priority is feeding, treatment, etc., any time left over, then evaluate). The priority of analyzing the impact of an intervention is not to satisfy the intellectual curiosity of the program managers. It is an essential tool for orienting the operation.
- It is better not to know the impact of the intervention (Fear of value judgment).

All these arguments can be refuted.

Unit summary



Summary

In this unit you learned how to identify and distinguish between potential vector-related species, plan appropriate strategies for controlling vector species and promote awareness on the safe use of pesticides. In addition you learnt how to recognise the challenges & constraints of environmental health management in emergencies and promote health & hygiene through implementing a sanitation programme. Furthermore you will be able to explain the importance of water sources, the minimum standards for water quality and quantity, monitor and to evaluate vector control measures, and lastly environmental health programmes in emergencies.

Self - Assessment



Assessment

- 1 Prepare a 10 min presentation in which you explain what is meant by vector-related species and their potential danger for bringing about natural disasters.
- 2 Design a plan of strategy for controlling vector species. Clearly identify the key areas for enabling good control of vector species.
- *3* List 3 key challenges & constraints of environmental health management in emergencies.
- 4 How would you go about monitoring and evaluating vector control measures and environmental health programs? Make a list of the important areas you would need to consider.
- 5 Put together a poster promoting either the safe use of pesticides OR promoting a sanitation programme.

References

The Sphere Project: Humanitarian Charter and Minimum Standards in Disaster Response (2004). Accessed on 2/02/08 at: http://www.sphereproject.org/content/view/27/84



Unit 12

Physical and Socio-economic Impacts of Disasters

Introduction

Disasters are no respecter of persons and the trail of destruction that they leave behind is a common occurrence. Their effect or impact, is usually felt across all sectors in society, at the community or individual level, which has led to push a for the more multi-sectoral approach to prepare and respond to disasters! The impact of a disaster may either be a direct or indirect one, its effect trickling into most homes and families in the community. The more obvious physical impact leads to the socioeconomic and emotional impact felt by the community. The intensity of the impact of any disaster is dependent on the preparedness level of the community or nation. Factors that increase the intensity of the effect of a disaster are poverty, environmental degradation, population growth, and lack of information and awareness about the hazards that exist in the area, and the potential risk they pose to the community at large.

In this unit we will look at the physical and social impact of disasters on society. One emerging issue that we will also touch on is that of animals in the time of disaster.

Upon completion of this unit you will be able to:

State the types of impacts of disasters on society.



Identify what different sectors in society are affected by disasters.

- Describe the impacts of disasters on the different sectors of society.
- *Develop* contingency plans to minimise food distribution problems in the post disaster period.
- Assess the impacts of disaster on people's income earning capacity and overall social welfare.
- Compare and contrast the extent of economic impacts caused by natural and man made disasters in any region of their choice.

Terminology	Physical impact	death and injury of people and damage to built environment.
	Rapid Assessment	a quick assessment of a disaster site immediately after a disaster, to determine immediate needs of people in impacted area
	Social impact	disruption to essential goods and services
	Built environment	includes things such as buildings, infrastructure, houses etc in an area.

Types of impacts

Disasters impact heavily on the basic needs of people, and their livelihood, thus governments need to be prepared so that they can deal with the disaster promptly and effectively. Usually, immediately after a disaster has occurred, a team made up of government and non – government agencies is sent into the disaster site to carry out what is known as a Rapid Assessment exercise. The information collected from this quick initial assessment on the damage done from the hazard, is used by the leaders of the community or nation to determine whether any external assistance is needed. It is also used to determine the "what and how much relief" needs to be brought in immediately, and also what specific segments of society have been affected heavily by the hazard.

The impact intensity felt by a community from a disaster is dependent upon the vulnerability of the community before the hazard struck (e.g. proximity to hazard, any education and awareness done etc) and thus their preparedness level. In any community the most obvious impact is the physical impact. The physical impacts in turn lead to the social impacts felt by the community. These are described in further detail below.

Physical Impacts

The physical impacts of a disaster are the deaths and injuries, and the damage to property and the built environment. The built environment can be classified as infrastructure and service sectors such as electricity, water etc. The amount of deaths can lead to a reduction in the population, and thus the workforce, which will in turn have an impact on the socio economic sector of the community. It should be noted here that the amount of physical damage caused by a hazard can affect the speed at which the response to the area can occur. If roads are cut off, this means alternative means need to be looked at to bring relief in to the disaster zone.



1 Infrastructure

Infrastructure includes the basic facilities, services and installations required for the functioning of a community or a society. Since these facilities, services and installations are spread throughout the community and country, they are normally impacted to some degree when disasters strike. Of the many components of a country's infrastructure, a select few are vital to both disaster response and to overall safety and security of the effected population. These components are referred to as "critical infrastructure,"

While all infrastructures damaged or destroyed in the disaster will eventually require rebuilding or repair, critical infrastructure problems must be addressed in the short term, while the disaster response is ongoing. The repair and reconstruction of critical infrastructure requires not only specialized expertise but also equipment and parts that may not be easily obtained during the emergency period. However, without the benefit of certain infrastructure components, performing other response functions may be impossible. Examples of critical infrastructure components include:

i Transport system (land, sea and air)

This system is important because at the time of disasters there needs to be an evacuation route available so as to get people out of the danger zone and or bring relief in. Transport is also important when a team needs to be sent in to the disaster zone to do a Rapid Assessment exercise. Transport mediums also need to be available, so that if one transport system is cut off, another mode of transport can still be used.

ii Gas and oil storage and transportation

Connected to transportation above, there needs to be a store of the above to enable transportation of people out of the danger zone. Evacuation may take a couple of days to a week, and so extra fuel and oil is needed for the cars, boats, or helicopters etc that will be transporting people out.

iii Communication

This is a critical because before a disaster and in the event of a disaster communication is needed. It is needed to get information out so that the outside "world" know what is needed and can respond appropriately.

iv Electricity, Water supply system, and Public health

Damage to critical infrastructure which provide the above basic services needed by the community can affect the lives of people in the short term. In great need immediately after any disaster are water and sanitation, as well as the health of the disaster victims. Again, this is assessed in the Rapid Assessment exercise so that it is dealt with immediately.

v Security

The management of past disasters was done on an *ad hoc* basis. As a result one of the many components overlooked was that of security, partly due to the fact that most of the resources were used for the immediate

evacuation of people and saving lives! Today however security has become and important factor that has been mainstreamed into the action plans of many disaster planning offices.

Security is the condition of being safe from harm, danger or loss. Security can be either emotional or physical security.

vi Physical Security

Physical security is any and all necessary requirements that once implemented are designed to prevent, deter, inhibit or mitigate threats that face the safety and security of persons and/or property. Safety and Security in disasters differ by the fact that safety provides for the reduction of the risk of occurrence of injury, loss or death from accidental or natural causes. Security on the other hand provides for the reduction of the risk of occurrence of injury, loss or death from the deliberate or intentional actions of man and natural causes.

Usually when disasters or an emergency situation arises, the following security issues arise:

a Looting of retail outlets and business houses

Disasters or emergency situations provide an ideal opportunity for people to go on a looting spree. Looting arises especially when it has not been factored into the disaster emergency response plan or action plan. If no preparedness in this area has been done, when the hazard strikes to cause a disaster, most of the resources are being used to evacuate people. This leaves business houses and retail shops left unattended and vulnerable to looting by those looking for an opportunity for "free stuff".

Looting may also take place after the immediate hazard has struck. This will usually happen when people have been waiting for some kind of response or assistance (recovery), and authorities have not been forthcoming with the needed aid. It is here that people say "Well we do not have any more jobs because everything was destroyed in the disaster, and so we do not have any money so how can we buy food?" As a result, looting takes place because of the fear that authorities will not take care of their needs, and so people find ways to take care of themselves and their families!

b Security of women and children

Again if there is no preparedness, women and children are vulnerable to attacks of violence or rape by others, or even to the exposure to the primary hazard (fleeing to a danger zone) or secondary hazards; maybe because the lack of knowledge or panic. Violence or rape is more likely to arise if in the evacuation process, families have been separated from each other, and thus women and or children isolated from that security of their families. It is also more likely to arise in care centres where it is usually overcrowded.

c Security of aid workers

There is now also the concern of the humanitarian workers who are flown into the disaster site to assist in the response of the disaster. Many humanitarian workers are foreigners to the site and so need to be aware of



the hazards (human or natural) in the area and take necessary precaution. For women, there is also the security against violence or rape, especially in a war situation!

vii Emotional security

People have different emotional needs that when faced with disaster, will act differently depending on how serious the disaster is.

Possible emotional reaction to a disaster situation is described in further detail in Unit 14. When the physical needs of security, whether it is food security, physical security etc are not met, coupled with the fear of uncertainties, this can lead to stress and trauma, thus lack of emotional security.

Social Impacts

i Welfare

Welfare falls into the socioeconomic and socio-political category. On the socioeconomic front this is represented by significant losses to Gross Domestic Product of the affected country or region. The local and national economy can experience low productivity, price slump, high unemployment and inflation. Small island states are more vulnerable compared to the larger developed nations when confronted with disasters of a large magnitude.

Disaster Type	Country	Damage (US\$'000)
Hurricane (Ivan) 2004	Cayman Islands	3,340,080
Tsunami 2004	Indonesia	4,451,600
Flood 1998	Bangladesh	7,000,000

Figure 13: Estimated monetary loss due to three disasters

Figure13 indicates monetary loss estimated at US\$'000 which translates into income loss that impacts directly on welfare delivery in the post disaster period.

There are overall financial impacts on the household and individuals that adversely impact on people's welfare for example dwellings, homes, property, and other assets can be damaged, sentimental value of assets can be lost forever which imply investment loss and reduction in the quality of life for the communities affected. For example people whose livelihoods depend on crops and livestock will face income loss that may impact on their welfare and overall wellbeing. For the business community (retailing, services, industries, wholesaling), their loss of income is represented by 'operational vulnerability' that is, the estimated time any business can operate without infrastructure support. For instance a business cannot operate without electric power (which is 0 hours), but it can operate for a maximum of 4 hours without phones. For time periods exceeding the above, the business ought to suspend operations indefinitely. (Lindell and Prater, 2003).

Directly related to the immediate welfare needs of the victims/survivors are their food requirements. In this respect food assembling and distribution points have to be coordinated in such a way that is effective and efficient given the prevailing circumstances.

Perhaps the welfare impacts of disasters can best be summed up by differentiating between the direct effects on property, the indirect effects brought about by the decline in factors of production, and secondary effects in the post disaster period such as economic decline manifested in balance of payments problems.

ii Economic Impacts

Economic costs of disasters vary across space and time. Evidence suggests a strong correlation between a country's level of development and disaster risk. On average, 22.5 people die per disaster in highly developed countries, 145 people die per disaster in countries with medium human development and 1,052 people die per disaster in countries with low levels of development (UNEP). Sometimes the economic impacts can be difficult to calculate. The Western Indian Ocean islands experience more than ten cyclones a year between November and May: huge costs are incurred due to the destruction of income-generating activities including tourism revenues.

To illustrate the financial loss to an economy, a study by SOPAC and the USP on the impacts of cyclone Ami on Fiji's agriculture sector estimated that 60-80% of subsistence crops were damaged at a cost of F\$921,000, direct damage to commercial crops was estimated at FJ\$39.2m, the sugar industry lost 150,000 tonnes in lost production, and FJ\$6m was lost in damaged infrastructure and equipment.

In Bangladesh, floods during the Monsoon season destroyed crops and disrupted the non-farm economy of the country even after the flood waters receded. For instance, the average monthly working days fell in the period of the floods for farm workers. Day labourers for example were severely affected, their employment fell sharply from 19 days per month to 11 days per month, and as such, wage earnings also fell by almost 46%.

Another example is the great Hanshin earthquake in Japan in 1995 that caused \$US 100 billion dollars damage which was equivalent to 2.1% of Japan's GDP. Extensive damage to buildings, transportation facilities and utilities (gas, sewage, power) makes up 80% of this cost. Recovery and reconstruction activities may start immediately after the event beginning with the most damaged sectors, whilst services sectors such as manufacturing may take up to twelve months or more for full recovery.

It is understood by everyone that a community is referred to as the people who live in it. Out of the varieties of impacts, economic impacts are one of the major areas that need attention from the moment of any disaster.

Just like food and shelter, education also needs to be included in the list of areas that contribute to the economic impacts. Due to the loss of



household belongings and perhaps the parents, there will be a loss of the family income. In these situations most people tend to ignore the importance of education for all ages. This also happens as a result of evacuating from the home land to different regions. However, to get education, either the students need to be admitted to other schools, or should be provided with housing to come back. Whatever the conditions, education should not be interrupted as it is central to creating a new level of public awareness and preparedness. Attending school also keeps children away from parental issues back at home. Similarly, they will get opportunities to share their own situation with friends and elders at school which brings more liveliness for them. In addition to this, parents will find that their children are safe, and they too will have time to attend other activities. Hence, this is possible only if the community gets prepared to use the resources available in the community beforehand.

Evacuation planning by using the available resources is a critical component of safety, including for people with disabilities. This is applicable for all buildings, including those that are new and fully accessible. Evacuation planning should include a need of assessment to determine who may need what in responding to an emergency and evacuating a facility. Also, this will inculcate the understanding of best use of the resources in the situation. In most places, during natural disasters and terrorism, in the development of preparedness plans school buildings will be the target of evacuation. In evacuation drills like fire in school buildings, the nearby parks and sports fields are allocated. In preparedness it is also very important for every member of the community to be familiar with the contact numbers during an emergency. This may include the numbers of Fire Station, Police Station etc. In this way the community will be aware of the use of the available resources rather than depending on the special resources provided during an emergency.

Just like losing the household, death of children and adults also means the loss of future labour force, thus loss of future productivity. Hence, the regional economy and labour force is required to be maintained. This means for the recovery a labour force is needed to rebuild the infrastructure to replace places like houses, schools, utilities, etc. Whereas in severe disasters; there will be a higher unemployment rate than employment as the schools, factories offices are completely destroyed. This results in people having to attend to more than one job.

Animals in Disasters

Introduction

In this course you have learnt much about the tragic impacts of disasters on human life; but the often-forgotten victims are the animals that share the planet's wild places, our farms and our homes. They are entitled to physical and emotional safety just like their owners – in fact they have millions of years more experience at surviving disasters than we have. And those that did not survive – the dinosaurs – can still warn us of the dangers of unpreparedness! In spite of the evident negative consequences of disasters on animals in modern times, public and government concern in the wake of a disaster continues to be largely focused on its impact on humans. Reports in the daily press too are often restricted to whimsical accounts about the miraculous escapes of an occasional animal.

The more serious effects on animals arise from their extreme vulnerability. Animals are often confined by their human masters to a field, pen or cage – they can't get away from a flood or fire unless we help them. At the other extreme, some animals normally kept in captivity are themselves a hazard if they suddenly find themselves roaming free in an unfamiliar situation. Another example that could constitute an economic disaster is an outbreak of an exotic disease in economically valuable livestock; it is estimated that an outbreak of Foot and Mouth Disease in New Zealand could cost the country far more than an earthquake or tsunami, although not in loss of human life.

The relationship between animals and humans varies hugely across the globe, and is very dependent on cultural and religious factors. In developed countries, pet animals are very important to their owners. This is less so in developing countries, where human life may be dependent on production animals such as sheep and goats, or reliant on animals like horses for transport. As well, some religions affect our relationship with animals – in India, the wellbeing of the cow is vital to the Hindu population, while handling of dogs and pigs during a disaster would not be possible for a Muslim.

Hazards associated with animals

The same spectrum of hazards that you have already learnt about will, of course, affect animals; but there are some hazard factors concerning animals which we will discuss here. For example, animals may themselves create hazards for people, making an already bad situation worse. Animals that are used to confinement, suddenly finding themselves free in unfamiliar surroundings, can be terrified and dangerous – even animals which we usually regard as harmless can knock children over or cause vehicle accidents.

A zoonosis (plural zoonoses) is a disease of animals which is transmissible to humans. Zoonotic diseases can be increased during disasters because the normal protective measures are absent. A common example in developing countries is rabies, spread by dog bites – and a frightened dog is more likely to bite anyone in its surroundings. Animal carcasses are a very common source of water contamination after disasters, and a viable plan to minimise animal deaths during a disaster will greatly reduce human infections during the recovery period. Some disasters occur in remote areas and may not directly affect the human population greatly. A forest fire on an inaccessible mountain-side may not be very serious to the local community; but it may destroy the habitat of a rare species, or drive out large numbers of poisonous snakes into nearby villages.

The ownership of animals can increase the vulnerability of their human owners to disaster. Research has shown (Heath, 1999) that, in the United States, people with no children, but with one or more pets, are less likely



to obey an evacuation order. In the developing world, this may apply to livestock owners – recently, during the severe flooding in Bangladesh, farmers refused to abandon their goats and cows by boarding rescue boats (World Society for the Protection of Animals, 2007). Occasionally, the media will highlight cases of animals helping to save humans in disaster situations: the recent New Zealand case of a woman farmer clinging to one of her dairy cows during a flash flood, dogs alerting owners to imminent earthquakes and the like. The most remarkable cases are associated with properly trained and expertly handled Search and Rescue dogs, with units at the ready in most areas of the world. They can be particularly valuable where people are trapped under collapsed buildings; the dogs can differentiate the living person from those already deceased, enabling frantic efforts to be prioritised.

Planning for disaster management in relation to animals

Very few countries currently (2007) have a disaster plan for animals. The United States Federal Government has decreed that all states must include companion (pet) animals and "service" animals (e.g. guide dogs) in their overall EDM plans, but the only examples available online were that of New Mexico and California (see references) which are brief but adequate. The Humane Society of the United States has an excellent guide to drawing up such plans on their website, suggesting the following steps:

- Nominate a lead agency often a government ministry such as the Ministry of Agriculture.
- 2 Make sure that all relevant bodies are included in planning, especially the local EOS and veterinarians' organisation, and that clear communication channels are established and that roles and responsibilities are defined.
- *3* The community and its context should be evaluated in order to identify likely natural and man-made hazards and human resources available.
- 4 The animal population in the community (companion animals, production animals, captive animals and wildlife) must be assessed for numbers, species, likely condition, farms and containment facilities, and estimated wildlife populations, as well as animal-related resources such as feed stocks, shelters, water supplies, and veterinary supplies.
- 5 Operational activities throughout the disaster cycle must be identified and allocated, with timelines if appropriate.

Factors to consider in a possible EDM plan for animals

i Mitigation

Location of farmed animals, and housed animals in zoos and laboratories, will need to be planned to avoid areas of increased hazard from flooding, tsunami, bushfires and other predictable disasters. Many older zoos are in built-up areas, and for these and other reasons it makes sense for their relocation to rural sites to occur as soon as possible.

Choice of species, breed and farming practices can help to alleviate some potential problems. Exotic breeds may not be readily adaptable to local extremes such as cold snaps, or drought. In farming, a choice of species or farming methods for maximum economic return may contribute to

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erosion, pollution of waterways, or global warming e.g. by methane production. Insurance of production animals should be considered where possible.

Vaccinations: Domestic pets and farm animals should be vaccinated against the most common infectious animal diseases in the region, and stocks kept of additional vaccines for diseases more commonly seen in emergencies – for example, Leptospirosis, a zoonotic disease, is more prevalent in flood situations, and some pneumonias and enteric (gut) infections increase dramatically during the stress of confinement and disruption to feeding schedules.

Identification of animals, especially in relation to ownership, is very important. In a small community, owners may be able to recognise individual animals, but usually a system involving numbered ear tags, registration tags, or similar will be necessary.

Wildlife under threat: The general mitigation principles for global warming are important to us all, but many wildlife populations are particularly at risk from habitat destruction. It could be argued that human "business as usual" is a disaster for wildlife – but, even if we do not agree with that view, planning can mitigate or exacerbate the effects on wildlife. Here is an example from The Times Online of November 7, 2007:

Sir David Attenborough has joined environmentalists in condemning a \$250 million plan by Tata, the Indian conglomerate, to build a soda ash plant on a lake in eastern Africa that is home to a million endangered Lesser Flamingos.

The naturalist and broadcaster said the development, due to be considered by Tanzania's environment minister today, would be "an ecological disaster" and would deliver a "huge blow" to the \$2bn-ayear tourism industry in the region.

ii Preparedness

Education, not only of the general public, but of other EDM organisations, is vitally important to mitigate the effects of a disaster on animals. At one level this will include informing householders of their responsibilities towards pets, and farmers to their livestock. School visits to raise the students' awareness of how they can be involved will be helpful.

Educational materials would need to include practical steps that animal owners must consider and for which they need to prepare themselves and their animals. Assisting institutions like zoos with their own EDM plans, and provision of formal training programmes for volunteers would be the next step.

Evacuation plans. Small pet animals will require carry cages or boxes lined with layers of newspaper. There should be one per animal, and they need to be sufficiently sturdy to contain the animal for several days, rather than made of thin cardboard. Dogs will need to be restrained with a collar and lead. Horses should have a halter or head-collar already on, or available quickly. Sheep and goats in small numbers may be led by ropes, but larger numbers of farm animals will need to be moved in the farmer's usual



manner. He or she will need to plan where the animals should be moved to, whether high ground in the case of a flood, or bare ground away from trees in the case of fire. Delivery of emergency food, or complete relocation, should be considered – the animals are best confined close to a road if possible. The availability of horse trailers or trucks may need to be planned. Zoos and other facilities may need help to prepare their own evacuation plans. Wildlife can be very unpredictable during disasters, and planning may need to consider protection for the human population.

Emergency kits for pet animals and horses could include vaccination certificates, medications, and a photograph to assist in identification if the owner becomes separated from the animal.

Livestock feed supplies will need to be stockpiled in a location that will be protected from likely natural disasters.

iii Response

People can be a hazard to animals in disasters. Human safety is paramount during disaster and emergency situations, but sometimes decisions can be taken which are not favourable to animals due to lack of knowledge or training – for example, abandonment, seizing, confinement in unsuitable conditions, or even unnecessary destruction.

Communication is vital, using all human resources with animal-related skills identified during the planning process. In particular, the deployment of trained veterinary, paraveterinary and animal control staff where they are most needed is the controller's priority. Volunteers should only be used to the limits of their knowledge, and the responsibility of the general public is to alert trained staff of animals in need.

Veterinary response, whether at organised centres or individually, is to coordinate activities of less trained staff, such as animal handling, triage, first aid, euthanasia, disposal of carcasses, and advice on risk to humans. Record-keeping is a vital task that lesser trained staff can help with, to facilitate returning animals to their owners.

iv Recovery

Economic loss due to reduced animal products may have a huge impact on human recovery after a disaster, both as direct loss of human food supplies and as a loss in income. There may also be a loss in animal food supplies which can result in reduced production for prolonged periods.

Re-unification with owners is particularly important for pet animals, and, understandably, often takes a back seat to the re-unification of people. However, the recovery of traumatised people can often be greatly assisted by re-unification with their pets – this is especially so for children.

Rehabilitation of animals may be an issue after traumatic experiences, and may require behaviour management techniques which can be supplied by specialists.

Unit summary



In this unit you learned about what kind of impacts disasters can have on the community. Impacts of a disaster can be either physical or social. Usually the physical impacts of a disaster lead to the social impacts of disaster. So if the physical impacts of a disaster can be reduced so too can the social impacts. The impact of any disaster can be reduced by being prepared for the hazard.

One impact that is not often mentioned is the impact on the animal population of a community. The economic effects of the loss of production animals will be huge in some societies, and the loss of companion animals may add to the trauma of disaster.

Self Assessment Activities



- 1 Search the internet for a case study of a disaster that has occurred in your area or within your region. A report or newspaper report may also be another source. The disaster may either be a man made or natural disaster. After reading your case study, do the following:
 - *a* identify the type of impacts
 - *b* state two sectors that were impacted by the disaster.
 - *c* describe what effect the disaster had on the above sectors in (b).
- 2 This is an internet based student self assessment task. With reference to the Boxing Day Tsunami disaster, map out an emergency food distribution plan that you and your family would have pre-planned and would like to see adopted and implemented by aid relief workers in the event of similar disasters. Consider factors such as short and long term impacts on personal and family income and how it affects your family's overall welfare.

Model Answers for Self Assessment Activities.

- 1 Your answer should state:
- What type of impact there was, whether physical, social, economic, emotional, or all of the above or just two of them, etc.
- Any two sectors that were affected by the disaster can be any two of the following education sector, health sector, built environment, power, water, transport, etc.
- The kind of impact the disaster had on the sectors you stated in (b) –
 e.g. if education, school halls were used as shelters, classes were
 disrupted, how long before students could resume classes, if parents
 had lost their offices in the disaster, they no longer had jobs to go back



to, thus was payment of child's school fee affected, etc.

2 The student's personal food distribution plan should primarily focus on their village and immediate surroundings. Reference to the Boxing Day Tsunami will give the student an insight into the problems and lessons learned to help the student map out or plan his/her own food distribution plan. Note there is no right or wrong answer, the purpose is to make the student think and appreciate the difficulties of coordinating and delivering food aid on a massive scale.

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Unit 13

Emotional Impacts of Disasters

Introduction

In Unit 1 you would have looked at the different types of disasters that occur. Whether it is a natural or a man-made disaster, the impact disasters have on the affected community, either collectively or individually, varies. All too often it is much easier to see the physical consequences of a disaster – injuries, death, and displacement. The immediate response to alleviate the pain and suffering is easily measured in terms of shelter, food, medicine, water and other things alike. Many victims of disasters have the ability to adapt to the sudden changes in their environment and daily routine more than others, and thus, are more resilient. The more prepared communities are before a disaster occurs, the more resilient they are.

Today across the small island states, we are seeing the need to consider more the psychosocial effects that the disaster has on the affected communities; something that is less obvious. As research has shown disasters are expected to increase in the future. As a result, more people are expected to be emotionally and mentally affected, testing their resilience. There is a need for trauma counselling services in high risk areas, as well as the need to consider or put in place welfare services for those severely impacted by disasters! Programs to put in place trained counsellors at the community or village level have already been established in some areas.

In this unit we will look at trauma, counselling, welfare and security as psychosocial effects of disasters on communities.

Upon completion of this unit you will be able to:



Outcomes

- Define trauma;
- Identify the stages of disaster recovery and their associated problems;
- *State and explain* at least three factors that make a person vulnerable to trauma;
- State at least three symptoms of trauma;
- Define counselling briefly using your own words;

- State at least three different types of counselling;
- State and identify at least four symptoms of people who need counselling;
- State briefly in your own words how to find a counsellor.



Terminology

Trauma:	experience in which powerful and dangerous events overwhelm a person's capacity to cope.	
Counselling:	short-term, interpersonal, theory-based process of helping persons who are psychologically healthy resolve to developmental and situational issues.	
Recovery stages:	Stages of recovery immediately after the impact of a hazard	

Trauma

What is Trauma?

Anyone who goes through a disaster experiences some kind of trauma. For the less resilient communities or individuals, trauma can destroy them in that they cannot cope with the sudden event of a disaster and so they may suffer from a developing disease, lead to substance abuse, mental disorders and eventually destroy relationships, and the very fabric of society which are families themselves. Trauma is an exceptional experience in which powerful and dangerous events overwhelm a person's capacity to cope. When an adult or child is traumatized, they are experiencing reactions to the trauma that affect their ability to function. You must remember that when we talk about trauma, it is not only the survivors of a disaster that can be traumatized – there are also the relatives and friends of survivors, or emergency workers, and even seeing and hearing about disasters through the media (especially children!).

Emotional Stages of Disaster Recovery

Before we go on, it is important to note as well that there are several stages that a community will go through during and immediately after the disaster, in the recovery stage. These may in one way or the other, contribute to the effect on a person after the disaster is over as noted in the diagram below.

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Typical Phases of a Disaster Reconstruction Honeymoon Integration Community Cohesion Heroic Disillusionment Pre-disaster Warning or Threat Impact Inventory **Trigger** Events One to Three Days One to Three Years

Figure 14: Typical Phases of a Disaster

These stages are described briefly below:

1 Pre-disaster

This is the stage just before the hazard strikes. Education and awareness is carried out in this stage. If it is a slow onset disaster then enough warning and awareness is given to the community on the risks posed by the hazard, thus giving the community enough time to prepare.

2 Heroic Stage

This is the stage usually at the onset or impact of disaster and immediately after the disaster. At this stage many people in the community are strong and focused, and use most of their energy in saving themselves as well as others. There is a strong sense of sharing, people helping one another, and treating even a stranger as "family". People are so busy responding and helping out when and where they can, and so the activity level is high and people usually really do not have time to stop and ponder over what has just happened.

3 Honeymoon

The honeymoon stage follows immediately after the heroic stage and may take several weeks. It is during this stage that there is cohesion in the community, in the care centres, where the immediate needs of food and water are being attended to. People meet together and are relieved that they are safe, and alive, and that they have a place to stay until they can return back home. Some begin the clean up process in anticipation of moving on and returning to their homes, and also with the encouragement from government and relief agencies that they will be supported, when trying to rebuild their lives and return to normal. Sometimes expectations of those in care centres become too high of government and relief agencies. When this happens the victims of disaster begin to get frustrated from the congested living in care centres, anger, restlessness, survival guilt, and anxiety begins to set in.

4 Disillusionment

This stage is also termed the "second disaster" stage in that people have now been in care centres for more than a month. They find that their request for assistance to get their lives back to normal seems to be taking forever by the authorities! It is also at this stage that many of the relief agencies have left the scene. People realize that they cannot wait on the government forever and some take it into their own hands to start to rebuild a normal life to get out of the stress they are going through while living at the care centre. This stage lasts a month or two to a year or two.

5 Reconstruction

This stage lasts for several years following the disaster. In this stage people have already assumed the responsibility of recovery and work together to develop reconstruction plans and programs. Reconstruction and rebuilding may be going on around them but the community has already returned to its normal routine; with some adaptation.

The above stages will assist you as a disaster officer to understand what people in disasters go through. Why? As a disaster officer, you will be able to make better informed decisions, to be able to meet the emotional needs that may arise during and after a disaster.

Factors of vulnerability to trauma

There are many factors which contribute towards one person experiencing trauma and not the other person. Many times it may not be just one particular factor that may be the sole cause or contributor, but more than one factor. In most cases people do get over the experience of surviving a disaster and move on with their lives. For others, it is easier said than done! Also, factors which contribute towards a child experiencing trauma may differ from that of an adult.

Generally, factors that may contribute towards trauma are:

- a Exposure or proximity to disaster site Those who are closer to the disaster site are also going to feel more intense impacts and suffer more, than those who live further away from the disaster site.
- *b* Repeated images of terror on TV this is especially true for children.
- c Relationships Those whose relatives have been lost or injured in the disaster are at higher risk compared to those who have not lost anyone.
- *d* Age; older people are often less adaptable than younger community members.
- *e* History of previous traumatic events If a person has gone through previous stressful events, whether it is violence, child abuse, etc,



they are more likely to suffer trauma after a disaster has taken place as opposed to someone who has not.

f Socio economic factors – generally, people who struggled to make a living before the disaster occurred, are more likely to be at more risk to trauma now that they may have lost everything, compared to someone who is more financially stable.

Can you think of any other factors?

Some Common Responses to trauma

Common reactions to trauma may be any of the following:

- Shock
- Anxiety
- Fear
- Increased anxiety
- Guilt at surviving
- Sadness
- Confusion and
- Regret.

A trauma patient may also experience nightmares, lack of sleep, and flashbacks of the event. Physical reactions to trauma may be nausea, sweating, tiredness, loss of concentration, breathlessness, and aches and pains.

In further response to all of the above symptoms, people may start to drink or smoke, substance abuse, throw themselves into work and or become anti social, avoid talking about what happened, as well as avoid any situation that may remind them of the disaster!

Recovery from trauma

The length of time it will take for someone to recover from a traumatic experience varies. It will depend on the nature of the event and the situation and circumstances surrounding the individual. Another important factor is the degree of loss the individual has suffered and the ease of accessibility of support systems available to the individual or family to get through the trauma. For those especially stuck in a state of depression it may take longer. One of the strategies used to deal with trauma is counselling, referred to as trauma counselling. This can happen at different levels as described below.

Counselling

What is counselling?

The word counselling comes from the Middle English *counseil*, from Old French *conseil*, from Latin *cōnsilium*; akin to *cōnsulere*, to take counsel, consult. The definitions of counselling may vary in descriptions as different people see counselling in different perspectives. However, counselling can be defined as a relatively short-term, interpersonal, theory-based process of helping persons who are fundamentally, psychologically healthy resolve to developmental and situational issues. There are many different types of counselling which include disaster counselling, trauma counselling, cross cultural counselling, etc.

A good counsellor does the following:

- Listens effectively to what you are saying
- Works with you to define your goals with respect to your values and culture
- Facilitates your untangling of thoughts, feelings and worries about a situation
- Helps you gain your own insight into how you act, think and feel
- Teaches, shows and helps you express your emotions in your own way
- Teaches, shows and helps you work out your own solutions to problems
- Teaches, shows and helps you accept what cannot be changed
- Helps you become empowered to act in ways that are in your best interest
- Uses a variety of different techniques to help you explore what is important to you

Who needs counselling after a disaster?

After a disaster most people go through a stressful time. Parents, children, heads of both the government and private sectors, and basically the whole community suffer some kind of trauma.

i Children

In the early aftermath of disastrous events, many children encounter problems that are not easily resolved or their usual ways of handling problems are not working well for some reason. They may have found, for example, that talking to friends or relatives about their concerns is impossible or unsatisfying. Some of the concerns confronted by children include puzzling distressing feelings, low self confidence, getting along with others, self-defeating behaviours, academic problems, sexual identity



concerns, and decision- making dilemmas. The Counselling Services can provide assistance for these concerns through counselling.

Post-traumatic Stress Disorder (PTSD) is a psychological damage that can result from experiencing, witnessing, or participating in an overwhelmingly traumatic (frightening) event. Children often relive the trauma through repetitive play. In young children, upsetting dreams of the traumatic event may change into nightmares of monsters, of rescuing others, or of threats to self or others. PTSD rarely appears during the trauma itself. Though its symptoms can occur soon after the event, the disorder may appear months or even years later.

Some of these changes might appear in a child having PTSD.

- Refusal to return to school and "clinging" behaviour, including shadowing the mother or father around the house
- Persistent fears related to the catastrophe (such as fears about being permanently separated from parents)
- Sleep disturbances such as nightmares, screaming during sleep and bedwetting, persisting more than several days after the event
- Loss of concentration and irritability
- Startled easily, jumpy
- Increase in behavioural problems, in school or at home in ways that are not typical for the child
- Physical complaints (stomach-aches, headaches, dizziness) for which a physical cause cannot be found
- Distance from family and friends, sadness, listlessness, less active, and preoccupation with the events of the disaster.

Professional advice or treatment for children affected by a disaster especially those who have witnessed destruction, injury or death— can help prevent or minimize PTSD. Parents who identify any of the above changes in their children should take their children for a check-up.

ii Adults

Usually adults do not hesitate to go to a professional counsellor because many adults and children find it helpful to talk to a counsellor specialized in post-traumatic reactions. Also it can be a cultural feature whereby it's not really a norm to talk about your problems in public or to confide to strangers. It is also important to consider that there might be severe cases among adults who might need assistance in getting to a counsellor to get diagnosed.

Soon after a disaster it is important to have a group of counsellors available for the victims to talk or attend to. However, if the number of counsellors is few compared to the population a selection of adult volunteers need to be trained, like teachers, council members, and parents. Being adults, teachers and trainers can play a wide role in helping their students by giving opportunities to come up with their experiences. Similarly, they can guide parents to help their children as well as themselves in the overcome of the trauma. Other than the people involved in schooling, counselling methods differ from culture to culture. How different cultural groups handle stress and deal with stressors, their abilities, needs and desires for certain types of assistance, their motivations, their sense of honour and pride, their religious orientations and beliefs, their political systems and leadership, and their ways of handling and dealing with grief and loss are just some of the variables which are affected by cultural differences. Therefore, it is important for the counsellors who are going to assist internationally in another culture to identify the important issues that will bring relief to the culture.

How counselling can help a disaster victim

Counselling gives the understanding of the actual situation in the perspective of the disaster victim. Hence different methods of counselling aid in adjusting to the environment. Counselling facilitates personal and interpersonal functioning with a focus on emotional, social, vocational, educational, health-related, developmental, and organizational concerns.

Some problems that can be helped by counselling:

- Coping with your relations to disaster.(fear, anger, coping with the changes in the environment)
- Exploring personal issues.(spirituality, sexuality relationships, your goals and ambitions)
- Family and relationship issues.(how to talk to the other person, intimacy with your partner)
- Dealing with practical issues(financial support, transport problems)

Populations served by counselling psychologists include persons of all ages and cultural backgrounds. Examples of those populations would include late adolescents or adults with career/educational concerns and children or adults facing severe personal difficulties. However, there is a lot of evidence that counselling can help you cope better with the many difficulties you face during and after a disaster.

How to find a counsellor after a disaster

When we say counselling, we are talking about the counselling people need just after an unusual occurrence such as the tsunami of 2004, severe hurricanes, cyclones and volcanic eruptions. Unlike the normal conditions (where anyone in very great distress can consult a doctor) after a disaster, anyone who is ready to listen to you is considered as a counsellor. The degree of medical knowledge of the counsellors or psychotherapists can be limited as it varies. Most counsellors work hand in hand along with the health facilitators.



Unit summary



When it comes to natural disasters, often people tend to understand and accept easily what has happened, and so are able to recover quickly; they are resilient. On the other hand for some people it might take months, perhaps years to come to terms with what has happened. These are people who might have lost parents, relatives, household, etc. This includes both children and adults of different ages. Experts specify these people as traumatic patients. With evidence, such patients can be helped by specialists called counsellors. Professional counsellors can be trusted and are known to be found working with emergency health departments, in the aftermath of disasters in almost all the places.

Self Assessment Activities



- 1 In your own words, briefly explain what is trauma.
- 2 What are the stages of recovery in a disaster and how will that help you as a disaster officer in the time of a disaster?

Assessment

- *3* In a disaster, why can one person may not be affected by a disaster, and another person be traumatized by the event?
- 4 Interview ten people who have experienced a disaster recently. This disaster might have impacted people leaving them with traumatic memories for instance, the tsunami of 2004.
- 5 Prepare questions in such a way that they tell you about counsellors and their contribution in the aftermath of the disaster.

Model Answers:

- 1 Your answer should be something to the effect of: trauma patients are those who cannot use their own problem solving and coping capabilities to overcome a sudden adverse event in their lives.
- 2 State the stages of disaster recovery as given in the text, and it will assist in knowing how to assist disaster victims as well as prepare oneself as a relief worker or disaster officer when responding to disaster sites.
- *3* You should state in your answer the factors that make some people more vulnerable to trauma than others.
- 4 Most of the people were not aware of counselling.
 - Those affected were mostly children.
 - Those who got the help from counsellors would have found themselves getting themselves adjusted slowly.

Individual Assignment

Explore the situation of Jenny and describe how Jenny could be helped to overcome what she is going through. The word limit is 1000-1500.

"Jenny of nine years old refuses to go any where without her mother being by her side. In Tsunami 2004 Jenny's father disappeared and never returned. If somebody talks about Tsunami she makes sure that she covers her ears so that she does not hear that."

Hints:

- Highlight what you would do at first.
- Would you convince her mother first?
- To whom will you go for help?
- Would you like to try different methods?
- Would you like to include a small scale survey?

Note: You must include all the references. Make sure that you can include any related material in the appendices and label them in accordance.

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Unit 14

Vulnerable Groups in Disasters

Introduction

In the event of a disaster we expect that the needs of everyone are catered for in the response and recovery stage. Sometimes this is not so. It usually happens that if a certain group of people were marginalized during normal times, it is most likely that they will not be catered for during disaster times. Vulnerable groups also refers to those who do not feel safe enough during response and recovery stage, and those who cannot safely and comfortably access and use the resources provided in the preparedness, response and recovery stages of a disaster.

Upon completion of this unit you will be able to:



Outcomes

Identify and list the most vulnerable groups in disaster and post disaster times.

- *Explain* briefly, at least three factors that isolate these groups to consider them more vulnerable than the rest of society.
- Describe briefly how we can reduce the effect of disasters on the vulnerable groups.



Terminology

IDP:Internally Displaced Person (IDP) may have been
forced to flee their home for the same reasons as a
refugee, but has not crossed an internationally
recognised border.Refugee:A person who has fled from and/or cannot return
to their country due to a well-founded fear of
persecution, including war or civil conflictAsylum seeker:Includes persons who had fled war or other
violence in their home country. A person who is
seeking to be recognized as a refugee is an asylum
seeker.

People with Disabilities

Have you ever known someone who is physically challenged? Even before you answer that question, let us ask ourselves another question – what does physically challenged mean? Physically challenged people are those who have difficulty moving, hearing, seeing, communicating, and or learning. Physically challenged people are also referred to as People with Disabilities (PWDs).

Physically challenged people have the same needs as everyone else in the community, however, they have more of a task because of their disability. In normal times, PWDs are marginalized, and so are worse off during disaster times.

In any disaster it is important that we address the needs of PWDs. Because of their disabilities, they have additional needs to the usual needs which everyone else has. For example someone with visual and hearing impairment would not be able to hear the warning siren in the event of a tsunami and so would also need assistance in getting to the safe areas.

From a rights based approach, it is important to include PWDs in all phases of disaster management as their needs have to be considered before, during and after a disaster.

When considering all the sectors in the planning of different phases of disaster management, it is equally important to also consider the needs of PWDs. A pre-disaster activity that is carried out is the risk mapping exercise. This exercise can identify barriers or obstacles that PWDs can face when trying to evacuate people out of the danger zone at the time the hazard has struck.

It is wise that in the pre-disaster phase, a database is developed that identifies PWDs in the community, the disability they face, and what their needs will be during and after the disaster. This may be extremely helpful because in the event of a disaster, special equipment might be needed to transport PWDs out.

In the immediate response to a disaster it is equally important that a person trained in assisting PWDs is included in every search and rescue team. Personnel and staff at camps or care centres should also have had some prior training in working with PWDs so that it is easy for them to identify the needs of PWDs in their care centre. Shelters or care centres will have to be made PWD friendly. For example there will be ramps for easy access, and latrines may have to be fitted with wider doors to allow easier access for wheel chairs.

Elderly People

Reuters posted photos of elderly men and women who survived the Boxing Day Tsunami, and the Bangladesh floods. A picture is worth more than a thousand words, and is sufficient to describe the hopelessness and desperation faced by the elderly population during and after disaster strikes.



The literature differs in terms of defining the 'elderly' groups. The disparities arise because elderly can be defined as those over 55-60 years, and studies have excluded those in long term nursing care but in the event of a disaster every person regardless of age is affected. Increased vulnerability of the elderly is derived from their impaired physical mobility, poor sensory awareness and pre-existing medical conditions.

The 2004 Indian Ocean tsunami left thousands of elderly people homeless and displaced, according to IPS news the elderly were very much sidelined in the initial relief efforts. Many were crowded into camps where they had to stand in long queues for food and in most cases had to compete with younger survivors for food, water and medical assistance. To make matters worse, the lack of data availability on disaster-related deaths by age, gender and disability implies the specific vulnerability of the needs of the elderly remain unknown. This could be a problem for relief workers when it comes to relief delivery work to the worst affected areas. Evidence suggests that the elderly receive less proportionate aid in the post-disaster period than do their younger counterparts. The explanations for this disparity point to the elderly not registering for disaster assistance because of the difficulty in going through the processes of filling in application forms and other related procedures to prove that they qualify for assistance. Younger age groups are better able to recover financially from a disaster compared to the elderly, reinforcing the vulnerability of the latter population age group to future disasters. A study of those affected by tornadoes in Texas showed 32.2% of the elderly reported a drop in their standard of living as compared to 12.5% of the non-elderly.

The dilemma facing the elderly is further compounded by the negative images of ageing. For example, there is a prevailing misconception amongst the developed world that older people are difficult to train, they are not open to new ideas, and considered a burden to welfare issues of society. The lack of public awareness and information about the needs of the elderly and their contribution to social growth has marginalised this group when allocating resources in the aftermath of disasters.

In addition, the elderly are at an increased risk of emotional distress especially those who live alone. Ehrenreich (2001) noted that the special needs of the elderly may take on a lower priority due to their age which aggravates mental stress and disorientation.

Internally Displaced People and Refugees

The events which result in internally displaced people are common throughout the world.

For the internally displaced people, there is little hope for any kind of future. Groups of internally displaced people band together and form camps in an effort to share resources and support themselves, to create a sense of community, and to provide themselves with some semblance of security. It is common among many African cultures, and other parts of the world, for the people in a community or a village to share resources. What one person has is shared with the rest of the villagers so that all may have their needs met. There is no reason for one person to hoard supplies because what one has is shared by all.

This sense of continuity is disrupted by the destruction of communities by rebel groups. When people band together in an internally displaced persons camp, it is difficult to continue any kind of schooling for there are no buildings, no materials, and often no people to teach. Even among the elders there is a sense of futility and depression about their situation. In some camps there are few adults left to raise the children, so the children run wild and are not taught the ways of the community. This problem is of great concern to many adult, not just those in the camps.

Why do people in internally displaced camps receive little to no aid?

Why do they not receive medical supplies or food from organizations such as the Red Cross or the United Nations?

The answers to these questions form the core of the problem of internally displaced people. When people flee destruction yet stay within their own country, they become internally displaced people. If they had crossed a border to another country, they would automatically become refugees. As refugees, they would have become eligible for aid from international organizations. As long as they stay within their country of origin, they do not qualify for aid from international organizations unless the government of the country requests it.

Internally displaced people are at the mercy of the forms of aid available to them from their own country. In many countries in Africa, the governments are too poor to have a system in place to deal with such dire social needs. It isn't that the governments do not care; they simply lack the resources to help those in need.

Non-government organizations (NGOs) are non-profit groups with a goal to provide help to people in developing countries. Depending on the area of focus, an NGO might contribute to the social, religious, educational, agricultural, or cultural needs of a particular group of people or an entire country. Since governments has so few resources, countries rely heavily on the financial contributions and personnel of NGOs to help build the country.

An Internally Displaced Person (IDP) may have been forced to flee their home for the same reasons as a refugee, but has not crossed an internationally recognised border. Many IDPs are in refugee-like situations and face the same problems as refugees. There are more IDPs in the world than refugees. Globally, there are an estimated 20-25 million socalled internally displaced persons (IDPs) and UNHCR helps 6.3 million of these.

The involuntary displacement of people is a long-standing phenomenon. Throughout history, forces and factors have driven people from their normal and secure environments in search of more favourable locations that would support their survival. Although this is still a dynamic instigation, involuntary population displacement currently involves a wider range of concerns.



Today, people are forced to uproot from their physical, economic, social, cultural, and psychological homes as a consequence of social disorder, political instability, and economic impoverishment. While traditionally, displacement of people in Africa has resulted from life threatening circumstances, the process has evolved to reflect the challenges of the 21st century, becoming more of a concern than ever before.

The general concept of displacement has come to encompass all forms of disruptions, usually caused by natural disasters, development projects, conservation and preservation activities, planned resettlement programs, violence and conflict. As a consequence of displacement, a person is forced to leave his or her native place, a phenomenon known as forced migration. This is opposed to voluntary migration, a movement in which individuals and groups willingly decide to migrate in the complete absence of economic, political, cultural, and environmentally based `push' factors.

It is important for young people to understand the repercussions of events on local, regional, and global scales. Much of this knowledge is centred on political figures and the actions of those in power. The voices of people without power are rarely heard or understood.

Internally displaced people and refugees are two groups of people who do not have a voice or much power, and yet the human condition demands that society understands their needs and what can be done to meet them. Most IDPs and refugees are poor people caught in circumstances beyond their control. Civil unrest and natural disasters know no boundaries, either economic or cultural, and the destruction of a community through these means could happen to anyone.

Examples of NGO Work

Roger is a naturalized American and the brother of an Irish priest who worked in Uganda. When the priest died, Roger went to visit the nuns with whom his brother had worked. A resourceful man, Roger started working with the nuns and created a computer school filled with old computers that were donated from friends in the United States. Through the Aprovecho Institute in Oregon, he helped the nuns build an enormous clay oven so the nuns could bake rolls and sell them to nearby stores. When I met him, Roger had recently arrived with twelve suitcases full of dismantled generators and lawnmowers which he put back together for the nuns to use.

A Catholic nun worked with the women in internally displaced persons camps in Western Uganda. She encouraged the women to make crafts using the natural materials found around them in the camps. The nun then arranged for the women to sell their crafts to make money and rebuild their lives.

Two Dutch women from an organization called ISIS worked with a group of Ugandan women to create a woman-owned radio station and to gather the stories of women whose lives had been disrupted by the civil strife around them. The Kabarrole Research Center, funded by a German education organization, works with women in internally displaced persons camps. One goal is to educate the women on their rights to retrieve ownership of lands they lost when their husbands were killed by rebel groups. A group of Ugandans working with the Kabarrole Research Center created a puppet show, designed to educate, which they took to IDP camps.

Medecins sans Frontieres (MSF) or Doctors without Borders, recently opened a health clinic in Northwestern Uganda to help those in IDP camps.

The plight of internally displaced people hit home in the United States in fall 2005 when Hurricanes Katrina and Rita caused devastating damage in New Orleans and Texas. An event, in these cases, a natural disaster, destroyed not only the places where people lived but also the social structure of the communities. Within a day or couple of days hundreds of thousands of people lost everything they owned. The scenes of distress from the people living in the Super Dome in New Orleans created an indelible mark in the memories of Americans not caught in the turmoil. When the Super Dome became an unfit place to live and the people living there were moved to the Astrodome in Houston, Texas, several newscasters reported them as refugees. This was a misnomer. While the people crossed a state line, they were still living within the United States. They had become internally displaced people.

Who is a refugee?

International law uses the following definition:

- a person who has fled from and/or cannot return to their country due to a well-founded fear of persecution, including war or civil conflict;
- "owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion, is outside the country of his nationality, and is unable to or, owing to such fear, is unwilling to avail himself of the protection of that country..."; and
- is forced to leave their country due to natural disasters or war and conflict. (According to the 1951 United Nations Convention Relating to the Status of Refugees).

The concept of a refugee was expanded by the Conventions' 1967 Protocol and by regional conventions in Africa and Latin America to include persons who had fled war or other violence in their home country. A person who is seeking to be recognized as a refugee is an asylum seeker. In the United States a recognized asylum seeker is known as an *asylee*.

The most important parts of the refugee definition are:

- *i* Refugees have to be outside their country of origin;
- *ii* The reason for their flight has to be a fear of persecution;



- *iii* The fear of persecution has to be well-founded i.e. they have to have experienced persecution or be likely to experience it if they return;
- *iv* The persecution has to result from one or more of the 5 grounds listed in the definition;
- *v* They have to be unwilling or unable to seek the protection of their country.

How is the term 'refugee' misused?

The term has slipped into common usage to cover a range of people, including those displaced by natural disaster or environmental change. Refugees are often confused with other migrants.

What makes a refugee different?

Refugees are forced to leave their countries because they have been persecuted or have a well-founded fear of persecution. Refugees run away. They often do not know where they will end up. Refugees rarely have the chance to make plans for their departure such as packing their personal belongings or saying farewell to loved ones. Many refugees have experienced sever trauma or have been tortured.

Women and Children

Most research done on disasters has come up with the conclusion that those who are most vulnerable are the women and children. As it is human nature, living conditions and responsibilities of women subject many to risk before, during, and after disasters. Women also exercise formal and informal leadership roles and are central actors in family preparation for, and recovery from, disaster.

According to Wood (2005), experience show that without the deliberate involvement of women in the planning and implementation of preparedness, response and recovery programs the overall national performance will suffer. In spite of this, it has to be taken into account that due to rape and abuse of young girls and women, their vulnerability increases. This leads to the spread of HIV/AIDS and other communicable diseases. The following are some of the major areas that need to be considered in the preparation of disasters.

- 1 Prioritise protection of human rights irrespective of nationality, sex, age, with/without disabilities.
- *2* Include measures to prevent violence against women (domestic and sexual violence) in disaster management planning.
- *3* Make sure that women are included in the management of shelter and temporary housing.
- 4 Provide special support to new born babies and their mothers and prevent child abuse by counselling, support and frequent medical check-ups for both mothers and children.

- 5 Ensure that both men and women get the opportunity to take "disaster leave" to care for children and elders.
- 6 Provide adequate support (financial, information), for marginalized women.

Source: Asia-Pacific Forum on Women, Law and Development (2005)

Children

Children who lose their caregivers during disasters get psychologically affected as they get more exposed to violence, especially gender based violence. Mostly this leads older children to wind up their education and get into the labour force to support the younger. Children are also vulnerable to:

- inhaled chemicals as they breath more times than adults;
- agents that act on or through the skin because their skin is thinner and they have a larger surface-to-mass ratio than adults;
- they do not have the cognitive ability to understand how to flee from danger or to follow directions from others; and
- the effects of agents that produce vomiting or diarrhoea because they have less fluid reserve than adults, increasing the risk of rapid dehydration.

Therefore, in the aftermath of disasters, children's rights must be protected and promoted. Support children who are exposed to violence and prevent the recruitment of children into the armed forces and, equally, to help those who already have direct experience of fighting. Prioritize children to be the first to get assistance in healthcare, protection and shelter.

Unit summary



Summary

This unit set out to identify and describe the most vulnerable groups in times of disasters. There are five types of groups – the elderly, refugees, women, children and the internally displaced persons. It is important for any community vulnerable to disasters to identify the most vulnerable groups in the community in the disaster preparedness stages so that relief efforts can be planned and delivered effectively in the aftermath to reduce adverse impacts on these vulnerable groups.



Self Assessment Activities



- 1 Identify at least two places in the world which have had civil unrest or natural disasters such as earthquakes, hurricanes, tornadoes, or tsunamis in the last decade.
- Assessment
- 2 How have these events impacted communities in these areas?
- 3 What is civil unrest?
- 4 What happened to the people caught in civil unrest or natural disasters? Where did they go?

Model Answers

- 1 Fiji/ Solomon civil unrest and Indonesia tsunami in 2004.
- 2 All sectors of the community were displaced. Uncertainties will develop in the mind of the community.
- 3 Civil disorder is a broad term that is typically used by law enforcement to describe one or more forms of disturbance caused by a group of people. Civil disturbance is typically a symptom of, and a form of protest against, major socio-political problems. Typically, the severity of the action coincides with public outrage. Examples of civil disorder include, but are not necessarily limited to: illegal parades; sitins and other forms of obstructions; riots; sabotage; and other forms of crime. It is intended to be a demonstration to the public and the government, but can escalate into general chaos.
- 4 People moved out of the country, taking with them their wealth. People starving, the adults emaciated, the children with distended stomachs.

People lost everything they owned. The scenes of distress showing recurring attacks on infrastructure and extensive closures of services due to civil unrest and destruction of related property.

Citizens not directly involved in a civil disorder may have their lives significantly disrupted. Their ability to work, enjoy recreation and in some cases, obtain necessities may be jeopardized. Disruption of infrastructure may occur during very severe events. Public utilities such as water, fuel and electricity may be temporarily unavailable, as well as public infrastructure for communication. They will move to a country where they will be able to live safely.
Assignment



Assessment

The following are noticed to be the most vulnerable groups in disasters.

- a Elderly
- **b** Refugees
- c Women
- d Children
- e IDPs
- In a group of not more than four select a topic from the vulnerable groups mentioned above.
- It is recommended that you highlight why the group you have chosen becomes vulnerable and how to handle them in the terms of a disaster.
- You can use power point, charts, leaflets, magazines, activities, model, etc. in the presentation.
- Your presentation must not be more 15 minutes.
- You will not be awarded with marks for extra time.
- References must be included.

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Disaster Preparedness and Response Training[™]

Complete Course: Modules One, Two, & Three™

Facilitator's Guide[™]

2014

National Center for Environmental Health

Centers for Disease Control and Prevention

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COURSE OVERVIEW

The Disaster Preparedness and Response Training Course has three modules. The course also has a final comprehensive capstone activity where learners apply the knowledge and skills learned in the course. After completing all three modules, you will have a better understanding of the disaster-related rapid needs assessments and surveillance necessary to support responses to disasters and other public health emergencies.

Each module builds on the skills and concepts learned in the previous modules. The modules should be completed consecutively in the following order:

- Module One Epidemiologic Response to Disasters
- Module Two Disaster Response Rapid Needs Assessment
- Module Three Overview of Disaster-related Morbidity and Mortality Surveillance

COURSE DESIGN

The course uses a "self-paced," learner-focused format. The majority of the instructional content for the module is contained in a Participant Workbook. Learners will read through the Participant Workbook individually and stop at specified points to discuss key points and practice exercises with a mentor or a facilitator. This self-paced format allows learners to complete the training at their own pace. It is expected that a mentor or facilitator will meet with the learner(s) periodically to review key points and address any questions. It is up to the learner and the facilitator to schedule meeting times. Depending on the number of learners, the facilitator might wish to schedule group sessions or meet individually with each learner.

This Facilitator Guide provides suggestions on how to facilitate discussions with learners around key concepts and lessons learned. The Facilitator Guide also provides suggested answers for the practice exercises and case studies included throughout the course

TARGET AUDIENCE

The target audience is 2nd year Field Epidemiology Training Program (FETP) residents (fellows) and alumni, as well as other health professionals associated with ministries of health who are responsible for disaster preparedness and response initiatives.

OPTIONS FOR FACILITATING THIS TRAINING

Training can be assisted in two ways:

- Individual mentor-directed A mentor helps the learner complete the training. The mentor's main responsibility is to review the learner's work and provide feedback. A mentor meets with the learner a minimum of two times. At the first meeting, the mentor orients the learner to the training, provides examples and directions indicated, answers questions, and sets future modes of contact and meeting time(s). Very small groups (fewer than five learners) may choose to work on the training together and find individual or collective mentors.
- Classroom Classroom training can be conducted in two ways. The first way is for learners to read the training material *before* attending class and then review in class what they read, the second is for learners to read the training material *during* class.
 - a. Learners read training material *before* attending class. At the start of each module, the facilitator reviews key points. The facilitator may prepare PowerPoint slides for a brief presentation of key points (a draft deck of slides is provided), lead an informed discussion about the reading, or ask learners about what they read and answer questions individually or in small groups (Appendix B contains sample questions). After each review, learners will complete practice exercises and skills assessments as directed.
 - b. Learners read training material *during* class. The facilitator directs learners to read the training material and complete the exercises as indicated in the workbook. The facilitator leads group discussions to review what learners have read and reviews learners' answers to the exercises and skill assessments.

FACILITATOR/MENTOR ROLE AND RESPONSIBILITIES

As a facilitator or mentor, you will help in the learning process. Your primary role will be to do the following:

- Schedule time to meet with learner(s) to discuss training topics and exercises
- Introduce the module and lesson topics
- Lead discussions to review or elaborate on content in the Participant Workbook
- Answer questions that learners might raise as they read the Participant Workbook
- Review and discuss learners' answers to practice exercises and case study questions, and provide feedback.
- Summarize the key learning points for each lesson
- Ensure learners complete the modules in a timely manner

You will also have an additional responsibility to play a more active role in supporting learners with their field work after the training.

ICON GLOSSARY

Throughout the Facilitator Guide, the following icons will help you navigate quickly to relevant sections.



Red Boxes – Areas highlighted in *RED* will help guide you by providing instructions, suggested timeframes for each activity, and key content to read to the learners.



Light bulb – Key idea or lesson learned that you should emphasize for learners



Stop – A point at which the participant should consult a mentor or wait for the facilitator for further information or instructions [BLUE in participant workbook, **RED** in instructor guide]



Check – Knowledge checks that learners should complete. Typically at the end of each section



Pencil - Practice exercise or case study that learners should complete

GLOSSARY OF TERMS

Active Surveillance – Surveillance that employs staff members to contact regularly health care providers or the population to seek information about health conditions.

Assessment Area – The geographic area that makes up the sampling frame in an epidemiologic study.

Case Definition – A set of standard criteria for classifying whether a person has a particular disease, syndrome, or other health condition. A case definition frequently includes criteria for person, place, and time and often includes inclusion criteria (characteristics that a person must have if they are to be included) and exclusion criteria (characteristics that disqualify a person from inclusion). A case definition can also include the degree of certainty in a diagnosis ranging from confirmed, probable, to suspected.

Cluster Accessibility – The ability to enter a given selected cluster to complete interviews. Difficulty in accessibility may arise due to storm damage, unsafe conditions, or restricted entries.

Communicable Disease – An infectious disease transmissible from person to person by direct contact with an affected individual, the individual's discharges, or by indirect means.

Completion Rate – A type of response rate that shows how close interview teams came to completing the targeted number of interviews.

Complex Emergency – A crisis in a country, region or society where there is a total (or near total) breakdown of authority, resulting from internal or external conflict, and which may require a large-scale international response beyond the mandate or capacity of any one single agency.

Confidence Interval (CI) – The range around a numeric statistical value obtained from a sample, within which, at a given level of probability, the actual, corresponding value for the population is likely to fall (e.g., 95%).

Contact Rate – A type of response rate showing the proportion of households where contact was attempted and the household successfully completed an interview.

Cooperation Rate – A type of response rate that shows the proportion of households where contact was made and the household agreed to complete an interview.

Direct Health Effect – An adverse health effect caused by the actual physical forces of a disaster, such as a drowning or injury from flying debris.

Disaster – The serious disruption of societal functioning causing widespread human, material, or environmental losses that exceed the local response resources, triggering calls for external assistance.

Disaster Epidemiology – The use of epidemiology to measure the short- and long-term health effects of disasters and to predict the consequences of future disasters.

Disaster Surveillance – A public health practice used to assess health effects, monitor the effectiveness of relief efforts, respond to public concerns and media inquiries, and facilitate planning for future disasters. See surveillance.

Displacement – The forced movement of populations of people or animals from the area where they live, usually due to sudden impact from natural disasters, threat or conflict.

Environmental Hazard – Any phenomenon in the environment that is a potential source of harm or adverse health effects.

Epidemiologic Case Study – A study aimed at revealing the relationships between exposures and mortality and morbidity, including case-control studies, cohort studies, risk-factor studies, case series, and outbreak investigations.

Evaluation and Effectiveness Study – A study aimed at evaluating specific programs and response techniques in addition to assessing the success of specific programs and responses.

Final Report – A report distributed to a wide audience that builds off of a preliminary report and includes additional data analysis and results, typically provided within a few weeks of conducting a rapid needs assessment (RNA).

Hazard – Any source of potential harm that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Hazard Mapping – The act of specifying and identifying locations at high risk for a specific hazard (e.g., areas vulnerable to flooding).

Household – A household includes all the individuals who occupy a housing unit as their usual place of residence.

Human-Induced Disaster – A disaster which occurs as the result of intentional or unintentional human actions and that occurs in or close to human settlements.

Human Impact – Injury, mortality, increased disease morbidity rates for a variety of illnesses, subsequent displacement, and a lack of necessities, such as food and water.

In situ – In a natural or original position or place.

Incidence – The occurrence of new cases of disease or injury or events in a population over a specified period.

Incidence Proportion – The proportion of an initially disease-free population that develops disease, becomes injured, or dies during a specified period.

Indirect Health Effect – Caused by unsafe/unhealthy conditions that develop due to the effects of the disaster or events that occur from anticipating the disaster (e.g., carbon monoxide poisoning from improper generator use).

Infrastructure Damage – Damage to houses, business centers, hospitals, and transportation services because of a disaster.

Mitigation Strategy – Formulated action or development of policies that reduce disaster-related risk to people and property.

Morbidity – The state of being ill or diseased or the incidence of illness in a population.

Mortality – The incidence of death in a population.

Natural Disaster – A disaster which is the result of potentially harmful phenomenon that occurs in nature, such as hydrometeorological, geological and biological hazards.

Noncommunicable Disease – A disease that does not pass from person to person, typically of long duration and slow progression.

Passive Surveillance – A system in which a health jurisdiction receives reports from hospitals, clinics, public health units, or other sources.

Preliminary Report – A presentation provided to key stakeholders within a day or two after data collection, allowing partners to make quick and better informed decisions and address any immediate needs.

Probability Proportional to Size – A method of sampling that ensures clusters with more households have a higher chance of selection and that is weight-adjusted during data analysis.

Rapid Needs Assessment (RNA) – A collection of techniques (e.g., epidemiological, statistical, anthropological) designed to identify quickly the basic and health needs of a community.

Response Rate – A calculation that helps determine the representativeness of the sample to the population within the sampling frame. See contact rate, completion rate, cooperation rate.

Sampling - The process of selecting representative respondents from the target population who reflect the characteristics of the population from which it is drawn.

Sampling Frame – The entire population within the selected assessment area from which a sample is drawn (e.g., a list or map of all households). The sample is a subset of the larger sampling frame.

Sentinel Surveillance – Surveillance that occurs when data are gathered from a limited number of sites; Sentinel Surveillance is used as an alternative to population-based surveillance and national surveillance.

Stratified Sampling – A commonly used sampling method that decreases the sampling error by dividing the target population into suitable, relatively homogenous, nonoverlapping subpopulations (strata); a random sample is then selected within each stratum.

Surveillance – The ongoing systematic collection, analysis, and interpretation of injuries, illnesses, and deaths, for the use in planning, implementation, and evaluation of public health practice.

Syndromic Surveillance – Surveillance that uses a group of signs and symptoms, primary complaints, or other characteristics of the disease, rather than specific clinical or laboratory diagnostic criteria.

Technological Disaster – A disaster which occurs as the result of human actions or technological failures.

Two-Stage Cluster Sampling Design – The recommended RNA sampling methodology. In the first stage, clusters are selected probability proportional to size from a population (30 clusters). Then within each cluster, interview-subject subunits are randomly selected (7 interviews).

Vulnerability Analysis – The analysis of the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

Weighted Frequency – A mathematical weight given to probability of selection, used in data analysis to adjust analyses to account for a complex sampling design (e.g., two-stage cluster sampling method). Weighted Frequency is often used to represent an entire target population.

Module One: Epidemiologic Response to Disasters™

Acknowledgement

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Disclaimer

The findings and conclusions in this facilitator guide are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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MODULE 1: EPIDEMIOLOGIC RESPONSE TO DISASTERS

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Estimated Time: 6 hours (30 minute introduction to module, up to 1.3 hours of independent reading, up to 1.3 hours of group discussion, up to 2.3 hours of practice exercises, and 30 minutes module review and wrap-up)

Distribute: Participant Workbook (for this module or, if conducting a five-day course, for all three modules

Explain: The skills that learners will acquire and how they will acquire these skills by reading the Epidemiologic Response to Disasters Participant Workbook. Note that learners will have opportunities to apply the skills by completing practice exercises and skill assessments. Explain also that brief facilitator-led discussions will clarify or will elaborate on key concepts

Provide: An overview of how the skills taught in the first module, *Epidemiologic Response* to Disasters, will prepare learners for supporting disaster response activities and conducting epidemiological responses and surveillance

Introduce: Lessons in Module One

Tell: Learners to read each lesson until they see the STOP sign

OVERVIEW OF MODULE ONE – EPIDEMIOLOGIC RESPONSE TO DISASTERS

In the 1960s, scientists began to use epidemiological methods to respond to the public health impact of disasters. Epidemiologists assess the effect of a disaster on human health, recommend means to control an outbreak within a disaster situation, and provide support for minimizing the effect of future disasters. To assist meaningfully as an epidemiologist, you must know the different types of disasters, how they occur, and the consequences they have for society. In the wake of a disaster many different types of organizations and professionals will provide assistance. You should have a clear understanding of how you as an epidemiologist fit into a potentially complex response effort.

In this module, you will learn to distinguish between different types of disasters and their public health effects and learn about the role of an epidemiologist in disaster response and preparedness. This module consists of two lessons:

- Lesson 1: Public Health Implications of Disasters and Hazards
- Lesson 2: The Role of Disaster Epidemiology in Disaster Preparedness and Response

LEARNING OBJECTIVES

After completing Module One, you will be able to do the following:

- Describe how a disaster affects the community, and especially a disaster's potential public health effects
- Explain the epidemiologist's role during each phase of the disaster cycle
- Understand the unique challenges of responding to a disaster as an epidemiologist

ESTIMATED COMPLETION TIME

Module One will take approximately six hours to complete, including some discussion time with your mentor or facilitator.

PREREQUISITES

Before participating in this training module, we recommended that you complete the following training courses:

- Introduction to public health and epidemiology (FETP core curriculum)
- Responding to outbreaks (FETP core curriculum)

Lesson 1: Public Health Implications of Disasters and Hazards

Overview: This lesson describes different types of disasters that affect human society and the public health consequences common to most types of disasters

Total Estimated Time: 3 hours

Reading and Activities: up to 45 minutes

Group Discussion: up to 45 minutes

Practice Exercise #1: 90 minutes, including a 30-minute review

LESSON 1: PUBLIC HEALTH IMPLICATIONS OF DISASTERS AND HAZARDS

Independent Reading: Tell learners to read the first two sections of Lesson 1— Introduction and Common types of disasters – until they see the STOP sign (pages 2-5).

TIME: 15 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

INTRODUCTION

As human populations grow and societies become increasingly interconnected and complex, the damages from natural and human-induced disasters have become more and more extensive. Our vulnerabilities as societies have deepened the effects that disasters have on human health. Socioeconomic, political, cultural, geographical, and other factors combine and compound to increase the scope of a disaster's consequences. As an epidemiologist, you may be called on to respond to disasters. You should understand the different types of disasters, the immediate and longer term of their effects on public health, and, following a disaster, the factors that magnify adverse health outcomes.

In this lesson, you will learn about the different types of disasters that affect human society and the public health consequences common to most types of disasters.

After completing this lesson, you will be able to do the following:

- Describe different categories of disasters
- Describe a disaster's effects in a community
- Identify a disaster's potential public health consequences

COMMON TYPES OF DISASTERS

There are many definitions for a disaster. Different organizations may use slightly differing definitions. Still, the following are fundamental components across all definitions – a disaster

- is a severe event,
- causes damage to infrastructure, economic and social structures, or human health, and
- requires external assistance.

The United Nations Department of Humanitarian Affairs, the World Health Organization and Gunn's multilingual Dictionary of Disasters Medicine and International Relief, all define a **disaster** as the following:

A disaster is a serious disruption of the functioning of society, causing widespread human, material or environmental losses that exceeds the local capacity to respond, and calls for external assistance.

While many disasters happen suddenly with little warning (e.g., tornadoes, landslides), others are preceded by warning signs (e.g., tropical cyclones). Disasters can result from natural **hazards** such as severe weather or from human-related activities such as bombings. Disasters are typically classified into distinct categories based on the cause of the hazard as either natural or human-induced.¹ The following describes these classifications:

Natural disasters – This category of disasters include those caused by hydrometeorological, geological, and biological hazards. Examples of



hydrometeorological-related disasters include floods, tornados, hurricanes (including cyclones, typhoons, monsoons and other tropical storms), ice storms, or extreme heat, and can be a factor in other hazards such as wildfires. Geological phenomena that can lead to disasters include earthquakes, landslides or mudslides, avalanches, and volcano eruptions. It can be difficult to categorize some natural disasters as overlap often occurs. For example, a tsunami is triggered by a geological event but includes an oceanic process manifested as a water-related hazard. Another example is a mudslide occurring as a result of flash-flooding due to a hurricane or other storm. Biological disasters are those that are caused by the spread of disease. There are four major patterns of disease occurrence ranging from the least to the most severe (endemic, outbreak, epidemic, and pandemic). Biological disasters are most often associated with outbreaks, epidemics, and pandemics.

¹ Ifrc.org. Types of a Disaster: Definition of Hazard website. [Cited 2013 Sept 12]. Available from: http://www.ifrc.org/en/what-we-do/disaster-management/about-disasters/definition-of-hazard/.

Technological or human-induced disasters – This category of disasters result from

human actions or technological failures. Human activity has increasingly affected an environment's natural ecology and contributed to the manifestation of these disasters. For example, human activities (e.g., agricultural or other practices) that result in deforestation have led to landslides and drought. Similarly, the settlement of communities in flood zones or close to beaches and coastal areas has increased the human effect of floods and tsunamis.

Most human activities directly responsible for creating disasters are related to technology or industry. Technological advances can and have resulted in creating both intentional and Notable human-induced disasters

- Brazil Plan Crash São Paolo's Congonhas Airport
- North Korea Oil Pipe
 Explosion
- Siberia Mine Explosion
- Mozambique Munitions
 Explosion
- Congo Train Derailment

Source: Time Magazine Lists <u>http://content.time.com/time/specials/2007/artic</u> <u>le/0,28804,1686204_1686252_1690614,00.ht</u>

unintentional disasters. A technological disaster is attributed, in part or entirely, to human intent, error, negligence, or involves a failure of a manufactured system. An example of this is the 2010 Gulf of Mexico Oil Spill disaster, which resulted in the immediate death of 11 workers.²

Complex emergencies – Complex emergencies, which result from internal or external conflict, can be slow to take effect and can extend over a long period. In a complex emergency, there is the total or considerable breakdown of authority which may require a large-scale response beyond the mandate or capacity of any one single agency, especially in resource limited countries. Complex emergencies are categorized by

- extensive violence and loss of life;
- displacements of populations;
- widespread damage to societies and economies;
- need for large-scale, multi-faceted humanitarian assistance;
- hindrance or prevention of humanitarian assistance by political and military constraints; or
- significant security risks for humanitarian relief workers in some areas.

In WHO (2002) Environmental health in emergencies and disasters: a practical guide, **complex emergency** is defined as the following:

² Centers for Disease Control and Prevention. Fatal injuries in offshore oil and gas operations – United States, 2003-2010. MMWR 2013 62(16):310-4

Situations of disrupted livelihoods and threats to life produced by warfare, civil disturbance and large-scale movements of people, in which any emergency response has to be conducted in a difficult political and security environment.

Table 1 lists examples of natural disasters, technological/human-induced disasters and complex emergencies

	Natural Disasters	Technological/Human-induced Disasters	Complex Emergencies
• • • • • • • • •	Earthquakes Extreme Heat Extreme Heat Floods Drought Tropical cyclones Landslides Tornadoes Tsunamis Volcanoes Wildfires Winter Weather Infectious disease outbreaks	 Radiation emergencies from nuclear blasts, nuclear reactor accidents, or accidental spills of radioactive material Accidental release of hazardous chemicals Bioterrorism Oil spills Bombing or destroying a nuclear reactor 	 War Conflict



Lead a discussion to review key lessons learned. Complete the Knowledge Checks and Discussion Questions. To guide additional discussion, you may use the following questions and suggested answers (15 minutes)

Potential Discussion Questions

What are the fundamental elements of a disaster?

Possible answers:

- It is a severe event
- It causes damage to infrastructure, economic and social structures or human health
- It requires external assistance

Name the classifications/categories of disasters

Possible answers:

- Natural disasters ecological disruptions such as hydrometeorological or geophysical phenomena
- Technological or human induced (i.e., of human origin) result either directly or indirectly from human activities that disrupt the ecosystem or relate to technological activities of human origin
- Complex –the combination of natural and human-induced hazards and other causes of vulnerability

Give examples of natural disasters

Possible answers:

- Earthquakes
- Extreme Heat
- Floods
- Tropical cyclones or hurricane
- Landslides
- Tornadoes
- Tsunamis
- Volcanoes
- Wildfires
- Winter Weather
- Infectious disease outbreaks

Potential Discussion Questions, continued

Give examples of technological/human induced disasters

Possible answers:

- Radiation emergencies from nuclear blasts, nuclear reactor accidents, or accidental spills of radioactive material
- Accidental release of hazardous chemicals
- Bioterrorism
- Oil spills
- Bombing or destroying a nuclear reactor

Give examples of complex emergencies

Possible answers:

- War
- Conflict



KNOWLEDGE CHECK

Oil spills, radiation emergencies from nuclear blasts, and bioterrorism are all examples of what kind of disaster? (You may select more than one response)

- A. Natural disaster
- **B. Technological disaster**
- C. Complex emergency
- D. Human-induced disaster

DISCUSSION QUESTION #1

Think about your community. What types of disaster(s) is your community most likely to experience?

Allow respondents to answer for their specific community. We recommend you think of a few disasters for the local region as examples.

Independent Reading: Tell learners to read the next section of Lesson 1 – Effects of Disasters – until they see the STOP sign (pages 6-8).

TIME: 10 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

EFFECTS OF DISASTERS

A key aspect to remember is that a natural or human-induced event becomes a disaster only if it

reaches a scope that is beyond the local capacity to handle the emergency and requires the assistance of external organizations. Often times, the hazard by itself might not be devastating. For example, a tropical cyclone that occurs in the middle of an ocean is purely a

A hazard may lead to a disaster when it interacts with vulnerable human populations

weather event and does not cause much, if any, damage. Such a disaster's effect will vary between communities depending on preparedness levels, resiliency, and mitigation efforts; that is, what might be a disaster in one community might not be a disaster in another. An area with a tsunami warning system might experience less of an effect (e.g., loss of life) from a tsunami than might an area with no warning system.

Several factors contribute to the vulnerability of a community: social vulnerabilities associated with poverty, social class, health and nutritional status, access to health services, and environmental conditions.

A disaster's effects generally fall into the following categories.³

Infrastructure Damage – Damage may occur to houses, business centers, hospitals, and transportation services. The local health infrastructure may be destroyed, which can disrupt the delivery of routine health services to an affected population. People who vacate damaged housing and other buildings may be without adequate shelter. Roads may be impassible or damaged, hindering relief efforts, limiting access to needed medical supplies and care, affecting the distribution of food throughout the country, and increasing the risk of injuries as a result of motor vehicle incidents. Environmental hazards can cause a disruption to utility services (e.g., power, telephone, gas) and to the delivery of basic services.

³ CDC, Public Health Surveillance for Disaster-related Mortality. Full-day Training: Colorado Department of Health and Environment Disaster Epidemiology Training; October 24, 2012; Denver CO

Human impact – Injury or death are the most immediate effects of disasters on human health. In the wake of a disaster and the ensuing infrastructure and

societal damage, morbidity rates for a variety of illnesses may increase as populations become displaced and relocated to areas where health services are not available. Or populations can find themselves in areas not equipped to handle basic needs at the level necessary to manage a surge of patients. Damage to infrastructure can lead to food and water shortages and inadequate sanitation, all of which accelerate the spread of infectious diseases. Loss of loved ones, social support networks, or displacement can result in psycho-social problems. Proper management of dead bodies also becomes a challenge and every effort should be taken to identify the bodies and assist with final disposal in accordance with surviving family member wishes and the religious and cultural norms of the community.

Environmental hazards – During natural or human-induced disasters, technological malfunctions may release hazardous materials into the community. For example, toxic chemicals can release and be dispersed by strong winds, seismic motion, or rapidly moving water. In addition, disasters resulting in massive structural collapse or dust clouds can cause the release of chemical or biologic contaminants such as asbestos or mycotic (fungal) agents. Flooded or damaged sewers or latrines may force people to use alternative methods for disposing human waste, potentially introducing additional environmental hazards into a community. Increase in vector populations, such as mosquitoes or rodents can pose a risk to human health, as can stray animals displaced by the disaster.

Regardless of how a disaster's effects are characterized, the result is a serious disruption of the functioning of society, causing widespread human, material, or environmental losses that exceed the local capacity to respond, and require external assistance.



Lead a discussion to review key lessons learned. Complete the Knowledge Checks and Discussion Questions. To guide additional discussion, you may use the following questions and suggested answers (15 minutes)

Potential Discussion Questions

At what point does a natural or technological/human-induced event become a disaster?

Possible answer:

If it reaches a scope that exceeds local resources and requires assistance from external organizations

Name the impact categories of disasters?

Possible answers:

- Infrastructure damage
- Human impact
- Environmental hazards

What is the result of a disaster?

Possible answer:

Disasters almost always result in increased morbidity and mortality and other public health concerns, environmental and infrastructure damage, or societal disruption.



KNOWLEDGE CHECK

Fill-in the blank with the correct response to the sentences.

Damage to houses, business centers, hospitals, and transportation services is an example of **infrastructure damage**.

Chemical or biologic contaminants such as asbestos or mycotic (fungal) agents possibly released from massive structural collapse or dust clouds during a natural or human induced disaster are categorized as **environmental hazards**

Human impact of a disaster can include increased morbidity rates for a variety of illnesses.

DISCUSSION QUESTION #2

What are the factors that can influence the effects a disaster may have on a community or region?

A disaster's impact will vary depending on community preparedness levels, resiliency, and mitigation efforts; what may be a disaster in one community may not be one in another. Several factors contribute to the vulnerability of a community: these factors include social vulnerabilities associated with poverty, social class, predisaster health and nutritional status, access to health services, and environmental conditions

Independent Reading: Tell learners to read the next section of Lesson 1 – Disaster-Related Health Effects and Public Health Implications – until they see the STOP sign (pages 9-12).

TIME: 15 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

DISASTER-RELATED HEALTH EFFECTS AND PUBLIC HEALTH IMPLICATIONS

Several factors determine the public health effects of a disaster, including the nature and extent of the disaster itself, population density, underlying health and nutritional conditions of the affected population, level of preparedness, and the preexisting health infrastructure.

Defining the relationship between a disaster and its specific health effects requires broad scientific investigation. Nevertheless, using available and reliable evidence and information, we can classify a disaster's health effects as either direct or indirect.

Direct health effects – Caused by the disaster's actual, physical forces. Examples of a direct health effect include drowning during a tsunami or injury caused by flying debris during a hurricane or tornado. These health effects typically occur during the event.

Indirect health effects – Caused by unsafe/unhealthy conditions that develop due to the effects of the disaster or events that occur from anticipating the disaster. Some indirect health effects may not appear until several weeks following a disaster while other indirect health effects may occur immediately after, or even prior to, the disaster.

For example, carbon monoxide poisoning is an indirect health effect that typically occurs during power outages and would require immediate attention. Table 2 describes several possible direct and indirect health effects of natural disasters.

Type of Disaster	Direct Health Effects	Indirect Health Effects
Hurricane/cyclone	 Drowning Injuries from flying debris (e.g., head and chest trauma) Injuries from submerged debris or structures (e.g., puncture wounds) 	 Worsening of chronic disease Carbon monoxide poisoning Waterborne disease Vector-borne disease Disease outbreak Mental health concerns
Tornado	 Injuries from flying debris or structural collapse 	 Worsening of chronic disease Carbon monoxide poisoning Waterborne disease Vector-borne disease Disease outbreak Mental health concerns
Flood	 Drowning Injuries from submerged debris or structures 	 Worsening of chronic disease Carbon monoxide poisoning Waterborne disease Vector-borne disease Disease outbreak Mental health concerns
Earthquake	 Injuries from rock slides or collapsed buildings Drowning from ensuing tsunami 	 Worsening of chronic disease Carbon monoxide poisoning Waterborne disease Vector-borne disease Disease outbreak Mental health concerns
Volcanic eruption	 Suffocation by ash or toxic gases Injuries, including burn injuries, from mud or lava flows Drowning from ensuing tsunami 	 Worsening of chronic disease Carbon monoxide poisoning Waterborne disease Vector-borne disease Disease outbreak Mental health concerns

Table 2. Direct and indirect health effects of natural disasters

PUBLIC HEALTH CONCERNS FOLLOWING A DISASTER

One of the public health concerns following a disaster is the potential for the spread of communicable diseases or new illness outbreaks. Damage to water systems, sanitation facilities, food supply systems, health infrastructure, and other basic infrastructures can increase the risk of an outbreak following a disaster. The gathering of large numbers of displaced people within shelters or refugee camps provides increased opportunity for disease transmission. In addition to the effect on humans, disasters can also disrupt the environment and increase human exposure to vectors such as mosquitoes, rodents, or other animals. Outbreaks do not spontaneously occur after a disaster. The risk of an outbreak of a communicable disease to occur is minimal unless the disease is endemic in an area before the disaster, because transmission cannot take place unless the causative agent is present. Improved sanitary conditions can greatly reduce the chances of an outbreak.⁴

In addition to concerns about communicable diseases, public health officials also track chronic diseases, mental health problems, injuries and mortality. Chronic

diseases such as diabetes, asthma, and high blood pressure could worsen due to disruption of routine health services, lack of access to prescription drugs, or environmental conditions. The inability to treat chronic diseases could be life-threatening to vulnerable populations and could give rise to additional complications that could affect a person's long-term quality of life.

After the initial phases of a disaster, the overall public health response effort gradually shifts from providing emergency care to providing primary and routine health services and resolving environmental health concerns. The epidemiologist should carefully assess the potential effect of the disaster on long-term public health needs. Damaged infrastructure after a disaster may significantly affect the ability to deliver routine health services for months or even years, interrupting immunization campaigns and treatment of chronic diseases.

Mental health problems can become a major public health concern following a disaster. The lack of mental health services or increase in stress may result in a rise suicide attempts, domestic violence, safety concerns for family and friends, and a feeling of anxiety attributed to the monumental task of rebuilding a life.⁵ In addition, disaster-related injuries might include drowning, electrocution due to downed power lines, motor vehicle crashes, and injuries due to cleanup efforts (e.g. chain saw injuries, wounds, tetanus).

⁴ Pan American Health Organization. Natural Disasters: Protecting the Public's Health. Washington (DC); 2000. Report No.: 575.

⁵ University of North Carolina. Public health consequences of disasters. Haiti Field Epidemiology Training Program, Intermediate, Module 6; no date [cited 2014 Oct 16].



Lead a discussion to review key lessons learned. Complete the Knowledge Checks and Discussion Questions. To guide additional discussion, you may use the following questions and suggested answers (15 minutes)

Potential Discussion Questions

How are direct health effects caused?

Possible answer:

Direct health effects are caused by the disaster's actual, physical forces. Examples of direct health effects include drowning from a tsunami or injury from flying debris during tropical cyclone, hurricane or tornado. These direct health effects of disasters typically occur during the event. These effects usually require immediate attention and resource allocation by emergency managers or public health response agencies.

How are indirect health effects caused?

Possible answers:

Indirect health effects result from unsafe/unhealthy conditions that develop due to the disaster's effects or events that occur while anticipating the disaster. Some indirect health effects may not appear until several weeks following a disaster, while other indirect health effects may appear immediately after the disaster. For example, carbon monoxide poisoning is an indirect health effect that typically occurs during electricity (power) outages and would require immediate attention.

What are examples of direct health effects of tropical cyclone?

Possible answers:

- Drowning
- Injuries from flying debris (e.g., head and chest trauma)
- Injuries from submerged debris or structures (e.g., puncture wounds)

.

What are examples of indirect health effects of tropical cyclones or hurricane? Possible answers:

- Exacerbation of chronic disease
- Carbon monoxide poisoning
- Water-borne disease
- Vector-borne disease
- Disease outbreak
- Mental health concerns



KNOWLEDGE CHECK

What is not a typical example of an indirect health effect?

- A. Exacerbation of chronic disease
- B. Waterborne disease

C. Drowning

D. Disease outbreak

DISCUSSION QUESTION #3

In what ways can treatment of chronic disease be affected after an earthquake?

Chronic disease treatment might be affected if health care infrastructure, such as hospital facilities, are destroyed or damaged. Due to destruction of roads and buildings, people might be unable to receive medication necessary for chronic disease management.

Practice Exercise Instructions

Depending on the size of the group, tell learners to complete this exercise individually, with a colleague, or as part of a small group. Instruct them to read through the following case studies and answer the questions related to each case. Have learners record their answers in the space provided in the participant workbook. Once completed, review the exercise and discuss possible answers

TIME: 15 minutes per scenario, include additional time for review

NOTE: Depending on the size of the group and your time constraints, you may wish to assign different groups to look at different scenarios. For example, groups 1 and 2 might look at scenarios 1 and 2, while groups 3 and 4 look at scenarios 3 and 4.

PRACTICE EXERCISE



PRACTICE EXERCISE #1

In this practice exercise, learners will apply the concepts learned in Lesson 1 to actual examples of disasters and their effects.

The Great East Japan Earthquake – 2001

On March 11, 2011, a 9-magnitude earthquake struck the east coast of Japan and triggered a tsunami with waves estimated to be greater than 30 meters, destroying many cities and villages. The earthquake and tsunami claimed over 15,000 lives and left over 2,000 missing. This catastrophic event severely damaged the Fukushima Nuclear Power Plant, resulting in the release of radioactive material. Radioactive contamination from the power plant added to the public health effects from the tsunami and earthquake.

http://reliefweb.int/sites/reliefweb.int/files/resources/Ops_Update_24monthReport_Final.pdf; http://www.who.int/kobe_centre/emergencies/east_japan_earthquake/situation_reports/sitrep35_6july2011.pdf

How would you classify this disaster?

This is classified both a natural and technological or human induced disaster. An earthquake and a tsunami are both natural disasters, but the resultant release of radioactive material would be considered technological or human induced disaster.

What are the potential resulting effects of the disaster?

The most significant effect was the toll on human health, which resulted in death and injury for over 27,000 persons. Infrastructure damage occurred in which homes, businesses, hospitals, and public health services were severely curtailed or completely destroyed. The earthquake and tsunami triggered a technological disaster which caused environmental hazards, in this case the release of radioactive materials from the nuclear power plant.

What are the likely public health implications?

Injuries resulting from the earthquake and tsunami are ongoing concerns, as are cleanup efforts. Concerns include chronic diseases (e.g., diabetes, asthma) and mental health and wellness when coping with a disaster. Exposure to cold weather and a lack of shelter could result in hypothermia. Exposure to radioactive material could also result in shortand long-term health issues. Following a disaster, damage or disruption to water systems, sanitation facilities, food supply systems, health infrastructure, and other basic infrastructure can increase the risk of an outbreak or illness. And the potential remains for the spread of communicable diseases or disease outbreaks.

What are the possible direct health effects?

Immediate or direct public health effects include drowning or physical trauma from the tsunami and earthquake.

What are the possible indirect health effects?

Long-term or indirect public health effects include exacerbation of chronic diseases (e.g., someone with diabetes might not have regular access to needed medications), potential effects of radiation contamination, water-borne diseases (e.g., norovirus), vector-borne diseases (e.g., malaria), communicable disease outbreaks in shelters, and mental health. Remember, risk of an outbreak of a communicable disease to occur is minimal unless a disease is endemic in an area before the disaster, because transmission cannot take place unless the causative agent is present.

What are some potential response challenges?

Damaged infrastructure (e.g. road inaccessibility, downed power lines), disruption or elimination of basic public health functions (sanitation, waste water treatment), and responder safety related to possible radiation exposure. The chaotic and overwhelming complexity of the disaster required an international response that exceeded the capacity of a single agency within Japan. Long-term emergency shelters were required due to largescale and continued evacuations of the population near the power plant.

Tungurahua – 2006

The Tungurahua volcano in Ecuador erupted on August 16, 2006. The eruption continued overnight before diminishing the following day. Massive clouds of ash, steam, and gas (approximately 8 km high), as well as abundant lava and pyroclastic flows descended through Achupashal, Cusúa, Mandur, Bascún, Juive Grande and La Hacienda rifts. The villages of Chilibu, Choglontuz, and Palitagua were severely damaged.

Volcanic material was also reported in Baños and blocked the Chambo and Puela rivers, producing a dam and putting several communities at risk for flooding. Ash fallout also severely affected the provinces of Los Ríos and Bolívar.

http://www.paho.org/disasters/index.php?option=com_content&task=view&id=759&Itemid=904

How would you classify this disaster?

A volcanic eruption is considered a natural disaster.

What are the potential resulting effects of the disaster?

The primary source of infrastructure damage comes from the heavy ash fallout and other debris from the volcano, which can cause collapsed roofs and impassible roads. Driving in ash-filled conditions might be difficult or impossible due to slippery road conditions or poor visibility, resulting in automobile accidents that cause injuries. The falling ash severely damaged villages, power grids, and water systems, causing unsafe conditions for communities located near the blocked dam. The massive clouds of ash, steam and gas can cause eye, skin, and respiratory irritation in humans, particularly those with preexisting conditions such as asthma or chronic bronchitis. Because of the stress and trauma of the event, the affected population could experience long-term mental health issues.

What are the likely public health implications?

Heavy ash fallout can lead to collapsed roofs, which can kill or injure people inside the buildings. Also, ash and other debris can cause severe burns or asphyxiation or both, and may contaminate food and water supplies. People in the vicinity of the ash fallout can have respiratory ailments, such as irritated nose, throat, and breathing difficulties. The affected population could also experience mental health problems.

What are the possible direct health effects?

Immediate or direct health effects include suffocation from ash, exposure to toxic gases, injury from mud or lava flows, and drowning from an ensuing tsunami on the coast or flooding from blocked rivers.
What are the possible indirect health effects?

Long-term or indirect health effects include exacerbation of chronic diseases (e.g., asthma, high blood pressure), water-borne diseases (e.g., malaria or yellow fever), and waterborne diseases (e.g., typhoid fever), mental health. Remember, risk of an outbreak of a communicable disease to occur is minimal unless a disease is endemic in an area before the disaster, because transmission cannot take place unless the causative agent is present.

What are some potential response challenges?

The falling ash severely damaged roads, power grids, and water systems, which made the movement of people or supplies extremely difficult or impossible. Rising dam levels made several villages inaccessible, which hampered evacuation efforts.

Heavy Rains and Landslides affect Guatemala – 2010

Heavy rains in September 2010, on the Pacific coast of Guatemala, caused landslides and overflowing of rivers, due to soil saturation. According to reports, there were more than 40 deaths, 16 people went missing and more than 50,000 people were affected. A red alert was declared in the affected areas. There was no damage to health facilities, although the road infrastructure was affected.

http://www.paho.org/disasters/index.php?option=com_content&task=view&id=1371&Itemid=904

How would you classify this disaster?

This disaster can be classified as a natural disaster which was the result of heavy rain leading to soil saturation and landslides

What are the potential resulting effects of the disaster?

Rapidly moving water and debris can cause infrastructure damage such as broken electrical, water, gas, and sewage lines. Roads are destroyed or greatly damaged, which endanger motorists and prevent the transportation of and access to relief aid. Other infrastructure in the path of the landslide can be severely damaged or destroyed (e.g., water systems, healthcare facilities, and communication).

What are the likely public health implications?

Landslides may cause many deaths in a very short amount of time, with trauma and suffocation by entrapment among the most common. Damage or destruction to health infrastructure, causing a potential lack of access to healthcare and chaotic environmental conditions, becomes a concern for communicable diseases that are endemic in the area. Public health officials also should track mental health problems and bodily injuries

What are the possible direct health effects?

Some immediate or direct health effects include death and injuries from debris slides or mudflows.

What are the possible indirect health effects?

Some long-term or indirect health effects include exacerbation of chronic disease, waterborne diseases, vector-borne disease, and mental health issues. Remember, risk of an outbreak of a communicable disease to occur is minimal unless a disease is endemic in an area before the disaster, because transmission cannot take place unless the causative agent is present

What are some potential response challenges?

Landslides rapidly destroy roadways and cause catastrophic debris slides. Landslides hamper safe movement of people or supplies. Landslides also bury villages and hillside houses, which complicates search and rescue efforts.

Darfur- Western Sudan, Sudan's Darfur Conflict – 2003

The Darfur region in western Sudan is experiencing one of the world's worst humanitarian emergencies. Since early 2003, conflict and violence between government forces and Janjaweed militia against the rebel forces of the Sudan Liberation Movement/Army and the Justice and Equality Movement have driven over one million people from their homes. The displaced have sought refuge in makeshift camps in Sudan and over 150,000 refugees have sought shelter and relief across the border in Chad

http://origins.osu.edu/article/worlds-worst-humanitarian-crisis-understanding-darfur-conflict

The operating environment in Darfur, Sudan, where displacement and population movements occur continuously, is extremely challenging. The population of concern includes around 2.3 million internally displaced persons (IDPs), some 140,000 refugees, 7,000 asylum-seekers and an estimated hundreds of thousands persons at risk of statelessness. Most are refugees from Eritrea, Ethiopia, Chad, the Democratic Republic of the Congo (DRC) and Somalia. <u>http://www.unhcr.org/pages/49e483b76.html</u>

How would you classify this disaster?

This disaster was a complex emergency caused by several confounding factors including warfare and civil disturbance, and resulting in the large-scale movement of people. Any emergency response had to be conducted in an extremely difficult political and security environment.

What are the potential resulting effects of the disaster?

Infrastructure in Darfur is nearly nonexistent, with persistent drought ravaging the land and diminishing pasture lands. The human impact was great—refugees faced malnutrition, violence, and high morbidity and mortality.

What are the likely public health implications?

Due to the complex nature of the disaster, food was scarce, poverty was widespread, and access to healthcare was limited to nonexistent. These public health implications contributed to poor health status among refugees.

What are the possible direct health effects?

Immediate health effects included injury and death among refugees, starvation, and food insecurity.

What are the possible indirect health effects?

Long term health effects included malnutrition, spread of communicable disease, worsening chronic conditions, and severe mental health problems. Because of limited resources, health systems were unable to provide care.

What are some potential response challenges?

The complex political atmosphere and the civil strife hampered the relief agencies' efforts. Warfare threatened the safety of relief workers and prevented the distribution of food, water, and medical supplies to refugees. Additionally, refugees were constantly displaced, which hindered surveillance activities and contributed to the spread of communicable disease.

After you are completed with the scenarios, summarize the key learning points from Lesson 1 outlined in the Lesson 1 Summary

LESSON 1 SUMMARY

As you have learned in this lesson, a disaster is a serious disruption of the functioning of society, causing widespread human, material, or environmental losses that exceed the local capacity to respond and therefore necessitates external assistance. Disasters are classified as natural, technological/human-induced, complex. A key aspect to remember is that a hazard becomes a disaster only if it reaches a scope that is beyond the capacity of local resources and requires assistance from external organizations. Given the evidence and information, a number of health effects of a disaster can be classified as a direct health effect or an indirect health effect.

Public health concerns following disasters include increased morbidity and mortality due to exacerbation of chronic diseases such as diabetes and asthma; mental health, especially in the absence of mental health services available to those affected by the disaster; and the potential risk of an outbreak due to damage to water systems, sanitation facilities, food supply systems, health infrastructure, and other basic infrastructure. The gathering of large numbers of displaced people within shelters or refugee camps also may provide increased opportunities for transmission of disease.

Lesson 2: The Role of Disaster Epidemiology in Disaster Preparedness and Response

Overview: This lesson describes the role of an epidemiologist in the disaster cycle

Total Estimated Time: 2 hours

Reading and Activities: up to 35 minutes

Group Discussion: up to 35 minutes

Practice Exercise #1: 50 minutes, including a 20-minute review

LESSON 2: THE ROLE OF DISASTER EPIDEMIOLOGY IN DISASTER PREPAREDNESS AND RESPONSE

Independent Reading: Tell learners to read the first four sections of Lesson 2— Introduction, Goals of Disaster Epidemiology, The Disaster Cycle, The Role of an Epidemiologist in Disaster Preparedness and Response – until they see the STOP sign (pages 18-25).

TIME: 25 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

INTRODUCTION

Traditional epidemiologic methods and tools apply to disaster preparedness, response, and recovery efforts. Disaster epidemiology uses epidemiologic principles to assess both the shortand long-term adverse health effects of disasters and to predict the consequences of future disasters. Epidemiologists are increasingly called on to assist with both natural and technological disaster responses. Given the complex nature of disaster preparedness and response efforts, and given the multiple players and stakeholders involved, understanding the unique role and responsibilities of an epidemiologist is critical. This lesson describes the role of an epidemiologist within the disaster cycle.

After completing this lesson, you will be able to do the following:

- Define the goals of disaster epidemiology
- Describe the disaster cycle
- Explain the epidemiologist's role during each phase of the disaster cycle
- Identify as an epidemiologist the unique challenges of responding to a disaster

GOALS OF DISASTER EPIDEMIOLOGY

The primary goal of disaster epidemiology is to prevent or reduce the morbidity and mortality

resulting from a disaster. Disaster epidemiology can produce timely and reasonably accurate information about morbidity and mortality caused by disasters and the factors that put populations at risk for illness and death. This information is essential to inform decisions about how to prioritize response efforts and where to direct relief supplies, equipment, and personnel. Epidemiologic knowledge can also identify specific risk factors associated with different types of disasters. Such identification can help develop effective strategies for mitigating the effects of

Disaster epidemiology is the use of core public health capabilities to

- Assess the needs of affected populations and provide timely and accurate health information to decision makers, and
- Identify risk factors and improve prevention and mitigation strategies for future disasters

disasters in the future. Such data can also inform the design of early warning systems and the development of targeted training and education programs

THE DISASTER CYCLE

Disasters are often thought of as happening in a cyclical manner, consisting of four phases: preparedness, response, recovery, and mitigation (Figure 1).⁶ It is important to note that the activities that take place within the disaster cycle are interrelated and may happen concurrently.



⁶ Adapted from UN/OCHA. Disaster Preparedness for Effective Response Guidance and Indicator Package for Implementing Priority Five of the Hyogo Framework, Geneva.2008. Available from: http://www.unisdr.org/files/2909_Disasterpreparednessforeffectiveresponse.pdf.

Preparedness – The preparedness phase includes the development of plans designed to save lives and to minimize damage when a disaster occurs. Disaster prevention and preparedness measures should be developed and put in place long before a disaster strikes. Preparedness plans should be developed based on the identification of potential disasters and the related risks associated with those disasters. When possible, this should include hazard mapping to specify locations at high risk for specific disasters. The plan should include training of health personnel, community members, and other potential first-responders, as well as establishing systems for communicating warnings to the community.

Strategies for evacuating at-risk communities before impending disasters should be well thought out and communicated to community members. Weather patterns, geophysical activities, terrorist activities, industrial activities, wars, and other activities associated with a potential disaster should be monitored so that officials can anticipate impact, issue timely warnings and, when possible, evacuate at-risk populations. This phase should also include an inventory of available resources to respond to a potential disaster. An inventory will help estimate the additional resources needed and speed up the mobilization of resources following a disaster. Finally, partnerships should form in the preparedness phase to establish alliances, outline respective roles and define everyone's responsibilities.

Response – The response phase is the actions taken to save lives and prevent further damage in a disaster. This phase begins immediately after a disaster has struck. During the response phase, plans developed in the preparedness phase are put into action. While some disasters last only for a few seconds (e.g., earthquakes, explosions), others might last for several days, weeks, or even months (e.g., floods, droughts). The primary focus of the response phase is to provide relief and take action to reduce further morbidity and mortality. Such actions include providing first aid and medical assistance, implementing search and rescue efforts, restoring transportation and communication networks, conducting public health surveillance, and evacuating people who are still vulnerable to the effects of the disaster. Also during this phase necessary supplies, including food and water, are distributed to survivors.

Recovery – As the immediate needs of the disaster are addressed and the emergency phase ends, the focus of the disaster efforts shifts to recovery. The recovery phase includes the actions taken to return the community to normal following a disaster.

Actions during this phase include repair and maintenance of basic health services, including sanitation and water systems; repair, replace or rebuild property; and the proper management of dead bodies. Proper care of dead bodies is necessary to help minimize the psychosocial effects on families. The management of dead bodies involves a series of activities that begin with the search for corpses, in situ identification of bodies, transfer to a facility serving as a morgue, delivery of the body to family members, and assistance from local health authorities for the final disposal of the body in accordance with the wishes of the family and the religious and cultural norms of the community. Documenting the cause of death, manner of death, and relationship to the disaster is important to better understand the human health effects of a disaster.

Mitigation – The mitigation phase is the sustained action or development of policies that reduce or eliminate risk to people and property from a disaster. During the mitigation phase, identified risks and population vulnerabilities are carefully reviewed to develop strategies to prevent reoccurrence of the same type of disaster in the future or limit the effect from such disasters. Existing preparedness plans are reviewed and revised to enhance the preparation efforts. A few examples of activities that could take place during the mitigation phase are building or strengthening dams and levees, establishing better and safer building codes, purchasing fire insurance, and updating land use zoning.

Though the order of events that take place following a disaster have a specific priority, many activities happen simultaneously. Similarly, some activities related to disaster response and recovery can extend for long periods. This is evident in continued efforts to manage the Chernobyl Nuclear Power Plant disaster that continues to plague the area over 30 years later with continued health risks and environmental cleanup.⁷

THE ROLE OF AN EPIDEMIOLOGIST IN DISASTER PREPAREDNESS AND RESPONSE

One public health action goal during a disaster is to identify certain risk factors. Specifically, those risk factors that predispose individuals or populations to adverse health outcomes during the four phases of the disaster cycle (preparedness, response, recovery and mitigation). The knowledge of these risks helps identify mechanisms of death, injury, and exposure. Such risk mechanism identification can mitigate the effects of current disasters and improve prevention and mitigation strategies for future disasters. Epidemiologists help to identify disaster-related outcomes, consider risk factors for disaster-related outcomes, and determine relevant risk

⁷ The Chernobyl Forum. Chernobyl's legacy: health, environmental and socio-economic impacts and recommendations to the governments of Belarus, the Russian Federation and Ukraine. 2002. Available from <u>http://www.preventionweb.net/files/5516_Chernobyllegacy.pdf</u>

factors for affected population groups. Epidemiologists have a role to play during all phases of the disaster cycle. But the epidemiologist's primary role is during the preparedness, response, and recovery phases.⁸

During the Preparedness Phase

During the preparedness phase, an epidemiologist's role is to conduct activities such as hazard mapping, translating data into policy, vulnerability analysis, educating the local community, and providing guidelines for community needs assessment and disasterrelated morbidity and mortality surveillance. In addition, epidemiologists play a vital role in providing training and building partnerships among potential disaster response agencies, such as local and state health departments, national or international governmental and nongovernmental organizations, and academic institutions. Throughout the disaster cycle, identifying the key partners in disaster response and including them in response plan development helps to smooth relationships among agencies.

During the Response Phase

During a disaster's response phase, the assistance of an epidemiologist is usually requested. The request is typically to support immediate response efforts. The epidemiologist plays a major role in such response efforts. During this phase, the epidemiologist employs scientific data collection and analysis methods to conduct a rapid assessment of health and medical needs through surveys and investigations. Using information obtained through needs assessments and surveillance, the epidemiologist can make recommendations for the distribution of health resources and other resources to affected populations.

Rapid needs assessment (RNA) – An epidemiologist might conduct an RNA during the response phase of a disaster. RNAs quickly identify a community's basic and health needs. The assessments help determine the magnitude of a community's needs and aid in planning and implementing relief efforts. A toolkit developed by CDC, the Community Assessment for Public Health Emergency Response (CASPER), can be a valuable reference for conducting rapid needs assessments. You will learn more about RNAs in Module 2 of this course.

Surveillance – During a disaster response, an epidemiologist might conduct surveillance of the health problems faced by the affected populations. Morbidity surveillance detects disease outbreaks and tracks disease trends. Early detection and response can mitigate the likelihood of outbreaks. Conducting health surveillance allows for informed decisions about allocating resources, targeting interventions to meet specific needs, and planning for future disasters. In addition to public health morbidity surveillance, mortality surveillance can provide information to prevent excess death.

⁸ Noji EK. The Public Health Consequences of Disasters. New York, NY: Oxford University Press; 1997.

Available surveillance systems should be used to the extent possible. In the preparedness phase, surveillance systems useful for detecting disaster-related health effects should be identified. But following disasters, disruption of health systems might occur; use of traditional surveillance systems is not always feasible and alternate surveillance methods should also be considered. You will learn more about public health surveillance during disasters in Module 3 of this course.

During the Recovery and Mitigation Phases

Following the response phase of a disaster, the epidemiologist's role is to continue necessary surveillance and monitoring activities, conduct research on the causes of disaster-related morbidity and mortality, evaluate interventions, and develop follow-up studies of populations affected by the disaster. The findings from these studies can help to identify prevention strategies for future disasters.

Epidemiologic case studies – While epidemiologic studies are mainly conducted after the disaster is over, the development of the study plan and associated data collection efforts begin in the response phase. The studies aim at revealing relationships between exposures and mortality and morbidity. Epidemiologic studies can include case-control studies, cohort studies, risk factor studies, case series, and outbreak investigations. Some examples are

- a case-control study on the risk of tornado-related death and injury after the tornado has occurred,
- an ecological study on chronic diseases and disaster medication needs of tropical cyclone or hurricane evacuees, or
- a cohort study of the potential link between severe flooding and an increase in the incidence of gastrointestinal symptoms in affected populations.

Evaluation and effectiveness studies – Evaluation and effectiveness studies can occur during a response or after the disaster. These studies evaluate specific programs and response techniques and assess the success of specific programs and responses. Evaluation and effectiveness studies can focus on the implementation of relief programs, methods used, or the performance of the local health authorities during a response. Examples of evaluation and effectiveness studies studies include the following:

- Lessons learned from an emergency response to cyclone or hurricanerelated mass evacuations
- An outcomes assessment of a particular triage method after disasters
- An assessment of the use and distribution of health services following a disaster



Lead a discussion to review key lessons learned. Complete the Knowledge Checks and Discussion Questions. To guide additional discussion, you may use the following questions and suggested answers (25 minutes)

Potential Discussion Questions

What are the main concepts you learned from the sections you just read?

Possible answer:

- The goals of disaster epidemiology
- The disaster cycle
- The role of an epidemiologist during the different phases of the disaster cycle

Define disaster epidemiology

Possible answers:

Disaster epidemiology is the use of core public health capacities to assess the needs of affected populations, provide timely and accurate health information to decision makers, identify risk factors, and improve prevention and mitigation strategies for future disasters

Describe the Response phase

Possible answer:

During the response phase, plans developed in the preparedness phase are activated. While some disasters last only for a few seconds (earthquakes, bombs, or other explosions), others might last for several days, weeks, or even months (floods or droughts). Thus the timing of the Response phase can vary. The primary focus of the Response phase is to provide relief and take action to reduce further morbidity and mortality

Potential Discussion Questions, continued

Describe the Recovery phase

Possible answer:

Once the immediate needs of disaster victims are addressed and the emergency phase ends, the focus of disaster efforts shifts to recovery. The Recovery phase includes the actions taken to return the community to normal following a disaster. Actions that take place during this phase include the repair and maintenance of basic health services, including sanitation and water systems; repairing, replacing or rebuilding property; and the management of dead bodies.

Describe the Mitigation phase

Possible answer:

The Mitigation phase is the sustained action or development of policies that reduce or eliminate risk to people and property from a disaster. During the Mitigation phase, identified risks and population vulnerabilities are carefully reviewed to develop strategies to prevent reoccurrence of the same type of disaster in the future or limit the effects from such disasters. Existing preparedness plans are reviewed and revised to enhance the preparation efforts. A few examples of activities that could take place during the Mitigation phase are building or strengthening dams and levees, establishing better and safer building codes, purchasing fire insurance, and updating land use zoning.

Describe the role of the epidemiologist throughout the disaster cycle

Possible answer:

During the <u>Preparedness phase</u>, an epidemiologist's role is to conduct activities such as hazard mapping, translating data into policy, vulnerability analysis, education of the local community, and provision of guidelines for community needs assessment and disaster-related morbidity and mortality surveillance. In addition, the epidemiologist plays a vital role in providing training and building partnerships. The epidemiologist plays a major role in response efforts. During the <u>Response phase</u>, the epidemiologist employs scientific data collection and analysis methods to conduct a rapid assessment of health and medical needs through surveys and investigations. During the <u>Recovery and Mitigation phases</u>, the epidemiologist's role is to continue necessary surveillance and monitoring activities, conduct research on the causes of disaster-related morbidity and mortality, evaluate interventions, and develop follow-up studies of populations affected by the disaster.

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KNOWLEDGE CHECK (FROM PAGE 21)

What are the phases of the disaster cycle?

A. Preparedness, response, recovery, mitigation

- B. Preparedness, response, risk assessment, planning, reconstruction
- C. Planning, response, risk assessment, evaluation, mitigation
- D. Planning, response, recovery, surveillance, evaluation



KNOWLEDGE CHECK (FROM PAGE 24)

What activity takes place during the preparedness phase of a disaster cycle? (you may select more than one response)

- A. Distributing basic supplies such as food and water
- **B. Establishing partnerships**
- C. Repairing roads and collapsed structures
- D. Conducting epidemiologic studies

What activity takes place during the mitigation phase of a disaster cycle? (you may select more than one response)

- A. Conducting a rapid needs assessment
- B. Conducting an inventory of available resources
- C. Evaluating the safety of building codes
- D. Conducting epidemiologic studies

DISCUSSION QUESTION #4

As an epidemiologist, what are some of the challenges or difficulties you could face in a disaster?

Epidemiologists play a vital role in helping to identify disaster-related outcomes, consider risk factors for disaster-related outcomes, and help determine relevant risk factors for affected population groups. Still, given the many factors surrounding a disaster, in disaster situations epidemiologists face numerous and complex problems, including the following:

- Working in a potentially hostile political environment
- Difficulty in applying epidemiologic methods in the context of great destruction, public fear, social disruption, or large population movement and shifting demographics
- Lack of time for organizing epidemiologic investigation
- Limited infrastructure for data collection

Independent Reading: Tell learners to read the next section of Lesson 2 – Special Considerations for Disaster Epidemiology – until they see the STOP sign (pages 26-27).

TIME: 10 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

SPECIAL CONSIDERATIONS FOR DISASTER EPIDEMIOLOGY

Challenges or considerations for disaster epidemiology include the following:

Absence of baseline data – Baseline information, such as prevalence of health conditions, may be absent; especially when the population affected is displaced to a shelter. In these cases information on the population may not be available before the disaster occurs. This absent or unavailable baseline information is a challenge when trying to determine the impact of the disaster such as true increases in particular health conditions. For example, an RNA after the Deepwater Horizon oil spill found that 31% of households reported at least one person experiencing recent cardiovascular symptoms. However, it is difficult to determine the true increase due to the lack of information on cardiovascular symptoms in the community prior to the oil spill.

Difficulty in obtaining denominator data – The population under surveillance may change frequently and be unpredictable. Residents might have evacuated or been displaced. Traditional census or population data might not adequately reflect the at-risk population. Additionally, the disaster might not affect individual persons uniformly.

Damage or disruption to the local healthcare infrastructure – Needed facilities might be damaged and provide only limited services. Healthcare systems might be completely destroyed and nonfunctional. Therefore, the only available medical assistance may be from outside, in the form of 1) temporary hospitals run by response workers, 2) Red Cross temporary shelters for basic medical care, or 3) mobile health units run by nongovernmental organizations or volunteer medical groups. Unfortunately, these aid agencies might not collect information uniformly, making surveillance difficult and comparison of data to create a clear picture of the disaster event nearly impossible.

Coordination of data collection efforts – Competing priorities often involve multiple sectors and affect what data are collected and the timing of that data collection. In addition, coordination of efforts can be difficult. Standardization of data elements across the different collection agencies and streamlined reporting and information sharing mechanisms are often difficult to obtain. Therefore, repeated collection of information in

a rapid manner from multiple sources under adverse conditions can be quite challenging.

Logistical constraints – Power and telephone outages affect communication networks and transportation systems. The usual reporting mechanisms can be interrupted, leading to the underreporting of health events.

Morbidity and mortality rate calculation challenges - To compare pre- and post-

impact morbidity and mortality rates and to compare those rates across population groups, we must calculate the rates rather than use simple numbers. For example, this calculation is done by relating death counts to the population during a specific period. In stable conditions, the population data can be obtained from census bureaus or other community data sources. During emergencies, however, epidemiologists often encounter challenges in estimating the population size to use as a denominator. Typically, when census or other community level data are not

Data about number of deaths can be obtained from the following sources:

- Medical Examiner or Coroner Office
- Clinic or hospital
- Disaster Mortuary Team (DMORT)
- Religious authorities
- Household members

available, estimates and educated guesses about the population size will need to suffice.

When calculating mortality, it is important to consider the size of the population and the time period in which the deaths occurred. This should be done by calculating mortality rates. Moreover, to determine the overall mortality effect, we need to understand the normal death toll within a certain period. Module 3 of this course will discuss tools to help conduct morbidity and mortality surveillance activities, including calculation of morbidity and mortality rates.



Lead a discussion to review key lessons learned. Complete the Knowledge Checks and Discussion Questions. To guide additional discussion, you may use the following questions and suggested answers (10 minutes)

Potential Discussion Questions

What are some of the challenges or considerations for disaster epidemiology?

Possible answers:

- <u>Baseline information</u>, such as prevalence of health conditions, may be absent; especially when the population affected is displaced to a shelter and therefore no information is available before the disaster occurred. This absent or unavailable baseline information poses a challenge when trying to determine true increases in particular health conditions.
- The population under surveillance might change frequently and be unpredictable, residents might have evacuated or might have been displaced, traditional census or population data might not adequately reflect the at-risk population, and persons might not be affected uniformly. Therefore, there is <u>difficulty obtaining denominator data</u>.
- <u>Facilities might be damaged and only able to provide limited services or healthcare</u> <u>systems might be completely destroyed and nonfunctional</u>. Therefore, outside medical assistance may occur in the form of temporary hospitals run by response workers, Red Cross temporary shelters for basic medical care, or mobile health units run by nongovernmental organizations or volunteer medical groups.
- <u>Competing priorities</u> often involve multiple sectors and affect what data to collect and the timing of that data collection. In addition, coordination of efforts can be difficult. Standardization of data elements across the different collection agencies and streamlined reporting mechanisms and sharing of information are often difficult to obtain.
- <u>Logistical constraints</u> such as electricity (power)and telephone outages affect communication networks and transportation systems, leading to interruption of usual reporting mechanisms and underreporting of health events

Practice Exercise Instructions

Depending on the size of the group, tell learners to complete this exercise individually, with a colleague, or as part of a small group. Instruct them to read through the each of the questions in the practice exam and select the best answer. Have participants record their answers in the space provided in the participant workbook. Once completed, review the exercise and discuss possible answers.

TIME: up to 30 minutes to complete, then reconvene the group to discuss the answers (up to 20 minutes)

PRACTICE EXERCISE



PRACTICE EXERCISE #2

In this practice exercise, you will test your knowledge and understanding of disaster and disaster epidemiology. For each question, choose the best answer(s) from the four choices provided (A, B, C, or D). Circle the letter at the beginning of the statement that corresponds to your choice. NOTE: Some questions may have more than one correct answer; you may select more than one response.

1. Disaster epidemiology seeks to

- A. Prevent or reduce the morbidity and mortality resulting from disasters
- B. Assess basic needs of affected populations
- C. Provide first-response to affected populations
- D. Inform resource allocation plans for the response phase of a disaster cycle.

2. Epidemiologists play a role only in the response phase of the disaster cycle.

- A. True
- B. False

3. What activity takes place during the recovery phase of the disaster cycle?

- A. Training of health personnel
- B. Developing preparedness plans
- C. Repairing and maintenance of basic health services
- D. Establishing partnerships
- 4. During which phase of the disaster cycle should inventories of medical supplies and basic needs be conducted?

A. Preparedness

- B. Response
- C. Recovery
- D. Mitigation
- 5. What activity takes place during the response phase of the disaster cycle?
 - A. Conducting surveillance of health problems
 - B. Conducting an inventory of available resources
 - C. Training of health personnel
 - D. Conducting epidemiologic studies
- 6. During what phase of the disaster cycle does an epidemiologist play the most limited role?
 - A. Preparedness
 - B. Response
 - C. Recovery
 - **D.** Mitigation

- 7. Which of the following does not describe an epidemiologist's role in a disaster?
 - A. Identify disaster-related outcomes
 - B. Determine risk factors for affected population groups
 - C. Rebuild damaged infrastructures and restore health systems
 - D. Conduct rapid needs assessments
- 8. What is the role of an epidemiologist during the preparedness phase of the disaster cycle?
 - A. Conduct needs assessments
 - B. Analyze vulnerabilities of communities
 - C. Educate local communities
 - D. Conduct surveillance activities.
- 9. Conducting a rapid needs assessment occurs during which phase of the disaster cycle?
 - A. Preparedness
 - **B.** Response
 - C. Recovery
 - **D.** Mitigation

10. What is an indicator of significant public health effects during disasters?

- A. Disease incidence
- B. Disease prevalence
- C. Mortality rate
- D. Case-fatality rate
- 11. What are some challenges for conducting epidemiologic work within a disaster setting? *Possible responses:*
 - Working in a potentially hostile political environment
 - Difficulty in applying epidemiologic methods in the context of great destruction, public fear, social disruption, and/or large population movement and shifting demographics
 - Lack of time for organizing epidemiologic investigation
 - Limited infrastructure for data collection
- 12. Conducting an outcomes assessment of a particular triage method after a natural disaster is an example of
 - A. An evaluation study
 - B. A rapid needs assessment
 - C. An epidemiologic study
 - D. A case-control study

After you are completed with the scenarios, summarize the key learning points from Lesson 1 outlined in the Lesson 1 Summary

LESSON 2 SUMMARY

As you have learned in this lesson, the primary goal of disaster epidemiology is to prevent or reduce the disaster-related morbidity and mortality. Disasters are often thought of as happening in a cyclical manner consisting of four phases: Preparedness, Response, Recovery and Mitigation. This is known as the disaster cycle. As an epidemiologist, your role will be to help to identify disaster-related outcomes and determine relevant risk factors for the affected population. While epidemiologists have a role to play during all phases of the disaster cycle, their primary role is during the preparedness, response, and recovery phases. At the same time, you should remember there are some additional challenges to conducting epidemiology in a disaster setting. These challenges include the absence of baseline data, a difficulty in obtaining denominator data, damage or disruption to local infrastructure, difficulty in the coordination of efforts, and other logistical constraints

This is the completion of Module One. Please thank the learners for attending (or let them know the schedule if continuing on to Module Two or Module Three), ask if they have any remaining comments or questions, and provide any contact information for any additional follow-up questions.

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Module Two: Disaster Response Rapid Needs Assessment[™]

Acknowledgement

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Disclaimer

The findings and conclusions in this facilitator guide are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

U.S. Centers for Disease Control and Prevention Office of Noncommunicable Disease, Injury and Environmental Health, National Center for Environmental Health, Health Studies Branch



MODULE 2: DISASTER RESPONSE RAPID NEEDS ASSESSMENT

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Estimated Time: 17.5 hours (30 minute introduction to module, up to 4.25 hours of independent reading, up to 3.75 hours of practice exercises, up to 4 hours of group discussion, up to 2.25 hours of skills assessments, 2.25 hours of optional data exercise, and a 30 minute module review and wrap-up)

Distribute: Participant Workbook for this module (if not already distributed)

Explain: The skills the learners will learn and how they will learn these skills by reading the Disaster Response Rapid Needs Assessment Participant Workbook. Note that learners will have opportunities to apply what they learn by completing practice exercises and skill assessments. Explain that brief facilitator-led discussions will clarify or will elaborate on key concepts.

Provide: An overview of how the skills taught in the second module, Planning a Disaster Response RNA will build on the information from the first module. Explain how this procedure will further prepare them for supporting disaster response activities and conducting epidemiological responses and surveillance.

- Module 1 provides an overview of disaster types, how they occur, and the consequences they have for society.
- Module 2 teaches the use of a rapid needs assessment (RNA) for disaster response and the various components needed to plan, execute and report results collected from the assessment

Introduce: Lessons in Module Three

Tell: Learners to read each lesson until they see the STOP sign

OVERVIEW OF MODULE TWO – DISASTER RESPONSE RAPID NEEDS ASSESSMENT

A **rapid needs assessment (RNA)** is a collection of techniques (e.g., epidemiological, statistical, anthropological) designed to provide information about a community's needs following a disaster.⁹ It uses local resources and specific methods to conduct a relatively quick, effective, and representative community snapshot to assess needs and guide relief efforts. During a disaster, you should consider an RNA when you need to understand a disaster's impact on affected populations.

⁹ Lloyd F. Novick, John S. Marr. *Public Health Issues Disaster Preparedness: focus on bioterrorism.* Jones & Bartlett Learning; 2003.

In this module, you will learn about an RNA for disaster response and the various components needed to plan, execute, and report results collected from the assessment. This module consists of four lessons:

- Lesson 1: Planning a Disaster Response RNA
- Lesson 2: Preparing for an RNA
- Lesson 3: Conducting an RNA
- Lesson 4: Data Entry, Analysis, and Writing the Report

Content is drawn from several tools and approaches, including the following:

- Centers for Disease Control and Prevention (CDC) /Health Studies Branch (HSB) Community Assessment for Public Health Emergency Response (CASPER) toolkit.
- Johns Hopkins and the International Federation of Red Cross and Red Crescent Societies Public Health Guide in Emergencies.
- World Health Organization, Cluster sampling methodology.

LEARNING OBJECTIVES

After completing Module Two, you will be able to do the following:

- Explain the steps for planning an RNA
- Identify an appropriate sampling method
- Design a questionnaire instrument
- Identify steps for implementing an RNA during a disaster response

ESTIMATED COMPLETION TIME

Module Two will take approximately 17.5 hours to complete, including some discussion time with your mentor or facilitator.

PREREQUISITES

Before participating in this training module, we recommend that learners complete the following training courses:

- Module One: Epidemiologic Response to Disasters
- Questionnaire Design (FETP core curriculum)
- Interview Techniques (FETP core curriculum)
- Introduction to Sampling (FETP core curriculum)

Lesson 1: Planning a Disaster Response Rapid Needs Assessment (RNA)

Overview: This lesson describes the purpose and importance of surveillance, particularly as it relates to controlling or reducing disaster-caused injuries, illnesses, and deaths, as well as some of the common public health disaster surveillance challenges.

Total Estimated Time: 2.75 hours

Reading and Activities: up to 55 minutes

Group Discussion: up to 60 minutes

Practice Exercise #1: 50 minutes, including a 20 minute review

LESSON 1: PLANNING A DISASTER RESPONSE RAPID NEEDS ASSESSMENT (RNA)

Independent Reading: Tell learners to read the first three sections of Lesson 1— Introduction, Overview of RNA Methodology, and Four Phases of an RNA – until they see the STOP sign (pages 3-5).

TIME: 15 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

INTRODUCTION

As you learned in Module One, *Epidemiologic Response to Disasters*, significant damage can happen after a disaster, such as physical injuries, illnesses, potential disease outbreaks, shortand long-term psychological effects, death, significant damage to buildings and other structures, and devastating financial loss.¹⁰ As an epidemiologist, you could be called on to assist in determining the extent of such damage, particularly damage to human health and the health infrastructure, to identify the needs of a community, and to recommend interventions to reduce further morbidity or mortality.

In this lesson, you will learn about an RNA method for gathering information about the health and other basic needs of a community affected by a disaster. The lesson sets out the four phases of conducting an RNA.

After completing this lesson, you will be able to do the following:

- Describe the need for conducting an RNA
- Recognize the issues that need to be addressed before conducting an assessment
- Identify challenges of conducting an RNA

¹⁰ Noji EK. 1997. The public health consequences of disasters. New York, NY: Oxford University Press.

OVERVIEW OF RNA METHODOLOGY

The destruction of homes, damage to local infrastructure such as the water supply, electricity, and health facilities, and the interruption of services and social support networks can affect a community's well-being. During the response phase of a disaster, public health and emergency management professionals must be prepared to respond to and meet the needs of the affected community. Action to mitigate adverse effects requires timely and accurate information. Key information such as the number of affected households, health status, immediate- and long-term needs and the scope and type of intervention required can be obtained quickly and effectively with the RNA's proven methodology.

Specifically, an RNA uses validated data collection methods to determine

• magnitude of the disaster's effect on the community;



- number of households affected,
- basic characteristics of the households affected (e.g., are there more vulnerable groups with increased risk for disease or death?),
- current health priorities and potential public health problems,
- availability of basic needs such as food and water, and
- need for external support or intervention.

A disaster-response RNA provides agencies, emergency managers, or local health authorities with evidence-based information about the affected population's needs. An RNA will help inform the prioritization of interventions and allocation of finite supplies and resources. Without the timely availability of reliable and scientifically sound data, public health officials run the risk of making ill-informed decisions that might adversely affect the response effort.¹¹

The RNA methodology is an epidemiologic investigation method. An RNA facilitates rapid data collection within a resource-constrained setting. It also focuses on the *household* as the unit of analysis rather than the individual. This focus on collecting household-level information allows for data collection timeliness. This method also assumes that the disaster affects everyone within a household, and all households within a given area are subject to the same exposure (disaster) equally. The RNA methodology serves as a relatively inexpensive and practical public health tool. Today, for most types of disasters, an RNA represents a first line of epidemiologic response.¹²

¹¹ CDC. Community Assessment for Public Health Emergency Response (CASPER) Toolkit, Second edition. Atlanta (GA); 2012.

¹² Malilay J, Flanders WD, Brogan D. A modified cluster-sampling method for post disaster rapid assessment of needs. Bull World Health Organ.1996;74:399-405.

FOUR PHASES OF AN RNA

The four phases of an RNA are the following:

- 1. Prepare the Assessment
- 2. Conduct the Assessment
- 3. Analyze the Data
- 4. Write the Report

These phases, represented in the Figure 1, should not be confused with the four phases of the disaster cycle discussed in Module One.





These phases provide a quick, inexpensive, accurate, and reliable process for obtaining household-based information about communities affected by natural or human-made disasters. In this lesson, we will focus on Phase 1 of an RNA, Prepare the Assessment.



Lead a discussion to review key lessons learned. Complete the Knowledge Check and Discussion Question #1. To guide additional discussion, you may use the question and suggested answers in the red box. (15 minutes)

Potential Discussion Question

For what purposes is the RNA methodology used?

Possible answer:

To help with rapid collection of data within a resource-constrained setting. RNA methodology also focuses on the household rather than the individual as the unit of analysis. This focus on collecting household-level information allows for timeliness in data collection. The RNA methodology is also a relatively inexpensive and practical public health tool. Today, an RNA represents a first line of epidemiologic response to most types of disasters





KNOWLEDGE CHECK

What are the four phases of an RNA?

- A. Respond, Recovery, Analyze Data, Disseminate Information
- B. Plan, Respond, Recovery, Write the Report
- C. Prepare, Conduct, Analyze Data, Write the Report
- D. Preparedness, Respond, Recovery, Mitigation

DISCUSSION QUESTION #1

An RNA is a validated data collection method to determine what type of information?

- The magnitude of the disasters effect on the community
- The number of households affected
- The basic characteristics of the households affected how many households include more vulnerable groups with increased disease or death risk
- Current health priorities and potential public health problems
- Availability of basic needs such as food and water
- The need for external support or intervention

Independent Reading: Tell learners to read the next section of Lesson 1—Purpose and Objectives of an RNA – until they see the STOP sign (pages 6-7).

TIME: 10 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

RNA PURPOSE AND OBJECTIVES

The primary purpose of an RNA is to rapidly obtain vital information about the needs of a community and monitor changes in those needs during the recovery period. In a disaster setting, the main objectives are to

• describe the effects of the disaster on health;



- determine the critical health needs and assess the impact of the disaster;
- characterize the population residing in the affected area;
- produce household-based information and estimates for decision-makers;
- evaluate the effectiveness of relief efforts through a follow-up assessment; and
- prevent adverse health effects.

When to Conduct an RNA

Conduct an RNA at any time the public health needs of a community are not well known. Such

times can occur during a disaster response or within a nonemergency setting. During a disaster, the local, state, or regional emergency managers or health department officials could decide to initiate an RNA when

- the effect of the disaster on the population is unknown,
- the health status and basic needs of the affected population are unknown, or
- the response and recovery efforts need to be evaluated.

Timeliness of an RNA is critical		
Event	Initial Assessment Timing	
Hurricane Isabel, NC, 2003	< 24 hours	
Earthquake Tsunami, American Samoa, 2009	5 days	
Hurricane Katrina, US MS, 2005	14 days	
Earthquake Turkey, 1999	15 days	

RNA Scope

While an RNA is a quick, reliable, and accurate technique that provides household-based information about a community's needs, it is not intended to

- provide direct services to residents such as cleanup or home repair;
- deliver food, medicine, medical services, or other resources to the affected area;
- determine why people are not returning to their community; or
- establish current population estimates.

RNA data are aggregated and reported at the household level. This method determines all the resources from which the affected community can benefit. During their interaction with the community, the RNA team may identify certain households in need of services, such as diabetic patients without insulin or supplemental oxygen-dependent persons without access to electric power. The team can refer these households to the appropriate resources.

RNA and the Disaster Cycle

You can conduct an RNA at any phase of the disaster cycle. But note that the affected community's needs will change at different points in that disaster cycle and the RNA's objectives will vary depending on the timing of the assessment relative to the disaster. For example, during the preparedness phase, you can conduct an RNA to assess the disaster preparedness level of the community, such as determining how many households have emergency supply kits. During the recovery phase of a disaster, you can conduct an RNA as a follow-up to a previous RNA to assess the effectiveness of the response or intervention program and determine ongoing community needs. RNAs have also been used to assess public health perceptions, determine current health status, and estimate the needs of a community in a nonemergency setting. For example, an RNA can be conducted as part of a larger health assessment to measure a community's awareness and opinions concerning the effect of a project (e.g., a new transportation route) on a community's health.



Lead a discussion to review key lessons learned. Complete the Knowledge Check and Discussion Question #2. To guide additional discussion, you may use the question and suggested answers in the red box. (15 minutes)

Potential Discussion Question

When can an RNA be initiated?

Possible answer:

- When the effect of the disaster on the population is unknown
- When the health status and basic needs of the affected population are unknown
- When the response and recovery efforts need evaluation


KNOWLEDGE CHECK

Which statement(s) are not objectives of an RNA? (Select all that apply)

- A. Produce household-based information and estimates for decision-makers
- B. Determine why people are not returning to their community

C. Deliver food, medicine, medical services, or other resources to the affected area

D. Characterize the population living in the affected area

DISCUSSION QUESTION #2

What are the main objectives of an RNA in a disaster setting?

- Describe the effects of the disaster on health
- Determine the critical health needs and assess the disaster's effect
- Characterize the population residing in the affected area
- Produce household-based information and estimates for decision-makers
- Evaluate the effectiveness of relief efforts through a follow-up assessment
- Prevent adverse health effects

Independent Reading: Tell learners to read the next section of Lesson 1 – Challenges to Conducting an RNA – until they see the STOP sign (pages 8-10).

TIME: 10 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

CHALLENGES TO CONDUCTING AN RNA

Many potential challenges are associated with conducting an RNA in a disaster setting. As a member of an RNA team, you should be aware of the common challenges that can occur during an assessment and be familiar with the preventive actions outlined in Table 1.

Table 1. RNA challenges and preventive actions¹³

Challenge	Description
Limited access	Challenge: Inability or difficulty in reaching people to interview.
	Preventive action: Understanding the current situation will be critical,
	including the displacement of the population (i.e., are people in a
	refugee camp, evacuation center, or other centralized location such as
	a shelter?). The sampling methodology might need modifying to ensure access to the affected populations.
Limited	Challenge: The assessment is poorly coordinated between various
coordination	Non-Governmental Organizations (NGOs) and excludes the host
	government and the affected community.
	Preventive action: Appoint a team leader to coordinate the
	assessment with the local officials, the affected community's leaders,
	and other agencies so that the results are shared and not duplicated,
	and so that future support of relief activities is ensured.
Lacking	Challenge: The assessment team lacks the expertise needed.
expertise	Preventive action: Select members of the team with disaster-specific
	(previous experience), site-specific (geography, language, culture) or
	specialty-specific skills (epidemiologists, public health nurses,
	logisticians).

¹³ Johns Hopkins Bloomberg School of Public Health; International Federation of Red Cross and Red Crescent Societies. Public Health Guide for Emergencies, 2nd ed. Geneva: IFRCRCS; 2008 [cited 2013 Nov 10]. Available from: http://www.jhsph.edu/research/centers-and-institutes/center-for-refugee-and-disaster-

response/publications_tools/publications/_CRDR_ICRC_Public_Health_Guide_Book/Forward.pdf

Incomplete data	Challenge: The number of competed surveys are often fewer than expected (e.g., poor access or refusal).
	Preventive action: Discuss the plans with local authorities, community
	representatives, and other agencies and use local media to
	inform/educate the community about the assessment.
Unreliable	Challenge: The estimated size of the target population – the
population size	denominator – is unreliable.
	Preventive action: Conduct a quick census of the affected community
	by, if possible, walking or driving around the affected area. Reach out to
	local agencies, other disaster responders, and relief agencies to find
	out whether they have more updated population estimates.
Failure to	Challenge: The assessment report does not consider the affected
consider needs	population's perceived needs.
	Preventive action: At every stage of the assessment involve
	representatives from the local governmental and nongovernmental
	agencies and the affected population, including when you are drawing
	conclusions from the local responses and determining outstanding
	needs.
Poor execution	Challenge: Assessment team members do not complete their assigned
	tasks in a timely manner. Thus, time is insufficient for accurate
	assessments, the assessment period is extended, and serious delays
	in vital action might occur.
	Preventive action: Establish a detailed and realistic timeline and
	clearly communicate the expectations and timeline with each team
	member. Readjust the plan based on the reality of the situation.
Poor information	Challenge: Information is not shared with government, NGOs, or other
sharing	agencies.
	Preventive action: Discuss before the assessment when and how to
	share common planning and priority settings.



Lead a discussion to review key lessons learned. Complete the Knowledge Check and Discussion Question #3. To guide additional discussion, you may use the question and suggested answers in the red box. (15 minutes)

Potential Discussion Question

Why is the inability to reach people to interview a challenge to conducting an RNA? What is a possible preventive action to that challenge?

Possible answer:

Because the RNA uses in-person, face-to-face, interviews, it is important to be able to reach people. Understanding the current situation will be critical, including the displacement of the population (i.e., are people in a refugee camp, evacuation center, or other centralized location such as a shelter?). The sampling methodology might need modifying to ensure access to the affected populations.



KNOWLEDGE CHECK

Which statement best describes preventive action for challenges related to unreliable population size?

- A. Inform/educate the community about the assessment using local media.
- B. Discuss when and how to share common planning and priority settings.
- C. Understand the displacement patterns of the population.

D. Conduct a quick census of the affected community by walking or driving around the affected area.

Which statement best describes preventive action for challenges related to incomplete assessment data?

A. Inform/educate the community about the assessment using local media.

- B. Discuss when and how to share common planning and priority settings.
- C. Understand the displacement patterns of the population.

D. Conduct a quick census of the affected community by walking or driving around the affected area.

DISCUSSION QUESTION #3

Think about your own community, what are some challenges to conducting an RNA that may happen in a disaster?

Allow respondents to answer for their specific community/jurisdiction. We recommend you think of a few challenges that may arise in the local region as examples (see Table 1).

Independent Reading: Tell learners to read the next section of Lesson 1 – Planning for an RNA – until they see the STOP sign (pages 11-14).

TIME: 20 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

PLANNING FOR AN RNA

Despite the urgent need for information following a disaster, reserving time to prepare sufficiently for an RNA is critical, especially before initiating any data collection. Knowing the purpose, setting, and availability of resources is similarly important, especially *before* making the decision to conduct an RNA.

Table 2 contains a checklist an RNA team can use in planning for the assessment. The checklist will help to clarify the RNA purpose, setting, and availability of resources. As epidemiologists you will most likely be a member of an RNA team. You should be able to identify the information your assessment team might want to collect in an RNA. You should be able to ensure that key planning steps have been covered. All the items on the checklist might not be feasible given disaster response circumstances, availability of resources, and immediate needs. Still, you should adapt the checklist in Table 2 to the context and culture of the affected community and to the available resources in the specific geographic area. Some key actions to consider when planning for an RNA are listed in Table 2.

Action	Description
	Know the Purpose
Define how information will be used	Before conducting an RNA, response officials' understanding of how the result will be used will help create a clear vision and narrow the scope of the data collection instrument. Clear goals are imperative to ensuring that the appropriate data are collected, thus generating useful information for public health actions.
Determine what information has been obtained from other assessments	Obtain information from local responders or from other assessments conducted by other agencies (e.g., flyovers and area damage assessments). Such information could be beneficial in determining your assessment area(s).
Identify relevant stakeholders	Identify and include all relevant stakeholders in the planning and design stages—this will ensure smooth partnership relations throughout the RNA process. During the first phase of an RNA, the role of each partner should be defined in terms

Table 2. RNA planning checklist

	of what each will contribute to the assessment. These contributions might include subject matter expertise, analytical support, materials, or ground information about the affected area. Working relationships between national and subnational partners, private or nongovernmental organizations, and educational institutions are built and fostered during the RNA preparedness stage. These partnerships are integral to the successful completion of an RNA. The number and type of partners in an RNA depends on the nature of the assessment, the location, and the RNA needs.
	Know Your Setting
Determine geographical areas to include	The RNA can, but might not always, cover all geographic areas affected by the disaster. The RNA's geographical assessment area covered will depend on the availability of resources and the objectives established by the local authorities. When determining the geographical areas in which to conduct an RNA, local authorities might take into account infrastructure damage or accessibility to areas affected by the disaster. Obtaining maps of the affected areas is often helpful (e.g., from local officials or meterologist office for areas affected by a hurricane or flood) to gain a better understanding of the affected community's geographical location, boundaries, terrain, and landmarks.
Determine the demographics and baseline health status of population	Having background information about the demographic characteristics of the affected population is informative for developing the questionnaire. Demographic data might be available from national census data, national statistics offices, Demographic and Health Surveys (DHS), or other population- based surveys. Useful demographic information includes age and sex distribution of the population, average household size, estimates of female- and child-headed households, and social structure. Although knowing the prevalence of medical conditions will be helpful to interpret the data, these data are not often available.
Ascertain security and access information	The RNA team should establish an understanding of ongoing natural or human-made hazards encountered during the RNA. Disaster response is often complicated by new hazards, such as road closures and downed power lines. Determining the

	overall safety and security of the affected area is important,
	especially before sending teams into the field. Speak with
	local officials to obtain safety and security information.
	Know Your Resources
Identify availal resources	e Identifying available resources (both equipment and personnel) requires coordinating with a broad set of partners. The following is a series of suggested steps the RNA team should take to identify available resources:
	 Coordinate with the Ministry of Health or other national agencies to support the response Determine the types and quantities of locally available resources: personnel, transportation, communication devices, first-aid kits, mapping devices such as Global Positioning System (GPS), computers with internet access, data entry and analysis software Identify a field coordination center that can serve as a headquarters for the RNA team. This center should be near the affected area and be equipped with phone or VHF or UHF radio communication device (or both), fax, and Internet access
Assemble the assessment te	Determine how many interview teams are needed. This will be based on the assessment design, sample size, number of interviews that need to be conducted, and the distance that needs to be traveled to access each household. Identify any special expertise needed to conduct the RNA (e.g., a data analyst, a Geographic Information System (GIS) expert, an environmental scientist, a mental health professional), and local staff available to assist in data collection. If you cannot recruit a multidisciplinary assessment team locally, get the proper authorization (e.g., work permits, travel permits) for additional personnel from neighboring areas or partner organizations, including neighboring countries or other expatriots. Local representation is essential to foster trust between the public and assessment teams and improve buy- in and support from the community. If possible, ensure someone locally based can arrange the assessment team's
	transportation, communication, accomodations, and meals.

Defining in advance what information is already known, what information is needed, where and from whom data should be collected, key partners and their role, available resources, and other such factors can improve the RNA's coverage, quality, and overall usability. Often, given the urgent need for information, the time required to organize, collect, and analyze precise and reliable data might simply prove infeasible This means you must make some decisions using less precise and less reliable data. When possible, you should confirm any information you use with the appropriate stakeholders (e.g., local officials, NGOs).



Lead a discussion to review key lessons learned. Complete the Knowledge Check and Discussion Question #4. To guide additional discussion, you may use the question and suggested answers in the red box. (15 minutes)

Potential Discussion Question

Why is it important to know the purpose when planning for an RNA?

Possible answer:

Knowing the purpose will help create a clear vision and narrow the scope of the data collection instrument. Clear goals are imperative to ensuring that the appropriate data are collected, thus generating useful information for public health actions. It is also important to obtain information from local responders or from other assessments conducted by other agencies to aid in determining your assessment area(s) and avoid duplication of efforts. Knowing the purpose will also help you to identify relevant stakeholders so that you can include them in the planning and design stages which will ensure smooth partnership relations throughout the RNA process



KNOWLEDGE CHECK

It is important to know the **purpose**, **setting**, and **availability of resources** before making the decision to conduct an RNA.

DISCUSSION QUESTION #4

What are some of the key items you should consider when planning for an RNA? See Table 2 for a checklist. All the items on the checklist might not be feasible given disaster response circumstances, availability of resources, and immediate needs.

PRACTICE EXERCISE

Instructions: Depending on the size of the group, tell learners to complete this exercise individually, with a colleague, or as part of a small group. Instruct them to read through the case study and answer the questions. Have learners record their answers in the space provided. Once completed, review the exercise and discuss possible answers.

TIME: up to 30 minutes to complete, then reconvene the group to discuss the answers (up to 20 minutes)



PRACTICE EXERCISE #1

In this practice exercise, you will apply the concepts learned in Lesson 1. Please read through the following scenario and answer the questions. This scenario will be used across the remaining lessons in this module.

Flooding in a Southeast Asian country

Torrential rainfall and floods due to seasonal monsoons affected a province in a Southeast Asian country. On July 22, 2013, 45,948 people were displaced, 24 reported as dead, 2 were injured, and 14 were missing. Thousands of acres of farmland were damaged. In the early hours of July 21, 2013, flooding on a local river caused embankments to break flooding 80% of nearby areas. The province had one community hospital, one pharmacy, few physicians and clinicians, limited commercial air service, and limited support infrastructure. Nevertheless, it was rich in local culture and had a strong, intact social system and leadership.

All latrines in the city and county centers were destroyed. Two hospitals were partially damaged. Many roads and bridges were damaged, limiting access to affected areas. Electric power was mostly not available, and water utilities had low pressure.

In the flood's aftermath, many health personnel responded, but some experienced personal injury, family injuries or deaths, and property loss. Because some responders were also victims and unable to work during the disaster, public services needed staffing assistance from outside sources.

The local government requested interagency assistance from NGOs, MOH, and other key partners to determine the health and general needs of the affected population. The objective was to inform response and recovery activities by assessing affected areas and identifying post-storm public health need

List the information that you should gather to plan for an RNA responding to this disaster.

- Stakeholders, specifically partners
- Geographical area affected
- Census data demographic and baseline health information
- Available resources
- How information will be used
- Information from other assessments
- Current safety of the situation

What should the goals of the RNA be during the recovery and mitigation phase?

- Assess effectiveness of the public health response to the flooding by conducting a follow-up to a previous RNA
- Identify ongoing community public health issues and needs during recovery phase

List some challenges that you would anticipate in this situations. Describe why these challenges would be relevant to an RNA.

- Damaged local health infrastructure causing limited access
- Absent baseline information
- Competing priorities
- Logistical constraints, lacking expertise
- Coordination of efforts and poor information sharing
- Language or cultural barriers

These issues could complicate gathering information needed to conduct the RNA. These issues could also complicate the ability of field teams to collect data, especially if roads remain damaged or people have not returned to their homes. Damage to local health infrastructure and the absence of baseline data might complicate comparing data collected in the RNA with existing health needs in the affected areas.

After you are completed with the scenario, summarize the key learning points from Lesson 1 outlined in the Lesson 1 Summary

LESSON 1 SUMMARY

As you have learned in this lesson, an RNA is an important tool during a disaster. An RNA helps to gather quickly the information necessary to plan disaster response activities. A four-phased approach and checklist guides RNA activities. Given the time and resource constraints, being aware of and prepared for the challenges you might encounter is important, especially when planning for and conducting an RNA.

Lesson 2: Phase 1 – Preparing for an RNA

Overview: This lesson focuses on planning for disaster surveillance, considerations for designing or using existing surveillance systems, and morbidity and mortality surveillance during a disaster

Total Estimated Time: 5 hours

Reading and Activities: up to 110 minutes

Group Discussion: up to 110 minutes

Practice Exercises: 80 minutes, including 30 minutes review

LESSON 2: PHASE 1 – PREPARING FOR AN RNA

Independent Reading: Tell learners to read the first three sections of Lesson 2 – Introduction, Overview of an RNA Sampling Method, and Determine Assessment Area – until they see the STOP sign (pages 17-19).

TIME: 15 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

INTRODUCTION

In Lesson 1, you learned about the RNA method for gathering household-based information from communities affected by a disaster. This method included a four-phased approach to gather household-based information. Remember that before initiating an RNA, determine whether that RNA uses the right assessment method based on the objectives, timeframe, and availability of resources. After this determination, RNA assessment teams will begin preparing for the RNA (Phase 1) to

- identify the assessment areas,
- develop questionnaires and forms, and
- identify and train field interview teams.

After completing this lesson, you will be able to do the following:

- Describe the recommended sampling methodology used for an RNA
- Describe the modified two-stage cluster sampling method
- Describe considerations affecting sample selection and size
- Develop assessment questionnaires for the RNA
- Describe methods for identifying and training field interview teams

OVERVIEW OF RNA SAMPLING METHOD

As you learned in Lesson 1, the primary objectives of an RNA are to

- describe the effects of the disaster on health;
- determine the critical health needs and assess the impact of the disaster;
- characterize the population residing in the affected area;
- produce household-based information and estimates for decision-makers;
- evaluate the effectiveness of relief efforts through a follow-up assessment; and
- prevent adverse health effects.

Ideally, you would collect information from all members of the community to assess their needs. But given time and cost constraints, this is rarely feasible, even in nonemergency situations. In a disaster response, obtaining information from every person would be too expensive and time consuming. The need to collect data in a rapid and timely manner necessitates conducting an RNA with a subset, or sample, of the population.

Sampling is the process of carefully selecting representative respondents from the target population who reflect the characteristics of the population from which it is drawn. When done correctly, sampling is an efficient way to gather quickly information on a population in a cost-efficient manner. A sample should accurately reflect the distribution of relevant variables in a population according to person, place, and time. To the extent possible, this subset should be as representative as possible of the larger population so as to generalize the findings accurately to the larger target population.

To select households within the assessment area, the recommended RNA sampling method is the two-stage cluster sampling design. This design includes the selection of 30 clusters (first stage) and within each cluster 7 interviews (second stage) are completed. The data collected using this method are meant to generate estimates. How you select the clusters and households for interviews is important to ensure valid estimates.

DETERMINE THE ASSESSMENT AREA

The first RNA preparation step is determining the assessment, or geographic, area(s). The assessment area(s) are the RNA's sampling frame. A **sampling frame** is a list of households from which a sample is to be drawn, such as maps or lists of households in an area. As mentioned in Lesson 1, local officials from the affected area who requested the RNA will usually determine the sampling frame.

One of the key assumptions of the disaster response RNA is that the households in the sampling frame are all similarly affected. Thus, the sampling frame should be limited rather than be expansive. The disaster area may be geographically large or have vast differences between communities. Differences may include the extent of storm damage, social or geographic vulnerability, or the nature of the jurisdictions responding to their needs. If such conditions occur, you should consider separate sampling frames and RNAs for each specific area. For example, if an earthquake struck an urban area and a rural area, you would consider conducting separate RNAs for the urban and the rural areas. Once you know your sampling frame(s), you will use the appropriate sampling

Examples of how the sampling frame can be defined include the following:

- Political boundaries (e.g., houses in a county, district, city, village)
- Geographic boundaries

 (e.g., houses located within specific landmarks, such as a road or lake)
- Specific community (e.g., houses in the most affected community without local health services)

methodology to draw a representative sample to reach your target population.



Lead a discussion to review lessons learned. Complete the Knowledge Check and Discussion Questions #5 and #6. To guide additional discussion, you may use the questions and suggested answers in the red box. (30 minutes)

Potential Discussion Questions

What is sampling?

Possible answer:

Sampling is the process of carefully selecting representative respondents from the target population who reflect the characteristics of the population from which it is drawn.

What is the recommended RNA sampling method?

Possible answer:

Two-stage cluster sampling design. This design includes the selection of 30 clusters (first stage) and within each cluster 7 interviews (second stage) are completed. The data collected using this method are meant to generate estimates. How you select the clusters and households for interviews is important to ensure valid estimates



DISCUSSION QUESTION #5

How is the geographic assessment area(s) identified? Generally, the assessment area will be that area affected by the disaster. The assessment area(s) are the sampling frame for an RNA. A sampling frame is a list of households from which a sample is drawn, such as maps/lists of households in an area.

DISCUSSION QUESTION #6

How is the sampling frame defined?

A sampling frame can be defined in a variety of ways. Some examples of how you can define the sampling frame include the following:

- Political boundaries (e.g., a county, a village, a district, a city)
- Geographic boundaries (e.g., houses located in a specific landmark, such as a road or lake)
- Selection of a specific community (e.g., the most affected community without local health services)

Independent Reading: Tell learners to read the next section of Lesson 2 – Two-Stage Cluster Sampling Method – until they see the STOP sign (pages 20-23).

TIME: 20 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

TWO-STAGE CLUSTER SAMPLING METHOD

The next step in preparing for an RNA is to determine the proper sampling method. The

sampling method should be selected on the basis of the assessment objectives, timeframe, and available resources. Two-stage cluster sampling is the recommended methodology for conducting an RNA. You may use other sampling methods, however, which are described at the end of this module.

The two-stage cluster sampling method is recommended for an RNA. Other sampling methods include simple random sampling, systematic sampling, and stratified sampling. However, these may not be feasible.

The World Health Organization's (WHO) Expanded

Programme on Immunization (EPI) adapated the two-stage cluster sampling methodology to estimate immunization coverage.¹⁴ According to WHO, this cluster design is easy to implement in the field, requires few resources, and provides valid and precise estimates with relatively quick reporting.¹⁵ The recommended design is 30 clusters of 7 subjects to yield 95% confidence levels. In 1992, CDC modified the EPI method for use following a disaster.¹⁶ The modification enables users to estimate the number of households with specific needs in the disaster-affected area.

There are times when sampling may not be necessary. A few conditions to consider when determining whether sampling is necessary, include when

- the total number of households in the assessment area is significantly larger than what can be assessed with available resources,
- the area that needs to be covered to assess the affected population is too large,
- the number of field interview teams is limited, or
- the assessment must be completed quickly (one or two days) because results are needed quickly.

¹⁴ World Health Organization (WHO). Rapid health assessment protocols for emergencies. Geneva: WHO; 1999.

¹⁵ Malilay J, Flanders WD, Brogan D. A modified cluster-sampling method for post disaster rapid assessment of needs. Bull World Health Organ.1996;74(4):399-405.

¹⁶ Hlady, W. G., Quenemoen, L. E., Armenia-Cope, R. R., Hurt, K. J., Malilay, J., Noji, E. K., & Wurm, G. Use of a modified cluster sampling method to perform rapid needs assessment after Hurricane Andrew. Annals of Emergency Medicine.1994; 23(4):719-725. [cited 2014 October 24]. Available from: http://www.annemergmed.com/article/S0196-0644(94)70305-1/abstract.

The goal of the two-stage cluster method is to complete 210 interviews (30 X 7) within each assessment area(s).

Stage One – Selecting 30 Clusters and Mapping

The first stage includes selecting a sample of 30 clusters (e.g., census blocks,

villages) with **probability proportional** to the estimated number of estimated number of households. The sampling method thus requires a count of all households in your sampling frame. In some geographic area, clusters may cover a wide area and/or has many housing units, which create logistical challenges for field interview teams to interview. In such situation segmenting

Selecting with a probability proportional to size ensures that clusters with more households have a higher chance of selection. This method of selection is then corrected during data analyses by weighting.

the cluster and select the cluster proportional to size is advisable.

You accomplish this first stage by dividing the sampling frame into non-overlapping subpopulations, or "clusters." Thirty clusters are selected with their probability proportional to the number of households in each cluster. You can gain information on the number of household per cluster from local officials, such as community leaders, and from local documents, such as tax records, property records, or census files *(see DEMO data)*. In some countries, you can obtain this information using the Census website or Geographic Information Systems (GIS) software such as ArcGIS developed by the Environmental Systems Research Institute, Inc. (ESRI). Using GIS provides more flexibility in the selection of a sampling frame. GIS allows the user to assess portions of a county, district, city or village. Instructions for using GIS to select clusters are based on your GIS program and shape files; they are not provided in this lesson.

Once you have selected the 30 clusters, create maps of the selected clusters, including road names and key landmarks, using GIS. If GIS resources are not available, identifying the selected clusters and landmarks is possible by using commercially available local maps or satellite images such as Google Earth.

Stage Two – Selecting Seven Households

For the purpose of conducting interviews during the second stage of sampling, seven households are randomly selected in each of the 30 selected clusters. The sampling method thus requires a count of all the households within the cluster. You should coordinate with local



authorities or leadership to decide how to best determine the number of households within each cluster.

We suggest the following two methods for selection of households from sampled clusters:

- Simple Random Sampling (SRS): Create a complete list of households within the cluster and use a random number generator to select randomly seven households. On arriving at your location, the steps for this method are the following:
 - 1. Travel around the cluster and count all the households
 - 2. Number the households from 1 to N
 - Using a random number table or random number generator provided to field teams, randomly select 7 households (see <u>www.random.org</u> for free tools) *OR* If GIS is available, identify seven random global positioning system (GPS) waypoints generated by using GIS and census data. If no home is located at the waypoint, interview the closet house to the waypoint
- 2) **Systematic Random Sampling:** Before arriving at a selected cluster, select a random starting point by using a printed map (see Figure 2). On arriving at your selected starting point, the steps for this method are the following:



- 1. Use a detailed map (e.g., a cluster viewed in Google Earth) or, if one is not available, count or estimate the number of households within the cluster
- 2. Divide that number of households by 7 (the N); any N is acceptable as long as the number remains consistent throughout the cluster
- 3. Start at the house nearest the randomly selected starting point, travel through the cluster and select the Nth house to interview until seven interviews are complete

Figure 2. Example of using systematic random sampling to select seven households for interview. Starting with house #1, every 8th house is selected for interview





Lead a discussion to review lessons learned. Complete the Knowledge Check and Discussion Question #7. To guide additional discussion, you may use the question and suggested answers in the red box. (15 minutes)

Potential Discussion Question

Is sampling always necessary?

Possible answer:

Sampling is not always necessary. A few conditions to consider when determining whether sampling is necessary, include when

- the total number of households in the assessment area is significantly larger than what can be assessed with available resources,
- the area that needs to be covered to assess the affected population is too large,
- the number of field interview teams is limited, or
- the assessment must be completed quickly (one or two days) because results are needed quickly.

In those situations, you will likely need to sample.



KNOWLEDGE CHECK

What is the recommended sampling method for conducting an RNA?

- A. Stratified sampling
- B. Two-stage cluster sampling
- C. Simple random sampling
- D. Systematic sampling

DISCUSSION QUESTION #7

Why is selecting a sample of 30 clusters with probability proportional to size important?

Selecting with a probability proportional to size ensures that clusters with more housing units have a higher chance of selection. This nonrandom sampling is then corrected by weighting during data analyses. **Independent Reading**: Tell learners to read the next sections of Lesson 2 – Considerations Affecting Sample Selection and Size and Other Sampling Methods – until they see the STOP sign (pages 24-26).

TIME: 15 minutes

CONSIDERATIONS AFFECTING SAMPLE SELECTION AND SIZE

The following are instances when factors outside of your control cause you to change or modify how you implement an RNA:

Cluster accessibility – You or your interview team may encounter difficulty completing all of the interviews for the 30 clusters. Difficulties might include storm damage, unsafe conditions, or restricted entries. If any such difficulty occurs, remember that clusters should be chosen without replacement—meaning that the clusters originally selected are the clusters that are assessed. And due to inaccessibility, this process might result in interviewing fewer than 30 clusters. One option is to increase the number of clusters selected in the first stage sampling prior to going into the field. For example, you or your leadership team can decide to select 35 clusters instead of the standard 30. If this method is chosen, it is critical that the change occurs *before* starting the first stage of the sampling method and before the interview team begins data collection in the field. Also, for this option it is essential that teams then visit all 35 census blocks and treat the design as 35x7 (sample size of 245) in data collection and analysis.

Clusters with fewer than seven households – You may also encounter clusters with fewer than seven households, making it impossible for field interview teams to interview the recommended seven households from that cluster. One option is to check the frequencies of households within the chosen sampling frame to identify this problem prior to the first stage of sampling (selecting the 30 clusters). If you see many clusters with a small number of households, combine the clusters to create larger clusters (e.g., combining 2-3 blocks or villages). The only requirement is that clusters be all-inclusive and non-overlapping. If this method is chosen, it is critical that the change occurs before starting the first stage of cluster sampling.

OTHER SAMPLING METHODS

As you may recall from the previous section, sampling is used when information on everyone from the sampling frame in a population cannot be obtained easily or when logistical challenges arise. Sampling efficiently yields information about a large population by extrapolating data from a representative sample of the population. While modified two-stage cluster sampling is the

recommended method when conducting an RNA, other probability-based sampling methods are available that you may find helpful.

Simple Random Sampling

Each unit (e.g., household) in the population is identified, and each unit has an equal chance of being in the sample. This method requires a comprehensive list of every household in the sampling frame. The following are key conditions for simple random sampling:

- The selection of each unit is independent of the selection of every other unit
- Selection of one unit does not affect the chances of any other unit

This method will take more time to complete than the two-stage cluster method due to the lack of geographical clustering of samples. More information about simple random sampling is presented by Peter K.Wingfield-Digby, Rapid Assessment Sampling in Emergency Situations, at http://www.unicef.org/eapro/Rapid_assessment_sampling_booklet.pdf

Systematic Random Sampling

Each unit (e.g., household) in the population is identified, and each unit has an equal chance of inclusion in the sample. You may use systematic random sampling when you can order or list sampling units (i.e., individuals or households) in some manner (e.g., logical geographic order, from one end of the village to the other). Rather than selecting all subjects randomly, determine a selection interval (e.g. every fifth household), select a starting point on the list picked at random, and select every nth household (where n = the sampling interval) on the list. Systematic random sampling assures good geographical distribution according to population density. Systematic sampling also allows better representation than simple random sampling, assuming no cyclic pattern in the distribution of sampling units (which would be extremely rare). More information about systematic random sampling is presented by Peter K.Wingfield-Digby, Rapid Assessment Sampling in Emergency Situations, which can be found at http://www.unicef.org/eapro/Rapid assessment_sampling booklet.pdf.¹⁸

Stratified Sampling

The target population (sampling frame) is divided into suitable, non-overlapping subpopulations, or strata. A stratum is a subset of the population that shares at least one common characteristic. Each stratum should be homogeneous within and heterogeneous between. A random or systematic sample is then selected within each stratum. Therefore, separate estimates can be obtained from each stratum, and an overall estimate obtained for the whole population defined by the strata. The value of stratified sampling is that each stratum is more accurately represented, and overall sampling error is reduced. More information about stratified sampling is

 ¹⁷ UNICEF. Rapid assessment samplingin emergency situations. Bangkok: UNICEF; 2010. [cited 2014 October 24]. Available from: http://www.unicef.org/eapro/Rapid_assessment_sampling_booklet.pdf.
 ¹⁸ *ibid*

in Peter K.Wingfield-Digby's Rapid Assessment Sampling in Emergency Situations, at http://www.unicef.org/eapro/Rapid_assessment_sampling_booklet.pdf.



Lead a discussion to review lessons learned. Complete the Knowledge Check and Discussion Questions #8 and #9. To guide additional discussion, you may use the question and suggested answers in the red box. (30 minutes)

Potential Discussion Question

Why do we sample? What are some types of sampling methods?

Possible answer:

Sampling efficiently yields information about a large population by extrapolating data from a representative sample of the population. While modified two-stage cluster sampling is the recommended method when conducting an RNA, other probability-based sampling methods are available including simple random sampling, systematic sampling, and stratified sampling.



DISCUSSION QUESTION #8

What are some of the challenges affecting sample selection and size?

- Cluster Accessibility: Because of storm damage, unsafe conditions, or restricted entries, you or your interview team might encounter difficulty completing all of the interviews for the 30 clusters;
- Clusters with Fewer Than 7 Households: You might encounter clusters with fewer than 7 households, which will make it impossible for interview teams to interview the recommended 7 households from that cluster.

DISCUSSION QUESTION #9

What is the difference between simple random sampling, systematic random sampling, and stratified sampling?

Simple random sampling

- Selection of each unit is independent of the selection of every other unit.
- Selection of one unit does not affect the chances of any other unit. This method requires a comprehensive list of every household in the sampling frame.
- Simple random sampling might take more time to complete due to the lack of geographical clustering of samples.

Systematic random sampling

- Use systematic random sampling when you can order or list individuals or households (sampling units) in some manner.
- Rather than selecting all subjects randomly, determine a selection interval and a starting point on the list picked at random, then select every nth household, person, etc. on the list (where n = the sampling interval).
- You can assure good geographical distribution (according to population density). Systematic sampling allows better representation than simple random sampling (assuming no cyclic pattern in sampling unit distribution, which would be extremely rare).
- Systematic random sampling requires a comprehensive list of every household in the sampling frame.

Stratified sampling

- When conducting stratified sampling, divide the target population into suitable, non-overlapping subpopulations (strata). Each stratum should be homogenous within and heterogeneous between. Then select a random sample within each stratum
- Separate estimates can be obtained from each stratum and an overall estimate obtained for the whole population. The value is that each stratum is accurately represented and overall sampling error is reduced

Instructions: Depending on the size of the group, tell learners to complete this exercise individually, with a colleague, or as part of a small group. Instruct them to read through the case study and answer the questions. Have learners record their answers in the space provided. Once completed, review the exercise and discuss possible answers.

TIME: up to 15 minutes to complete, then reconvene the group to discuss the answers (up to 10 minutes)



PRACTICE EXERCISE #2

In this practice exercise, you will apply the concepts learned so far in Lesson 2. Please recall the flooding scenario (page 15) and answer the questions.

Flooding in a Southeast Asian country, continued

[See page 15]. As a result of the large number of people displaced, reported dead, injured, or missing due to flooding, gathering exhaustive information is difficult.

What sampling method would you use to determine health- and safety-related needs of those impacted by the flooding? Why?

Two-stage cluster sampling

This method is often more practical than a simple random sample, which requires numeration of all households in the sampling frame. Two-stage cluster sampling provides a way to collect information from a relatively small sample size yet provides reasonable estimates for an entire population. This sampling method also allows for increased efficiency (e.g., less driving time) and thus can be more timely and cost-effective. **Independent Reading**: Tell learners to read the next sections of Lesson 2 – Develop the RNA Questionnaire and Forms and Structuring an RNA Questionnaire – until they see the STOP sign (pages 28-33).

TIME: 30 minutes

DEVELOP THE RNA QUESTIONNAIRE AND FORMS

In addition to identifying the assessment area(s), you should work with stakeholders (e.g., local authorities, subject matter experts) to finalize the assessment questions as well as to determine the best data collection option (i.e., paper forms or electronic devices). The RNA field interview teams should carry all required forms in the field. These forms include the following:

- Questionnaire/interview
- Tracking form
- Introduction letter or consent script
- Confidential referral form

Developing the RNA Questionnaire



In the aftermath of a disaster, accurate and low-cost, population-based information about the affected community's general safety and health needs is critical. A questionnaire is developed to identify rapidly the need for basic necessities such as food, water, electricity, shelter, and access to medical care. The RNA questionnaire is used to gather the right information to determine the magnitude of the need and to plan and drive relief efforts.

As such, before you begin to develop the questionnaire, you must first identify the RNA's

objective, scale, and scope as agreed on by local authorities, subject matter experts, and other key stakeholders. Such agreement will ensure understanding of the work to be undertaken, anticipated time frame, and questionnaire priorities. This is the crucial first step, as all other questionnaire aspects stem from it.²⁰

It is important to collect only data that will be used. Define what you need to know (not what you would like to know) and consider cost, speed, and availability of resources.

²⁰ Connolly MA, editor. Communicable disease control in emergencies: a field manual. WHO; 2005. [cited 2013 Sept 3]. Available from:

http://www.who.int/diseasecontrol_emergencies/publications/9241546166/en/index.html.

Structuring an RNA Questionnaire

Once you have determined the assessment's scope and objective, you are ready to begin building the questionnaire. The RNA questions will be at the *household level*, including those pertaining to the health status and behavioral/mental health of inhabitants within a household (e.g., does anyone in the household have a cough?).

Questionnaires should be simple, short and ideally limited to 10-15 minutes (generally, a two-page questionnaire). Consider the following when developing questions: Questionnaire objectives and questions should **SMART**:

- **S**pecific clear and unambiguous
- **M**easurable concrete criteria for measuring
- Attainable realistic
- **R**elevant specific to the situation
- **T**ime-bound limited to a time-frame
- Avoid open-ended questions and only ask for information that will meet the assessment objectives. In general, yes/no and multiple choice questions are the best options for obtaining the needed information most efficiently. Examples of an openended and closed-ended (preferred) question are provided below.

Open-ended question: Since the disaster, what types of injury have you or a member of your household sustained?

Close-ended question (preferred): Since the disaster, have you or a member of your household sustained a broken bone?

_Yes ___ No ___ Don't Know ___Refused

- Consider including the following categories within the two-page questionnaire:
 - o Location of the household
 - Household type (e.g., single family home) and extent of damage to the dwelling
 - o Household needs (e.g., food, water, medicine, first aid)
 - o Household members' physical and behavioral health status
 - o Greatest need
- Consider the comfort level of both the interviewer and the respondent. If questions are too personal, the respondent might refuse or be uncomfortable answering, which might lower the response rate.
- Pilot test the questionnaire (i.e., practice the interview with others who have not been involved in the development) for acceptability, comprehension, and appropriate order to identify any confusing questions and to estimate the length of time necessary to complete the interview.

If possible, use existing questionnaires with demonstrated reliability and validity in your population. Existing questionnaires will save you time and allow you to compare your data with other data. The following resources may provide additional pretested questions from local or international organizations that you can use to develop your own questionnaire:

- WHO
- Demographic and Health Survey (DHS)
- CASPER Toolkit, Appendix B (question bank) and Appendix C (preparedness template that can be used for disaster planning
- CDC surveys such as the Behavioral Risk Factor Surveillance System (BRFSS), Pregnancy Risk Assessment Monitoring System (PRAMS), National Health and Nutrition Examination Survey (NHANES), National Health Care Survey, National Health Interview Survey

Data Collection Options

There are two options for collecting data from the field: paper forms and electronic devices. You should consider the advantages and disadvantages to both, given the objectives and the nature of your questionnaire. As Table 3 summarizes, paper forms can be labor-intensive in the data entry process while electronic devices can be labor-intensive in the development stage. Also, the potential for error lurks at different stages in the paper versus the electronic formats. Regardless of the data collection method you choose, pilot testing the questionnaire is essential before deployment to the field.

	Advantages	Disadvantages
Paper form	 No technical training Relatively cheap supplies Requires paper, pens, and clipboards No maintenance of supplies No limitation on number of teams Faster to fill during an interview 	 Relatively slow data management process (i.e., requires data entry after fieldwork) Can be labor-intensive to enter data into database after fieldwork Potential for human error
Electronic form	 Can provide real-time data quality checks Quicker data management process (i.e., no data entry required after fieldwork) 	 Technical training required May be expensive to purchase the hardware and software May incur costs if broken, dropped, or water-damaged Requires data collection devices, battery chargers, and electricity in the field

Table 3. Data collection options advantages and disadvantages

Necessitates maintenance and care of software and devices
Can be labor intensive to develop in advance of fieldwork
Unavailability of equipment may limit the number of teams
May distance the interviewer from the interviewee

RNA Forms in the Field

The RNA interview team should ensure the following forms are included in the field packet and have been properly reviewed before going into the field. Table 4 contains the necessary forms.

Form	Definition	Key Consideration
Tracking form	Used to monitor the outcome of	The field interview teams should
	every interview attempt and is the	use the reverse side, or second
	basis for calculating the response	page, of the tracking form to take
	rates. The form will allow the RNA	notes in the field including
	team to collect information about	households that need to be
	each household selected, even	revisited. When the RNA is
	those that are inaccessible. Field	complete, the tracking form should
	interview teams should record each	be destroyed so there is no way to
	household selected and the	link addresses to specific
	interview outcome	questionnaires.
	See RNA (CASPER) Toolkit, Append	dix E for a copy of the tracking form.
Introduction and	When arriving at the household, the	A script written for the field
consent script	team should be prepared to give an	interviewer teams to recite from is
	introduction and obtain verbal	helpful. The script can be
	consent. The survey participant	memorized or read to respondents.
	must give explicit verbal consent to	The script should be kept brief,
	participate in the interview. Written	printed on official letterhead, and
	consent is typically not required	given to each selected household.
	because obtaining a signature	This form should include a phone
	leads to increased confidentiality	number for the health department
	risk for the participant.	or agency responsible for the RNA.
	See RNA (CASPER) Toolkit, Append	lix G for an example of an

Table 4. RNA forms in the field²¹

²¹ CDC. Community Assessment for Public Health Emergency Response (CASPER) Toolkit, Second edition. Atlanta (GA); 2012.

	introduction and consent script.	
Confidential	Field interview teams must be	This form should be immediately
referral form	prepared to respond if they come	communicated to the RNA
	across an urgent need that	leadership staff for rapid follow-up
	presents an immediate threat to life	and communication with previously
	or health. Typically, teams that	identified health service providers
	encounter a household with urgent	in the area (e.g., mental health) or
	needs should encourage or assist	response agencies involved in
	the household to call emergency	addressing immediate needs
	services. In the event that calling	during disasters.
	emergency services is not	
	appropriate or possible, the teams	
	should complete a confidential	
	referral form.	
	See RNA (CASPER) Toolkit, Append	lix F for a sample of a confidential
	referral form.	
Leave behind	The field interview team can help	Handouts should include a list of
handouts and	distribute vital public health	key contact names and numbers
public health	information to the community (e.g.,	were people can get help and
material	health education on carbon	updated information about the
	monoxide poisoning prevention,	disaster including, but not limited
	proper cleanup methods, and	to, shelters or places to get medical
	contact information for disaster	care, food, electricity, and so on.
	services). Handouts should be	This information should be given
	prepared in advance and provided	out regardless of participation
	to all interviewed households and	status and can also be given to
	interested community members.	interested community members
		who were not selected to be in the
		assessment.
	<u> </u>	



Lead a discussion to review lessons learned. Complete the Knowledge Check and Discussion Questions #10 and #11. To guide additional discussion, you may cover content covered in Table 3 and Table 4. (20 minutes)



Independent Reading: Tell learners to read the next sections of Lesson 2 – Identify and Train Field Interview Teams and Conducting the Interview– until they see the STOP sign (pages 34-38).

TIME: 30 minutes

IDENTIFY AND TRAIN FIELD INTERVIEW TEAMS

Face-to-face interviews are used to conduct the RNA questionnaire. Therefore, field interview

teams must be selected and trained to administer the questionnaires in the field. Training field interview teams on how to administer the questionnaire is vitally important in ensuring the validity of the results. Important considerations in assembling and training a field interview team are discussed in this section.

Forming Field Interview Teams

The field interview team – the people who conduct the RNA in the field – should ideally be a multidisciplinary, qualified group representing a wide range of expertise and with previous experience conducting interviews. For example, a team to assess the health needs of an

affected population would ideally include people from one or more of the following fields: public health and epidemiology, nutrition, logistics, and environmental health.

Take into account the following criteria when selecting team members.²²

- Familiarity with the region or population affected
- Knowledge of and experience with the type of disaster being assessed
- Capacity for teamwork and local acceptability for those recruited from abroad
- Analytical skills, particularly the ability to see trends and patterns
- Capacity to make decisions in unstructured situations using relatively sparse data

Each field interview team should be a mix of gender, experience, and profession. For example, males paired with females, locals paired with external partners, experienced persons paired with inexperienced persons, and students paired with professionals or seasoned volunteers. This will

²² WHO. Rapid Health Assessment Protocols for Emergencies website. http://www.who.int/diseasecontrol_emergencies/publications/9241546166/en/index.html. Accessed September 25, 2013.

The RNA field interview team differs from the RNA assessment team. The field interview team conducts the interviews in the field and the assessment team prepares for the RNA (e.g., identifies the assessment area(s), defines the scope and nature of the questionnaire, develops the questions). help to ensure an even distribution among the teams as well as promote a safe work environment.

Size of Field Interview Teams

Identify approximately 20-30 persons to conduct the RNA in the field. These persons should be divided into separate teams, with at least two persons in each team, for a total of 10 to 15 teams. The number of teams will dictate the amount of



Table 5. Considerations for the number of field interview teams

Small Number of Field Teams (<10)	Large Number of Field Teams (≥10)
 May be easier to identify required staff and train 	 May be difficult to identify enough staff and train
	 Can solicit broader participation across participating organizations
Data collection will take more time	Data collection will take less time
Less equipment is needed (e.g., vehicles, electronic devices)	 Requires additional coordination and equipment (e.g., data collection devices, battery chargers in the field)

Once the field interview teams are in place, hold an introductory meeting to allow members a chance to exchange contact information, become familiar with each other's roles and skills, and receive training.

Training the Field Interview Teams

Training the field interview teams is one of the most important aspects of conducting the RNA. Poorly trained teams could collect or report the data inaccurately, thus jeopardizing the results and misrepresenting the affected communities needs. Therefore, it is important that all field interview teams be trained to conduct an RNA properly. Conduct a three- to six-hour just-in-time training either one day in advance or on the morning of the first day of field data collection. At the end of the training, field interview team members should be familiar with the following:

- The RNA's objectives
- Each team member's roles and responsibilities
- The questionnaire and the information that each question elicits
- The sampling methodology and key considerations
- Future meeting times and places, including the debriefing process

- How to deliver the interview introduction and consent script
- Situations requiring immediate referral
- Safety instructions and a general awareness of potential hazards such as flood water, downed power lines, or unattended animals
- Hazards to look for such as improper generator use
- How to complete the necessary forms for every household at which contact was attempted

For a complete sample agenda, please see the Community Assessment for Public Health Emergency Response (CASPER) Toolkit, Appendix H²³.

CONDUCTING THE INTERVIEW

Because an RNA is conducted at the household level, you should select one adult household member (i.e., 18 years of age or older) to speak for all household members. The field interview team should use its best judgment to select the person to be interviewed. The general rules for selecting such a person are as follows:

- Any adult regardless of sex, race, ethnicity, or religion can be selected
- If more than one adult is present, the interviewer can allow the household members to self-select or the interviewer may make the choice
- The selected person should understand that he/she is reporting on the entire household and not on just themselves

Interview Tips

Before going to the field, interview team members should assign and clearly understand roles and responsibilities of each member (e.g., driving, navigating, interviewing). More specifically, we recommended that the local member conduct the interview and make the initial contact with the selected household. The household may be more willing to take part in the interview if it is led by a local representative. Local representatives are typically seen as trustworthy advocates who have the best interests of the community in mind. The assigned interviewer should practice the questionnaire with his/her partner so that both are familiar and comfortable with the questions (e.g., wording of the questions, intent of the questions, skip patterns).

Before going into the field, interview team members should also decide where to conduct the interviews. Specifically, decide beforehand whether household interviews will be conducted in an area outside the home protected from hazards (e.g., front porch) or inside the home. The decision is at the discretion of the team and should take into account the comfort level and personal safety of both team members. An area outside the home, however, is the preferred interview location.

²³ CDC. Community Assessment for Public Health Emergency Response (CASPER) Toolkit, Second edition. Atlanta (GA); 2012.

The following table provides a general guideline for a successful interview and includes suggested tips to build rapport, minimize response bias, and encourage open dialogue.



Table 6. RNA interview tips²⁴

Building Rapport		
Act professionally	 Dress appropriately including modest clothing, flat shoes, and no excessive jewelry 	
	Refrain from eating, drinking, or chewing gum during the interview	
Establish legitimacy	Deliver introductions according to the consent script	
	 Ensure proper identification, including badges which should remain visible to the respondent at all times 	
Show empathy and	Convey a sense of empathy and respect	
respect	 Establish eye contact, display confidence, and an approachable demeanor 	
	 Express interest in the respondent's answers 	
	• Be an active listener while remaining patient if/when a respondent is having a difficult time answering questions; remember, the respondent is using his/her time to help ensure the success of the RNA	
	Minimize Response Bias	
Standardize questions	 Ask questions in the same manner for each interview; read questions exactly as they are written Do not attempt to "improve" a question by altering a few words or not reading the question in its entirety. This could change the question's entire meaning Do not omit questions (e.g., if the team member "knows" the answer or thought he/she heard it) Do not finish a respondents sentences Do not "prefill" answers to questions (e.g., if the respondent answered a question in another conversation) 	
Allow participants to think	 Give respondents time to express themselves while keeping the interviews at a steady pace 	

Encourage the Respondent		
Clarification of questions	 If the respondent needs clarification, repeat the question first and then elaborate if needed 	
	 If the respondent is not fully satisfied with the answer choices, encourage him/her to select the one that fits best without leading 	
	 If any confusion remains, team members should write down exactly what was said so that the confusion can be addressed with the RNA assessment team 	
Probing techniques	 If a question is open-ended, ask the respondent to elaborate as a way to obtain additional information, if necessary. For example, an interviewer can ask "Is there anything else you would like to add?" 	
	 Do not direct a respondent toward an answer, use overt encouragement, or remind a respondent of an earlier remark if the answers differ from what the team expects 	
	 Remain neutral and, if necessary, repeat the response – a technique that can lead to clarification or improve recall 	

At the end of the interview and before leaving the household, team members should review the entire questionnaire to ensure that all questions have been answered. The team members should record any confusion or concern about questions during the interview and share the confusion or concern with leadership staff. Remember to thank the respondent, to leave the handouts and other public health information, and to refrain from leaving in haste. Before leaving, review the questionnaire again for missing information and complete the tracking form.



Lead a discussion to review key lessons learned. Complete the Knowledge Check and Discussion Question #12. To guide additional discussion, you may use the question and suggested answers in the red box. (15 minutes)

Potential Discussion Question

Why do we train field interview teams?

Possible answer:

Training the field interview teams is one of the most important aspects of conducting the RNA. Poorly trained teams could collect or report the data inaccurately, thus jeopardizing the results and misrepresenting the affected community's needs. Conduct a three- to sixhour just-in-time training either one day in advance or on the morning of the first day of field data collection (see bulleted list above for topics to cover)



KNOWLEDGE CHECK

Which of the following is NOT an interview tip when conducting an RNA?

- A. Convey a sense of empathy and respect
- B. Give respondents time to answer questions

C. Prefill answers to questions when you have heard the respondent previously answer the question

D. Ask questions in the same manner for each interview

DISCUSSION QUESTION #12

What are some things to consider when deciding the number of field interview teams to have for your RNA?

You will need approximately 20-30 persons to conduct the RNA in the field (10-15 teams). The number of teams will dictate the amount of time needed to conduct the RNA; fewer teams require a longer time to collect the data, while more teams allow for a shorter data collection period. You should also take into account the availability of equipment needed. For example, larger numbers of field interview teams require more equipment such as vehicles and electronic data collection devices (if necessary).

- Small Number of Teams may be easier to identify needed staff, data collection will take more time, less equipment needed
- Large Number of Teams may be more difficult to identify needed staff, data collection will take less time, more equipment needed
PRACTICE EXERCISE

Instructions: Depending on the size of the group, tell learners to complete this exercise individually, with a colleague, or as part of a small group. Instruct them to read through the case study and answer the questions. Have learners record their answers in the space provided. Once completed, review the exercise and discuss possible answers.

TIME: up to 30 minutes to complete, then reconvene the group to discuss the answers (up to 20 minutes)



PRACTICE EXERCISE #3

In this practice exercise, you will apply the concepts learned in Lesson 2. Please recall the flooding scenario (page 15) and answer the questions.

Flooding in a Southeast Asian country, continued

[See page 15]. As previously mentioned, the local government requested interagency assistance from NGOs, MOH, and other key partners to determine the health and general needs of the affected population. This request was met and an RNA assessment team were formed to prepare for the assessment.

Develop 10 questions to collect information on immediate needs and health-related issues of the affected provinces.

Question topics to consider include demographic characteristics, damage to houses, utilities, general and mental health status, interruption of electricity (power) and communication in affected places, destroyed water supply systems in heavily affected areas, and exposure to floodwaters. <u>Ensure they are asked at the **household** level</u>

What are some considerations for selecting field interview team members?

The field interview team should include a multidisciplinary group of qualified personnel representing a wide range of expertise and previous interviewing experience. Ideally, select team members who have

- Familiarity with the region and affected population
- Knowledge of and experience with floods and monsoons
- Analytical skills, particularly the ability to see trends and patterns of adverse health effects generally seen in post-flood settings

Each field interview team should include a mix of individuals across sex, experience, and profession.

During the predeployment training, field interview team members were briefed on safety issues they might encounter in the field. What types of personal safety issues may someone encounter after a monsoon? What personal supplies should teams take into the field?

Interview teams were advised not to go into areas they believed might expose them or their team to safety risks, and the team was educated about personal safety issues. Examples of safety concerns include the following:

- Road inaccessibility and bridge collapse
- Downed power lines
- Nonfunctioning traffic lights
- Domestic and wild animals
- Safe judgment in entering homes
- Debris down trees, twisted metal, etc.
- Flood water
- Increased vectors (e.g., mosquitoes)

Teams were also made aware of personal health issues, such as flood or contaminated water exposure and personal supplies they should take to the field (e.g., hat, gloves, coat, sturdy closed-toe shoes, snacks, water).

After you are completed with the scenario, summarize the key learning points from Lesson 2 outlined in the Lesson 2 Summary

LESSON 2 SUMMARY

As you have learned in this in this lesson, an RNA is a useful tool to provide local, state, and other decision-makers with the health status and basic needs of a population affected by a disaster. During a disaster, the results of an RNA help to plan and implement response activities. Thus it is important to properly identify the geographical areas under assessment, as well as consider all of the factors affecting questionnaire development and properly train the field interview team. With the scarce resources and damaged infrastructures typically found in a disaster setting, the need is critical to provide accurate information to decision-makers who allocate resources and implement relief efforts

LESSON 3: PHASE 2 – CONDUCTING AN RNA

Lesson 3: Phase 2 – Conducting an RNA

Overview: This lesson focuses on planning for disaster surveillance, considerations for designing or using existing surveillance systems, and morbidity and mortality surveillance during a disaster

Total Estimated Time: approximately 1.5 hours

Reading and Activities: up to 15 minutes

Group Discussion: up to 20 minutes

Practice Exercise: 50 minutes, including a 20 minute review

INTRODUCTION

Independent Reading: Tell learners to read the first two sections of Lesson 3 – Introduction and Administering the Questionnaire in the Field – until they see the STOP sign (pages 41-43).

TIME: 15 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

As discussed in Lesson 2, the method for conducting an RNA is the face-to-face interview. As part of phase 2, *Conducting an RNA*, to conduct a successful interview in the field, interview teams must follow several steps. In this lesson, we discuss the steps interview teams need to follow.

After completing this lesson, you will be able to do the following:

- Explain the interview steps that should be followed in the field
- Discuss field awareness



ADMINISTERING THE QUESTIONNAIRE IN THE FIELD

To administer the questionnaire safely and accurately, field interview teams must follow the approved interview guidelines and steps.

Interview Steps in the Field

The flowchart in Figure 3 shows the general steps for conducting an RNA in the field.





Considerations while in the Field

Fieldwork requires awareness of the environment, use of personal judgment, and a positive and flexible outlook. Table 7 depicts five considerations for interview team members to keep in mind while in the field.

	Building Rapport
Think safety	Despite all the preparation necessary before conducting an RNA in the
	field, unexpected problems may arise. Interview teams should
	 receive briefings about potential safety concerns, such as downed power lines, unsafe road blockages, unattended pets, and other potential hazards;
	 use personal judgment when assessing any safety concerns and contact the RNA leadership about any concerns that arise; and
	 communicate with RNA leadership frequently to ensure safety.
Remain flexible	As with all disaster relief efforts, flexibility is important. Various
	responsibilities need to be shared, such as transportation logistics,
	interviewing, and tracking. Team members should remember that

	 plans can always change so field interview teams may switch members, may swap clusters, or may be asked to take on an additional cluster; and a positive attitude is key
Adhere to the	To ensure data quality and representativeness, adherence to the RNA
methodology	methodology is vital. Adherence includes
	 randomly selecting households within clusters and conducting interviews in a standard, structured manner;
	 following the assessment procedure and guidelines covered in the just-in-time training; and
	 calling the RNA team leadership office (field headquarters) if you have any questions
Be respectful	Field interview team members going into a community should remember
	to be respectful to the respondents and to the community. They should
	 read the provided script its entirety, answer any questions the household respondent might have, and allow the respondent to quit at any time if the respondent so requests; and
	 consider cultural norms and practices when selecting the time and the day to conduct interviews. Always remember that the respondent has just suffered through a disaster
Understand	Field team members should understand and accept their own personal
personal limitations	limitations, whether those limitations involve a personal comfort level
	when entering a household, time limitations of being in the field, or a
	team member's physical condition.

RNA Debrief

After the field data collection is complete, a debriefing meeting with all of the team members is a recommended step. The meeting will help to identify lessons learned and suggest improvements. Team members should share their anecdotes, observational information, lessons learned, or concerns not captured on the questionnaire for inclusion in the final report(s). Table 8 includes sample debriefing questions to collect information from RNA teams.

Table 8. Sample debriefing questions

Example Questions

- In your opinion, what went well? What did not go well?
- To what extent do you think this assessment will be useful to your community in responding to this emergency?
- Did you think you were prepared (e.g., training, food, safety, communications, supplies)

for your assignment?

- Would you want to participate on a team in the future?
- If we were to do this assessment again, what improvements can we make?
- Did you learn anything from this experience?
- Did you have specific problems with any of the tools or methods used (e.g., questionnaire, tracking form, selecting individual house)
- Please provide any additional comments.



Lead a discussion to review key lessons learned. To guide the discussion, you may use the questions and suggested answers in the red box. (20 minutes)

Potential Discussion Questions

What are some considerations for field interview team members to keep in mind while they are in the field?

Possible answer:

- Think safety: know potential safety concerns, use personal judgment to assess safety. Communicate frequently with RNA leadership and team members.
- Remain flexible: plans can change; team members and clusters can change at the last minute. Remaining flexible while keeping a positive attitude is important.
- Adhere to the methodology: this helps to ensure quality and that data are representative. Just-in-time training helps make sure teams adhere to assessment procedures.
- Be respectful: read the provided script entirely. Answer questions and allow the respondent to quit at any time. Consider cultural norms and practices when selecting interview times and days.
- Understand personal limitations: field team members should understand and accept their own personal limitations, whether those limitations involve a personal comfort level when entering a household, time limitations of being in the field, or a team member's physical condition

Why should you conduct a debrief once field data collection is complete?

Possible answer:

Debriefing after an RNA helps to identify lessons learned and improvements to future assessments. These meetings allow team members to share anecdotes, to exchange observational information, lessons learned, or concerns not captured in the questionnaire

PRACTICE EXERCISE

Instructions: Depending on the size of the group, tell learners to complete this exercise individually, with a colleague, or as part of a small group. Instruct them to read through the case study and answer the questions. Have learners record their answers in the space provided. Once completed, review the exercise and discuss possible answers.

TIME: up to 30 minutes to complete, then reconvene the group to discuss the answers (up to 20 minutes)



PRACTICE EXERCISE #4

In this practice exercise, you will apply the concepts learned in Lesson 3. Please recall the flooding scenario (page 15) and answer the questions.

Flooding in a Southeast Asian country, continued

[See page 15]. RNA interview teams were selected, appropriately trained, briefed on the conditions related to impassable roads and bridges, damaged hospitals, limited electricity and water, and are ready to begin the RNA

What are the interview steps in the field?

- Locate the cluster
- Select starting point
- Randomly select a house (determine whether it is accessible or in accessible)
- If accessible, read intro script and obtain consent (available) or deem unavailable or nonconsenting (unavailable)
 - o Complete the interview
 - o Identify urgent needs
 - o Complete tracking form
 - Fill out referral form, if needed
- Move to the next randomly selected house repeat until you have completed 7 interviews in the cluster
- If the house is inaccessible, complete tracking form and move to the next randomly selected house repeating until 7 interviews in the cluster are complete

What are some of the safety concerns in the field?

Some examples include downed power lines, unsafe road blockages, unattended pets, flood waters, and other potential hazards

Why is debriefing important?

Debriefing is important—it provides an opportunity to identify lessons learned and improvement areas. Team members can share their anecdotes, exchange observational information, lessons learned, or concerns not captured on the questionnaire, all for inclusion in the final report(s).

After you are completed with the scenario, summarize the key learning points from Lesson 3 outlined in the Lesson 3 Summary

LESSON 3 SUMMARY

In this lesson, we explore proper interview techniques by the RNA team while in the field. The interview guidelines that the interview teams are required to adhere to are defined, as well as several important considerations while in the field. Fieldwork often requires an astute awareness of the environment, the use of personal judgment, and a positive and flexible outlook. For example, the interview teams should always be mindful of personal safety (e.g., avoiding downed power lines), remain flexible, and understand their personal limits. After completing RNA field activities, we recommend that team members meet to discuss the process, lessons learned, and areas for improvement.

Lesson 4: Phases 3 and 4 – Data Entry, Analysis, and Writing the Report

Overview: This lesson focuses on planning for disaster surveillance, considerations for designing or using existing surveillance systems, and morbidity and mortality surveillance during a disaster

Total Estimated Time: 5.25 hours

Reading and Activities: up to 75 minutes

Group Discussion: up to 50 minutes

Practice Exercise: 50 minutes, including a 20 minute review

Optional Data Exercise: up to 140 minutes

LESSON 4: PHASES 3 AND 4 – DATA ENTRY, ANALYSIS, AND WRITING THE REPORT

Independent Reading: Tell learners to read the first two sections of Lesson 4 – Introduction and Data Entry and Analysis – until they see the STOP sign (pages 46-48).

TIME: 15 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

INTRODUCTION

In lesson 3, you learned how to define the scope and nature of the questionnaire and how to design the questionnaire. Now we will cover phases 3 and 4, *Data Entry and Analysis*, and *Writing the Report*. We will discuss the process for analyzing data collected from a questionnaire using a statistical software package and learn how to use a preliminary and final reporting structure to report the results from the questionnaire and the data analysis.

After completing this lesson, you will be able to do the following:

- Discuss the considerations for using paper versus electronic devices for data entry
- Describe the method for analyzing data
- Understand the use of weighted analysis
- Describe the process for writing a preliminary and final report of the RNA findings

DATA ENTRY AND ANALYSIS

You will use statistical software packages to analyze data collected from both paper and electronic questionnaires. Although a variety of statistical software packages are available, we recommend Epi Info[™] software: it is user-friendly and free of charge. Any statistical software package is acceptable as long as it allows you to "weight" data (e.g., SAS). Weighting data is a key requirement for any software package considered for an RNA data analysis.

Data Entry

To ensure the quality of data collected, whether electronically or paper-based, consider how you will enter and analyze the data. Table 9 details considerations for entering and analyzing data.

Table 9. Considerations for data entry.²⁶

	Paper Form	Electronic Device
•	Enter into an electronic dataset using software that is familiar, easily accessible, and maintainable	 Merge collected data into a single file that statistical software can analyze (e.g., Epi Info[™], SAS)
•	Build data entry platform before conducting fieldwork	
•	Provide training for data entry staff to enter data accurately	

Data Analysis

To adjust the data to account for a complex sampling design, such as the two-stage cluster sampling methodology, **weighted**

frequencies are used to represent the entire target population (i.e., the sampling frame). Note that in most cases, nonweighted analyses will not represent the entire target population and may bias estimates.

For tutorials in creating the database, entering data, and running analysis, please visit the CDC's Epi Info[™] website at <u>http://wwwn.cdc.gov/epiinfo/user-guide/</u> and follow the User Guide

Remember, households selected in cluster sampling have an unequal probability of selection. To avoid biased estimates, data analyses should include a mathematical weight for selection probability. Weighting involves assigning a weight for each household for which an interview is completed. The weight is based on the household's probability of selection. Once all data are merged into a single electronic dataset, a weight variable is added to each surveyed household by use of the formula in Figure 4 (see DEMO data)

Figure 4. Weight variable formula					
Woight -	Total number of households in the sampling frame				
weight =	(number of households interviewed in cluster) * (number of clusters selected)				

The numerator is the total number of households in the sampling frame; that number will be the same for every assessed household. Remember, the sampling frame is defined as the entire assessment area in which the RNA is conducted.

In only one instance will all the weights be equal. If you complete seven interviews in each cluster, then each household will receive the same weight – assigning weighting will not be required. For example, if information was obtained from exactly seven households in 30 clusters, the denominator for every household would be 7 (number of interviews) * 30 (number of clusters selected) which equals 210. In this case, the sample itself was weighted because all households in the sample had an equal probability of being selected. This outcome is possible, but unlikely to occur.

The more likely scenario is to have households where people are not home, households refuse to participate, or insufficient households in the clusters. When this occurs, the denominator will be different for each surveyed household depending on the cluster from which the household was selected. Households from the same cluster will have the same weight, but weights will differ between clusters. For example, if only five completed interviews occurred in a cluster, the denominator of the weight for each of the five surveyed households would be 5 (number of interviews) * 30 (cluster size) = 150.



Lead a discussion to review key lessons learned. Complete the Knowledge Check and Discussion Question #13. To guide additional discussion, you may use the question and suggested answers in the red box. (15 minutes)

Potential Discussion Question

How do you adjust for a complex sampling design such as cluster sampling? Possible answer:

To adjust the data to account for a complex sampling design, such as the two-stage cluster sampling methodology, weighted frequencies are used to represent the entire target population (i.e., the sampling frame). Note that in most cases, nonweighted analyses will not represent the entire target population and may bias estimates. Remember, households selected in cluster sampling have an unequal probability of selection. To avoid biased estimates, data analyses should include a mathematical weight for selection probability. Weighting involves assigning a weight for each household for which an interview is completed. The weight is based on the household's probability of selection



KNOWLEDGE CHECK

True or **False**. Providing training for data entry staff to enter data accurately is a consideration for electronic data entry. **This is a considerations for paper-based data entry**

Which statement(s) are true about weighted analysis. (you may select more than one answer)

A. Weighted analyses are meant to account for a complex sampling design, such as two-stage cluster sampling.

- B. Weighted analyses are done to avoid biased estimates
- C. Weighting is always required
- D. Weighted analyses are completed by assigning a weight for each

DISCUSSION QUESTION #13

What is the formula for weighting data?

Total number of households in the sampling frame

Weight =

(number of households interviewed in cluster) * (number of clusters selected)

Independent Reading: Tell learners to read the next section of Lesson 4 – Example of Applying Weights – until they see the STOP sign (pages 49-55).

TIME: 40 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

Example of Applying Weights: India Tsunami

An RNA conducted in India after a major tsunami will illustrate the process of applying weights using sampling data collected from an RNA. In stage one of sampling, 30 clusters were selected representing a total of 19.370 households. The goal was to conduct 210 interviews, but only 187 were completed. Figure 5 provides a sample dataset showing the number of interviews per cluster and the assigned weight for each household interviewed. For the purpose of calculating the "weight" column (highlighted in yellow), an additional column was added, ""# interviews", to represent the number of households interviewed within the clusters (highlighted in blue). Note that the weighting formula circled in red is the same calculation with the three variables introduced above.

Figure 5. Sample dataset showing the number of interviews per cluster and the assigned weight for each house interviewed.²⁷

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3	2/7/2009	2	6	107.61	3	2			2		yes	yes	no	no
4	2/7/2009	2	6	107.61	1	1				1	yes	yes	no	no
5	2/7/2009	3	6	107.61	2	2			1	1	yes	yes	no	no
6	2/7/2009	3	6	107.61	2	2			1	1	yes	yes	no	no
7	2/7/2009	3	6	107.61	2	1			1		yes	yes	no	no
8	2/7/2009	4	7	92.24	2	2	0	0	0	2	yes	yes	no	no
9	2/7/2009	4	7	92.24	2	2	0	0	2	0	yes	yes	no	no
10	2/7/2009	4	7	92.24	2	2	0	0	2	0	yes	yes	no	no
11	2/7/2009	4	7	92.24	2	2	0	0	0	2	yes	yes	no	no
12	2/7/2009	4	7	92.24	5	6	0	2	4	0	yes	yes	no	no
13	2/7/2009	4	7	92.24	6	8	0	4	4	0	yes	yes	yes	yes
14	2/7/2009	4	7	92.24	4	7	0	0	7	0	yes	yes	no	no
15	2/7/2009	5	6	107.61	5	14	1	8	5		yes	yes	no	no
16	2/7/2009	5	6	107.61	4	4		2	3		yes	yes	no	no
17	2/7/2009	5	6	107.61	8	8		5	2	1	yes	yes	no	no
18	2/7/2009	5	6	107.61	3	3			3		yes	yes	no	no
19	2/7/2009	5	6	107.61	2	2				2	yes	yes	no	no
20	2/7/2009	5	6	107.61	2	2			1	1	yes	yes	no	no
21	2/7/2009	10	5	129.13	2	1	0	0	0	1	yes	yes	no	no
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Calculating Weighted Frequencies

After assigning weights, the next step was to calculate the frequencies for each of the interview questions. For the purposes of this RNA, EPI Info ™ was the statistical software. To calculate weighted frequencies in Epi Info[™] "classic mode," the following steps were performed (use DEMO data):

• Step 1: Import the data file with the weight just created



- Step 2: Click on "Frequencies" along the left hand column
- Step 3: In the "Frequency of" box, select variable(s) for which you would like results
- Step 4: In the "Weight" box, select the variable "WEIGHT" that was just created
- Step 5: Click "OK" (see Figure 6) and generate a report providing the estimates. ٠

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Figure 6. Frequency analysis window showing selected variables and weight

Figure 7 displays the Epi Info[™] output window with the selected variables from the previous step, followed by a table for each selection. Save the output tables and use them in the final report.

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Delete Records	No 87032.7755555577 89.56% 89.56%					
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	Total 97183 000000022 100 00% 100 00%					
📄 DefineGroup	Total 97103.00000022 100.0070 100.0070					
🗐 Undefine						
🚉 Assign	95% Conf Limits	95% Conf Limits No 89.36% 89.75%				
Recode	No 89.36% 89.75%					
Display	Yes 10.25% 10.64%					
Select	HEADACHE Frequency Percent Cum. Percent					
Cancel Select	No 84194 4149206368 86 63% 86 63%					
🗎 H	X 12000 5050000000 1000000					
🗐 Sort	Yes 12988.5850795051 15.57% 100.00%					
Cancel Sort	Total 97183.000000019 100.00% 100.00%					
Statistics						
	95% Conf Limits					
Tables	No. 86 42% 86 85%					
🗎 Means	Yes 13 15% 13 58%					
📄 Summarize	INJURY Frequency Percent Cum Percent					
Graph	The Toto Tiologood of total and total					
Advanced Statistics	No 79188.719126986 81.48% 81.48%					
	Yes 17994.280873016 18.52% 100.00%					
Kaplan-Meier Survival	Total 97183 00000002 100 00% 100 00%					

Cox Proportional Hazard

Figure 7. Example of Epi Info[™] output window showing weighted frequencies

Nonweighted frequency

To obtain nonweighted estimates, follow the above instructions but do not assign a variable in the "weight" box. Applying weights provides projected estimates that can be generalized to every household in the assessment area or sampling frame. The unweighted frequency only shows results from your RNA sample. Table 10 shows the nonweighted and weighted frequencies for a specific question from a Tsunami RNA.

Table 10. Nonweighted	and weighted frequencies	of current source	of electricity
following a tsunami ²⁸			

Sources of Electricity	Indicator	S	Sources	of Informa	ation
	Frequency	%	Frequency	%	95% CI
Power company	137	74.1	14,190	74.0	61.9–86.0
Gasoline generator	15.7	74.1	3,200	16.7	7.6–25.7
None	19	10.3	1,789	9.3	3.8–14.8

Remember that weighted analysis does not account for changes that may occur in the number of households between the time of the census and the time of the assessment (e.g., the number of households per cluster may have changed between when the census was conducted and when the RNA was conducted). Thus, despite attempts to arrive at unbiased estimates, the reported frequencies may lack precision.

Calculation of 95% Confidence Intervals

Once the weighting has been established, you will need to calculate **Confidence Intervals** (**CIs**). When conducting weighted estimates, the RNA team should use 95% CIs. CIs represent the reliability of the weighted estimate. Do the following steps to calculate a 95% confidence interval in Epi Info[™] "classic mode," (see DEMO data):

- Step 1: Import the data file into Epi Info™
- Step 2: Select "Complex Sample Frequencies" command under "Advanced Statistics" on the left hand side.
- Step 3: In the "Frequency of" box, select variable for which you interested
- Step 4: In the "Weight" box, select the "WEIGHT" variable that was created
- Step 5: in the "Primary Sampling Unit" box, select the "Cluster Number" variable
- Step 6: Click "OK" (see Figure 9) to generate a table providing confidence intervals

110



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Complex Sample Frequencies	
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Figure 9. Example of Epi Info[™] output window showing complex sample frequencies

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📄 Select	Row % 100.000
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	SE % 2.987
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E Frequencies	
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Response Rates

Calculating response rates helps determine the representativeness of the sample to the population within the sampling frame. The field interview teams collect the



information to calculate response rates (i.e., numerator and denominator) on the tracking form. This underscores the need for the teams to be well-trained in using the tracking form and to be disciplined in tracking all households selected for interview, including those for which no interview was completed or no contact was made.

To compile the tracking form data, tally the responses to each row on the tracking form. In some sections, it may be necessary to reconcile discrepancies (e.g., the interviewer may have appropriately selected both "no answer" and "door was answered" because the field interview team returned to complete a survey at a household previously selected but no one answered the door"). Select only the final designation (e.g., "door was answered") for tally and disregard the prior visits. These tallies can then be entered into a spreadsheet, illustrated in Figure 10. Each column should represent a single cluster. If more than one tracking form was completed per cluster, consider forms for the same cluster cumulative and tally them onto the same column in the spreadsheet.

A														0
	Location													
	Cluster	1	2	3	4	5	6	7	8	9	10	11	12	13
	Interviwer	Team 1	Team 3	Team 7	Team 5	Team 1	Team 9	Team 4	Team 4	Team 3	Team 11	Team 9	Team 11	Tear
	Date of Interview	9/9/2013	9/10/2013	9/9/2013	9/9/2013	9/9/2013	9/10/2013	9/9/2013	9/9/2013	9/9/2013	9/9/2013	9/9/2013	9/9/2013	9/9/2
No Access	Household Accessible	12	12	13	13	29	14	12	15	22	19	21	19	23
NO ACCC33	Household Inaccessible	0	0	0	0	0	0	0	0	0	0	0	0	0
	No Housing	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mobile Home	0	0	0	0	0	0	0	0	1	0	0	0	0
Type of Dwelling	Single Family Home	12	12	13	13	0	14	12	15	21	19	15	19	12
	Apartment or Condo	0	0	0	0	29	0	0	0	0	0	6	0	11
	Other	0	0	0	0	0	0	0	0	0	0	0	0	0
_	None or Minimal	10	10	11	7	17	11	9	10	13	11	13	13	11
Damage	Damaged	1	0	0	0	2	0	1	0	2	2	1	4	0
	Destroyed	0	0	1	0	0	0	0	0	2	1	1	0	0
	Descuses ensured	44	10	44	7	47	4.4	10	10	46	10	45	40	
	Llome but no onewer	0	0	0	0	0		0	0	0	12	0	13	
No Answer	Appears Vacant	0	0	1	0	2	0	0	0	2	1	0	0	0
	Appears vacant	4	0	4	6	10	2	2	5	2	5	6	4	10
	Nobody Home		2		0	10	3	2	5	5	5	0	2	12
	Language Barrier	1	0	0	0	0	0	0	0	0	0	1	0	0
	Refused to Particinate	5	2	4	4	q	4	3	2	6	2	3	6	3
	Non-resident	0	0	0	0	0	0	0	1	0	1	2	1	0
Interview	No adult over 18 vrs old	0	1	0	0	0	0	0	0	1	0	0	0	ő
	Interview begun not finish	0	0	1	0	2	0	0	0	1	2	2	0	1
	Interview Completed	5	7	6	3	6	7	7	7	7	7	7	6	7
	Interview Completed	5	'	0	3	0		(1		(0	'
Total Number	of Households Sampled	5	7	6	3	6	7	7	7	7	7	7	6	7
Total Number of	f Households Attempted	12	12	13	13	29	14	12	15	22	19	21	19	25

Figure 10. Sample dataset showing attempted and completed interviews per cluster

Calculation Response Rates

The three common response rates included in the analysis are the completion rate, the cooperation rate, and the contact rate. The definition, calculation, challenges, and key considerations of these response rates are described in more detail in Table 11.

Rate	Definition	Calculation	Challenges	Key Points
Completion	Represents	Number of	Rates below 80%	You should allot
	how close	completed	(typically n=168)	enough time for
	interview teams	interviews /	result in an	teams to complete a
	came to	Goal number of	unacceptably low	minimum of 80%.
	collecting the	interviews	number to	We recommend
	goal number of	(typically n=210)	represent the	having a few teams
	interviews		sampling frame	available to return to
	(typically			low-responding
	n=210).			clusters during
				follow-up day(s)
Cooperation	The proportion	Number of	The higher the	It represents both
	of households	completed	number of	the eligibility and the
	at which contact	interviews /	contacts made,	willingness of the
	was made and	All households	the more the	community to
	agreed to	where contact	sample becomes	complete the
	complete an	was made*	one of	interview.
	interview.		convenience.	
Contact	The proportion	Number of	The lower the	Higher contact rates
	of households	completed	contact rate, the	indicate better
	at which contact	interviews /	more the sample	representativeness
	was attempted	Number of	becomes one of	of the sample to the
	and agreed to	households	convenience at	population. Lower
	complete an	where contact	the second stage	rates indicate that
	interview	was attempted**		teams had to
				attempt interviews at
				many households to
				obtain the necessary
				interviews

Table 11. Common response rates

* including completed interviews, incomplete interviews, refusals, door was answered

**including completed interviews, incomplete interviews, refusals, and appears as though someone is home but no answer, appears vacant, and nobody home after 1st , 2nd , or 3rd visit



Lead a discussion to review key lessons learned. Complete the Knowledge Check and Discussion Question #14. To guide additional discussion, you may use the questions and suggested answers in the red box. (20 minutes)

Potential Discussion Questions

Why do we calculate response rates?

Possible answer:

Calculating response rates helps determine the representativeness of the sample to the population within the sampling frame

How do you define the three response rates? What are some key points to remember?

Possible answer:

The three response rates are the contact, completion, and cooperation rates. See Table 11 for information on definition and key points to remember



KNOWLEDGE CHECK

What response rate represents how close field interview teams came to collecting the goal number of interviews (typically n=210)

A. Contact rate

B. Completion rate

C. Cooperation rate

DISCUSSION QUESTION #14

What are the three common response rates? How do you calculate them?

Completion

Number of completed interviews / Goal number of interviews (typically n=210) Cooperation

Number of completed interviews / All households where contact was made Contact

Number of completed interviews / Number of households where contact was attempted

Independent Reading: Tell learners to read the next section of Lesson 4 – Reporting Results – until they see the STOP sign (pages 56-59).

TIME: 20 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

REPORTING THE RESULTS

Writing the report is the RNA's final phase. Although it is the last phase, its planning and development should begin long before any data are collected in the field. An essential element to this process is to plan for the report in advance. During the preparation phase of the RNA, you should identify several foundational aspects of the report, such as who will write the report, who is the target audience, and what analysis you will include. Exploring these aspects with the RNA assessment team at the onset will allow the team to turnaround the reports quickly to key stakeholders (e.g., within 48 hours). We recommended the following two reports:

- **Preliminary Report** or presentation provided to key stakeholders within a day or two of data collection. This will allow partners to make quick, better-informed decisions and address any immediate needs
- A **final report** that builds off of the preliminary report and includes additional data analysis and results. This report is distributed to a wider audience and is often provided within a few weeks of the RNA

As with any report, results should be in a simple, easy-to-read format that reflects the original objectives of the RNA. Table 12 provides a series of key considerations when planning and creating reports.

Action	Description
Designate a point person	Designate a person who will be in charge of the reports. This
	person should be familiar with the entire process and involved in
	the preliminary meetings, sampling, and analysis.
Create table shells	Begin the writing process before completion of data collection.
	Gather background information for the report and create table
	shells that will expedite the development of the report.
Identify audience needs	When drafting the report, consider the target audience. Will you
and tailor content	send the report to emergency managers, to epidemiologists, to
	politicians, to the media, or to all or these recipients?
	Consider how each audience digests information and tailor
	accordingly. Use the audience to determine the format, now much

Table 12. Report considerations²⁹

	information to include, the report length, and the technical detail. For example:						
	• Emergency managers may find the projected number of HH useful (e.g., 5k households need tarps, 4k households need medication, etc.). This information is probably best displayed in a bulleted list.						
	• Epidemiologists will likely want the most technical information, including full tables with all the data (including all results, missing data, confidence Intervals, etc.).						
	Politicians/media may need a written paragraph of overall results						
	or bulleted format of key points. Graphs/charts might be more						
	effective rather than lengthy tables.						
Recommend actions	Present results in an action-prompting format.						
based on results	Actions derive from the current health status or needs of the						
	population as presented in the results. Actions can include, but						
	are not limited to, prioritization of resources, public health						
	messaging, enhanced health surveillance, or public health						
	interventions.						

Preliminary Field Report

The preliminary field report is a draft version of the final report. The preliminary report contains the initial results and recommendations to share with stakeholders who need time sensitive information. We strongly recommend that you inform partners and stakeholders of the preliminary results as soon as possible to ensure timely responses by other agencies and maximum transparency to the public. Given that the report has not been finalized, that fact should clearly appear on each page and should be clearly communicated to show that the report is preliminary in nature. Therefore, limited distribution of the preliminary report may be in order. Table 13 provides a common structure for the preliminary and final report.

Table 13. Common reporting structure³⁰

Section	Description
Introduction	Describe the purpose of the report, including the background of
	the disaster (e.g., date occurred, affected population) and details
	of the RNA request (e.g., who requested, who conducted, timing
	of assessment) and the RNA's aims and objectives.
Approach or methodology	Provide the audience with an overview of the methodology used
	to produce those results that appear in the results section. Include

	a simple description of the sampling frame (i.e., target
	population), the two-stage cluster design, the questionnaire, the
	number and training of field interview teams, and the data
	analysis procedures.
Results	Include the three response rates discussed earlier in this lesson,
	the number of households represented by the sampling frame,
	and the RNA's main findings. Remember the audience needs and
	expectations and tailor the level of detail and content accordingly.
Conclusions	Recap the main findings, the RNA's limitations, and the
	preliminary recommendations as based on the initial conclusions.
	Recommendations should be specific, objective, targeted, and
	tangible, thus enabling them to prompt action.
Attachments	If available, include other report types or supporting
	documentation in conjunction with the preliminary report, such as
	bulleted lists of highlights or press releases.

We recommend that a presentation accompany the delivery of the preliminary report. Invite to the meeting all partners and appropriate community organizations. The meeting should mirror the structure of the preliminary report and include background, method, results, and conclusion sections. Give consideration to the best way to present the results in an oral presentation. An oral presentation is also a good opportunity to discuss implementation of the recommendations, next steps, and lessons learned, and to solicit input from a broad group of stakeholders

Final Report

The final report includes additional, detailed information regarding the RNA results. Release of the final report and its distribution to a wider audience is customary within several weeks after release of the preliminary report. A final report will include the following new and updated sections from the preliminary report:

- Executive summary develop an executive summary that highlights the report outcomes in a short and easily digestible format that also contains the report's key results and conclusions
- **Updated results section** include key findings from the preliminary report as well as any additional analyses not included in the preliminary report (e.g., qualitative data or analysis of open-ended questions, if applicable). The results may include weighted and nonweighted frequencies, weight and nonweighted percentages, and confidence intervals that correct any inaccuracies from the preliminary report.
- **Updated conclusion section** include discussion from the preliminary report and incorporate any feedback received, additional information, and final

recommendations created in collaboration with partners. Also include any actions taken as a result of the RNA (e.g., enhanced public health messaging)

• Acknowledgements section – include in the final report all individuals and organizations that helped with each stage of the RNA

After the report is finalized, provide a final copy to all partners, including state and local public health authorities, emergency operations centers, incident command staff, and other agencies



Lead a discussion to review key lessons learned. Complete the Knowledge Check and Discussion Question #15. To guide additional discussion, you may use the question and suggested answers in the red box. (15 minutes)

Potential Discussion Questions

What are some key considerations when planning and creating reports? How many reports do we typically recommend?

Possible answer:

As with any report, results should be in a simple, easy-to-read format that reflects the original objectives of the RNA. There are typically two reports, a preliminary report and a final report. Look at Table 12 above to discuss key considerations



KNOWLEDGE CHECK

True or False. The report writing process should be started before completion of data collection

DISCUSSION QUESTION #15

What is the difference between a preliminary and a final report?

- A preliminary report or presentation is provided to key stakeholders within 48 hours of data entry completion to make quick, better-informed decisions and address any immediate needs.
- A final report builds off of the preliminary report and is disseminated to a broader audience, often within a few weeks of the RNA.

PRACTICE EXERCISE

Instructions: Depending on the size of the group, tell learners to complete this exercise individually, with a colleague, or as part of a small group. Instruct them to read through the case study and answer the questions. Have learners record their answers in the space provided. Once completed, review the exercise and discuss possible answers.

TIME: up to 30 minutes to complete, then reconvene the group to discuss the answers (up to 20 minutes)



PRACTICE EXERCISE #5

In this practice exercise, you will apply the concepts learned in Lesson 4. Please recall the flooding scenario (page 15) and answer the questions.

Flooding in a Southeast Asian country, continued

[See page 15]. The RNA interview teams conducted face-to-face interviews and completed the data gathering process. That they distribute within 48 hours a preliminary report to stakeholders is important, as is a final report that for later distribution to a broader audience.

Why did the teams carry tracking forms into the field?

The tracking form marks the number of homes approached and the outcome of each attempted interview. The main purpose of the tracking form is to calculate sampling rates that might be indicative of the representativeness of the data. The tracking form is also how three important rates are calculated:

- Contact Rate = Completed Interviews / All Units Where Contact Was Attempted (Completed, Incomplete, Refusals, Non-respondents)
- Cooperation Rate = Completed Interviews / All Units Where Contact Was Made (Completed, Partial, Refused)
- Completion Rate = Completed Interviews / Ideal Number of Interviews to Complete (typically n =210)

What are the components of the final report?

A final report will include the following new and updated sections from the preliminary report:

- Executive Summary Develop an executive summary that highlights the report outcomes in a short and easily digestible format and that contains the report's key results and conclusions.
- An Updated Results Section Include key findings from the preliminary report, as well as any additional analyses not included in the preliminary report (i.e., qualitative data or analysis of open-ended questions, if applicable). Results might include weighted and nonweighted frequencies, weighted and nonweighted percentages, and confidence intervals (correcting any inaccuracies from the preliminary report).
- An Updated Conclusion Section Include the discussion from the preliminary report, as well as incorporating feedback received, additional information and final recommendations created in collaboration with partners, and any actions taken as a result of the RNA (e.g., enhanced public health messaging).
- Acknowledgements Section Include and add to the final report all individuals and organizations who helped with each RNA stage.

After you are completed with the scenario, summarize the key learning points from Lesson 4 outlined in the Lesson 4 Summary

LESSON 4 SUMMARY

In this lesson, we discussed data entry, analysis, and reporting RNA findings. To ensure the quality of the collected RNA data, consider whether to use an electronic or a paper-based data entry method. Weighted analysis may be necessary to account for a complex sampling design, such as the two-stage cluster sampling method. We provided details on how to calculate a weighted analysis and discussed how to obtain the 95% confidence interval. We discussed how response rates determine how representative the RNA sample is to the population within the sampling frame. The field interview teams record the information necessary to calculate these rates on the tracking form. The three response rates included in the analysis are the completion rate, the cooperation rate, and the contact rate. After completion of data entry and analysis, develop a preliminary or draft report that includes the initial results and recommendations to share with those stakeholders who need time-sensitive information. Once stakeholders and other vested parties provide their input, produce the final RNA report and include additional, detailed information regarding the RNA results. Release of the final report and its distribution to a wider audience is customary within several weeks of the preliminary report.

SKILLS ASSESSMENT

Instructions: Tell learners to read the skills assessment. See learner instructions below.

TIME: up to 90 minutes to complete, then reconvene the group to discuss the answers (up to 45 minutes)

RAPID NEEDS ASSESSMENT (RNA) CASE STUDY: FLOODING IN GUATEMALA

This case study is based on an actual assessment conducted in 2010 by the Guatemala Ministry of Health (GMOH). The scenario has been adapted from the case study of this assessment developed by the Health Studies Branch (HSB), National Center for Environmental Health (NCEH), Centers for Disease Control and Prevention (CDC) in Atlanta, GA.

Instructions

- Read each section of the case study example
- Pretend that you are on the response team sent to investigate this emergency
- Read the questions in the grey-shaded boxes
- Use the information covered in Module Two to respond to the questions
- Write your responses in the space provided within this workbook
- Discuss your responses with your mentor/facilitator

LEARNING OBJECTIVES

After completing this skills assessment, you will be able to describe the following:

- The two-stage cluster sampling design used in an RNA
- What should be included in an RNA household assessment
- The usefulness of an RNA during an emergency response

CASE SCENARIO

In June 2010, Tropical Storm Agatha made landfall in Guatemala. Between June 1st and June 3rd, the storm was responsible for the deaths of 160 persons and another 53 missing. Rapid, subsequent flooding, torrential downpour, and severe storms caused evacuation of multiple residences, neighborhoods, and cities. Emergency water rescues and helicopter extractions occurred, but much of the property left behind by residents was heavily damaged or destroyed. In the aftermath of the disaster, the Guatemala Ministry of Health (GMOH) conducted a Rapid Needs Assessment (RNA) to 1) identify the immediate public health needs of residents who returned to the affected communities and 2) guide response and recovery activities.

Assessment Location

Preparations for the assessment began on June 4th. The GMOH knew it would be important to conduct the assessment in the areas hit hardest by the storms. To help determine where to take action, GMOH began quickly to collect information about precipitation levels.

Q1. When would an RNA be helpful?

GMOH officials would most likely conduct the RNA after the tropical storm, after subsequent rain and flooding ended, and especially after GMOH officials deemed it safe to send teams into the affected areas. Ultimately, the timeline depends on the RNA objective(s). For example, if the goal is to determine whether health protection messages are being received about boiled water, then conduct the RNA immediately. If the goal is to understand the disaster's mental health effects, postpone the RNA for a few weeks.

Q2. Develop 1-2 RNA objectives

Any objective is fine as long as it is RNA-appropriate (e.g., focus on household needs, not individuals within the community). Some examples include the following:

- Determine household evacuation or other protective behaviors
- Determine the affected community's current general needs and health needs
- Provide information for the allocation of resources
- Determine the affected community's mental health needs
- Determine access to medical care

Q3. What information would you need to gather to determine where to conduct the assessment?

To find the most flood-affected areas, you should gather information from damage assessments or information from emergency responders and local government officials. You can also obtain data from weather services to locate the path of the tropical storm through Guatemala and look at maps depicting areas of heaviest flooding. Gathering and synthesizing data from several sources help narrow the focus of where to start. Typically, you would conduct an assessment such as this in the areas identified as most disasteraffected or damaged, where local infrastructure and vulnerable populations have been hit hardest.



Figure 11. Areas affected by heavy rain or flooding



Example of Assessment area (El Progreso)



Using data collected from emergency managers and meteorological maps that showed the areas with the highest precipitation levels (Figure 11), the GMOH selected El Progreso as the assessment location. GMOH then developed maps using GIS data, as seen in Figure 12. After deciding the location, the GMOH continued with the next step: creating a questionnaire

Questionnaire Design

In working to design a questionnaire, that health officials and emergency managers formulated questions that captured multiple types of information pertaining to the affected population—including their health needs and the storm's physical effects.

Q4. After a disaster such as a flood, what specific information would GMOH officials want to capture in a data collection instrument?								
Examples of questionnaire elements in a flood-RNA include the following:								
• Demographic information, such as household size and structure (e.g., number of children in the household under the age of 1)								
Assessment of property damage, including the level of flood water in the house and whether the home is still habitable								
• Availability and access to basic utilities and supplies, including potable water, running water, toilets, food, electricity, phones, sanitation services and diapers								
 Access to basic health care, including medical supplies, medical care, and prescriptions 								
• Health conditions of the affected persons, including any injuries, physical or mental illness, and other chronic conditions that occurred post-disaster								
 Access to relief efforts, including safety information, aid received, and clean-up information. 								
Evacuation behaviors								
Communication methods								
MOLI developed a complian plan to determine to which have shalds within El Dramassa they								

GMOH developed a sampling plan to determine to which households within El Progresso they would administer the questionnaire. After completing the sampling plan, GMOH created a short, one-page questionnaire to collect all the necessary health, access, and demographic information needed to conduct the assessment accurately (Appendix A).

Data Collection

Given the number of affected households within the Progreso Department's target population (approximately 28,000 households), the GMOH evaluated the best method for selecting a sample and set out to collect a sample to assess.

Q5. If you were selecting a sampling method, which one would you choose?

As the target population is quite large (approximately 28,000 households), two stage cluster sampling would be ideal. A two-stage cluster sampling is a practical and efficient way to collect information from a relatively small sample but reasonably apply it to a much larger sampling frame. Information from only 210 HU's is collected, and by using census information to determine their selection probability, it becomes possible to collect information to help project department-wide household frequencies and percentages.

Q6. After determining the most appropriate sampling method, what information and sources of information would be needed to select a sample of households from the target area?

To select a sample, a complete list would be needed of all the households in the target area or, if an exact total cannot be formulated, an approximation. Sources to find such information would include census data, tax assessor or tax office records of the households themselves, and local (department, village, region or zone) government offices.

The GMOH considered multiple selection methods but ultimately chose a two-stage probability-proportional-to-size sampling method. As the first stage involved gathering a list of all the primary households, the team identified census and property data as necessary information sources with which to begin. The GMOH team reached out to the Guatemala Census Office and was able to gather block-level (Avenida) information on the total number of HUs in the affected area. To conduct the sampling, the team chose variable names and location of the fields needed from the database – Department, Municipal Zone, block (Avenida) total population, and HU count, for example.

The GMOH considered multiple selection methods, but ultimately chose a two-stage probabilityproportional-to-size method. As the first stage involved gathering a list of all the households, the team identified census and property data as necessary information sources. The GMOH team reached out to the Guatemala Census Office and was able to gather block-level (Avenida) information on the total number of households in the affected area. To conduct the sampling, the team chose variable names and locations of the fields needed from the database: examples include Department, Municipal Zone, block (Avenida), total population, and HU count. Figure 13 is an example of the downloaded data files, divided by their department of interest, Progreso:

_	K7	• (ĉ	fx 578								
4	A	В	С	D	E	F	G	н	1	J	K
1	Departamento	Municipal	Zona	Avenida	Populacion Total	Numero de Casas	Cumulativo	Cum_Range	a N_al azar	N_Groupo	NA_Generado
2	El Progreso	Morazan	1	1	44	25	25	1-2	5		50
3	El Progreso	Morazan	1	2	50	21	46	26-46	5		102
4	El Progreso	Morazan	1	. 3	42	18	64	47-6	50) 1	315
5	El Progreso	Morazan	2	4	40	16	80	65-80	0		338
6	El Progreso	Morazan	2	5	37	22	102	81-102	2 102	2 2	500
7	El Progreso	Morazan	2	6	68	27	129	103-125	9		578
8	El Progreso	Morazan	3	7	40	14	143	130-143	3		1264
9	El Progreso	Morazan	3	8	38	17	160	144-160	0		1630
10	El Progreso	Morazan	3	9	46	18	178	161-17	3		2006
11	El Progreso	Guastatoya	1	1	29	16	194	179-194			2134
12	El Progreso	Guastatoya	1	2	48	20	214	195-214			2150
13	El Progreso	Guastatoya	1	3	59	19	233	215-23	3		2264
14	El Progreso	Guastatoya	2	4	53	27	260	234-260	0		2767
15	El Progreso	Guastatoya	2	5	16	5	265	261-265	5		2807
16	El Progreso	Guastatoya	2	6	35	16	281	266-281			3047
17	El Progreso	Guastatoya	3	7	3	3	284	282-284			3128
18	El Progreso	Guastatoya	3	8	52	29	313	285-313	3		3293
19	El Progreso	Guastatoya	3	9	57	25	338	314-33	3 330 & 337	3&4	3369
20	El Progreso	Sansare	1	1	27	12	350	339-350	0		3764
21	El Progreso	Sansare	1	2	28	14	364	351-36			3767
22	El Progreso	Sansare	1	3	36	27	391	365-391			4222
23	El Progreso	Sansare	2	4	40	25	416	392-410	5		4237
24	El Progreso	Sansare	2	5	36	21	437	417-437	7		4291
25	El Progreso	Sansare	2	6	52	32	469	438-465	9		4318
26	El Progreso	Sanarate	1	. 1	102	36	505	470-505	5 500) 5	4396
27	El Progreso	Sanarate	1	2	19	7	512	506-512	2		4510
28	El Progreso	Sanarate	1	3	31	14	526	513-52	5		4657

Figure 13. Sample excerpt of data from El Progreso

To determine the selection of clusters, the team divided the process into four steps:

- 1. Start a cumulative tally of households from block (Avenida) to block (shown in yellow)
- 2. Use a random number generator to randomly select 30 numbers
- 3. Choose the block (Avenida) that represents the first random number
 - a. Looking at the hypothetical data above, a random number of 50 would correspond with the block (Avenida) where the 50th household is found based on the cumulative column. In this case, *Municipal Morazan; Zona 1; Avenida 3 in Row 4* is the first cluster
- 4. Continue to select blocks (Avenidas) using the randomly generated number list until all 30 clusters have been selected

Q7. Looking at the sample data in Figure 13, which cluster would be chosen by the random number 287?

Random number 287 corresponds with the 287th HU found in the 3rd zona, Municipal Guastatoya, Avenida 8. This cluster contains HUs 285 through 313.

The GMOH team was divided up, and each unit was given contact phone numbers for field coordinators, a list of all contact numbers for all interviewers, and a map of their respective cluster(s). On June 5th—just two days after Agatha ended—the field interview teams were trained on how to properly administer the data collection instrument. By the morning of June 6th, the teams began assessing households in the Progreso Department

Q8. What information should the predeployment training cover?

- Background of the current disaster (e.g. reason for current RNA)
- Purpose of RNA (rapidly obtain data for decision-making efforts, specific goals)
- Brief methodology overview (two-stage cluster sample, importance of field teams)
- Organization of teams
- Selecting households (explain cluster methods, describe HU selection process)
- Review questionnaire (interview tips, clarification of specific questions intent, skip patterns, etc.)
- Completing forms (tracking, intro, and consent script, public health materials, referrals)
- Safety briefing for field interview teams (road conditions, downed power lines)
- Logistics (meeting or call-in times/paces, transportation, food and water, Identification documents or badges, contact information, instructions for potential media encounters, debriefing time/location)

Q9. The GMOH team broke into groups to conduct interviews. What general guidelines should you follow when assembling interview teams?

- Each team should have at least two members
- Each team should try to include one male and one female member
- Teams should be made up of professionals with varying backgrounds (e.g., an epidemiologist and public health practitioners)
- Someone on the team should have access to a motor vehicle
- Someone on the team should have a functioning cell or satellite phone
- If possible, someone on the team should speak the native language(s) that is (are) spoken widely in the affected area

Fieldwork

All household interview attempts were recorded on the tracking form (Figure 14)

Figure 14. RNA tracking form

Rapid Needs Assessment (RNA)																		
	Tracking Form																	
Location:																		
Instructions: Use one tracking form per cluster. Check where appropriate, but try to choose only one best option for each of the five categories. Go as far down the list as possible for each site you visit.																		
Sampled Hou	using Units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1) ACCESS														ļ				
Household is /	Accessible																	
Household is In	accessible																	
2) TYPE OF DWELLI	NG																	
No housin	g structure																	
Mo	bile Home																	
Single Fa	mily Home																	
Apartment	t or Condo																	
	Other																	
3) DAMAGE	3) DAMAGE																	
None	or Minimal																	
Damaged																		
	Destroyed																	
4) ANSWER				_	_		_	_			_		_	_		_		
Door was	answered											U				U		U
home but	no answer																	
Арре	ars vacant																	
Nobody home	1 st visit																	
alter	2 nd visit																	
	3 rd visit																	
5) INTERVIEW																		
Language Barrier																		
Refused to Participate																		
Interview begun, not finished																		
Interview (Completed																	
Survey # (i.e. Completed Que	, 1-7) from stionnaire:																	

Each team worked to get all the interviews completed; they conducted interviews all day June 6th and June 7th, with the teams returning back to base camp at approximately 5:00pm (sundown). All completed questionnaires were immediately entered into the statistical software Epi Info[™]. Shortly after data entry, analysis was conducted to determine results. In total, the interviewers were able to complete 207 questionnaires.

Q10. Name at least two roadblocks or challenges interviewers might encounter while in the field.

- Language barriers: If possible, someone on the team should be conversant in the native language or have translated versions of the questionnaire on hand
- Nonresponsive, unavailable interviewees: All refusals should be recorded on a tracking form, and interviewers should make individual judgment calls as to whether to revisit an HU would be feasible in the event someone asks to reschedule
- Choosing a household from multiple family units (apartment complexes): Randomly select a floor of the building, assign numbers to each of the possible units, and randomly select one to interview.
- Neighborhood inaccessible due to road closures, down power lines, etc.

regarding the public health hazards of the flood as supplemental education to the residents of the affected communities. These procedures are common in disaster situations as many times affected populations do not have an easy means of getting information regarding safety and/or treatment options.

By June 8th, after analyzing the data and producing the results (Table 14), the team presented a complete report on their findings to the GMOH Emergency Preparedness and Response Director.

Characteristic	% of households (n=207)	95% CI	Projected households	Estimate 95% Cl
Residence				
Feels residence not safe	40.4	29.2 – 51.6	8454	6078 – 10830
Needs tarp	47.3	34.6 - 60.0	9945	7376 – 12514
Utilities				
No electricity	11.2	2.6 – 19.8	2751	755 – 4747
Drinking water				
Drinking bottled water	17 /	82-265	3633	1/12 - 5853
from agency	17.4	0.2 20.0	3033	1412 3033
Drinking bottled water	ΛΛ Λ	34 2 - 54 6	9206	6721 - 11690
from other source		34.2 34.0	3200	0721 11030
Drinking from stream	1.4	0.0 - 2.9	300	0 – 657
Healthcare needs since th	e flooding			
Illnesses	35.1	270 – 43.2	6936	5484 - 8387
Injuries	9.9	4.6 – 15.2	2033	922 – 3134
Required medical care	24.6	16.5 – 32.8	5036	3439 - 6633
Emotional concerns	17.8	8.8 – 26.8	3466	1612 – 5321
Other				
Needs clothes	28.1	17.98 – 38.30	6033	3922 – 8144

Table 14. Characteristics of households in affected areas following the flood, El Progreso

Q11. What can you conclude from these findings? Using your response, what recommendations would you make to decision-makers?

- Nearly half of respondents need tarps
- A majority of households still have electricity
- A majority of households still have access to clean and safe water
- Some households reported emotional concerns as health issues
- Some households reported illness and injury as medical concerns

Using these results, you will need a strategy built around distributing tarps, given that a majority of respondents voiced this as a need. Additionally, given that both physical and mental health related issues were widely reported, recommending accessible health services would also be important, especially for more vulnerable populations.

The director shared the information with the Governor's Office. The report was instrumental in helping to provide mental health services in addition to distributing necessary items, such as clothing and tarps, and medication to the affected communities

This is the completion of Module Two. Please thank the learners for attending (or let them know the schedule if continuing on to Module Three), ask if they have any remaining comments or questions, and provide any contact information for any additional follow-up questions.

Question	Response
Q1. Date (MM/DD/YY)	
Q2. Interviewer Name	
Q3. Team Number:	
Q4. County:	
Q5. Cluster number:	
Q6. How many people lived in your household	Number:
before the flood?	
Q7. How many people slept here last night?	Number:
Q8. How many in your household were children	Number:
less than 2 years old?	
Q9. How many in your household were 65 years	Number:
of age or older?	
Q10. If one or more children are currently living in	□Yes □No □Don't Know □Ref □NA
the household, do you have access to enough	
diapers and formula for 7 days (if needed)?	
Q11 . Is anyone in your household pregnant?	□Yes □No □Don't Know □Ref □NA
Q11a. If YES, how many?	Number:
Q12 . Did your whole household evacuate your	□Yes □No □Don't Know □Ref
home to sleep somewhere else?	
Q12a. If YES, what day did your household	Date evacuated://
evacuate your home? (MM/DD/YY)	
Q12b. If YES, what day did your nousehold	
return (spend the first hight back)? (MM/DD/YY)	
Q13. What is the primary type of construction of	1=Brick/stone/concrete
this dwelling (majority of exterior as observed by	2=Siding (e.g., wood, aiuminum, vinyi)
Interviewer)?	A News environment
Q14. Would you describe the damage to your	1=None or minimal
nome as	2 Damaged and uninhohitable but
	1-NOT renairable
Q14b. If DAMAGED, do you need a tarp?	□Yes □No □Don't Know □Ref

Appendix A. Flood assessment form, June 2010
Q15. Do you feel the home is safe to live in?	□Yes □No □Don't Know □Ref	
Q15a . If <i>NO</i> , when do you expect this home to be safe to live in?	1=Less than a month 2=1–3 months 3=4–6 months 4=More than 6 months 5=Never 99=DK	
Q16. Has your household noticed any increase in problems with the following?	□Mosquitoes □Flies □Rats □No problems	
Q17. Does your household currently have running water?	□Yes □No □Don't Know □Ref	
Q18. Does your household have a working indoor toilet?	□Yes □No □Don't Know □Ref	
Q18a . If <i>NO</i> , does your household have access to a functioning toilet?	□Yes □No □Don't Know □Ref	
Q19. Are there screens on the windows in this	□Yes □No □Don't Know □Ref	
residence?		
the utility company?	Tes ino idontknow iref	
Q21 . Has your household used a generator at any time since the flood?	□Yes □No □Don't Know □Ref	
Q21a. If YES, where is or was the generator located? Q22. Since the flood, has your household used any of the following appliances indoors?	 1=Inside 2=Garage/shed 3=Carport 4=Outside, greater than 25 feet from home 5=Outside, less than 25 feet from home 88=Other 99=DK Charcoal, wood or propane cooking stove Other gasoline or diesel powered equipment specific 	
	□No □Don't Know □Ref	
Q23 . Where is your household getting your drinking water from?	1=Well 2=Public utility	

	3=Bottled, supplied by Red Cross or other
	relief agency
	4=Bottled, not supplied by relief agency
	5=No drinking water
	99=DK
Q24 . Is your household treating your drinking	□Yes □No □Don't Know □Ref
water?	
Q24a. If YES, how is your household treating	1=Boiling
vour drinking water?	2=Bottled
, ,	3=Chemical treatment
	4=No treatment
	88=Other
Q25. Do you or your household members need	□Yes □No □Don't Know □Ref
clothes?	
Q26. Has anyone living in this household ever	a. Asthma
been told by a doctor, nurse, or other healthcare	b. Emphysema
professional that he or she has the following	c. Hypertension
health problems?	d. Heart disease
	e. Diabetes
	f. Physical disability
	g. Hearing impairment
	h. Visual impairment/legally blind
	i. Gastrointestinal illness
	i. Renal disease
	k. Neurological (stroke, seizures, Transient
	Ischemic Attack (TIA))
	I. Dementia/Alzheimer's
	m. Arthritis and joint pain
	n. Cancer
	o. Anemia
	p. Psychiatric disorders
	a. Other
Q27. Has any household member become ill	 □Yes □No □Don't Know □Ref
since the flood?	
Q27a. If YES, how many household members	a. Stomachache/diarrhea
have had the following since the flood:	b. Dehydration/ heat stress
~~	· · ·

	c. Respiratory (cough, flu)
	d. Hearing or visual impairment
	e. Injury/ Physical disability
	f. Stroke (heat, hypertension, other)
	g. Heart attack (chest pain)
	h. Chronic illness that worsened
	i. Skin condition/rash/sunburn
	i. Stress/sleep disturbance
	k Inability to perform daily task
	L Other
Q28 Has any household member been injured	\square Yes \square No \square Don't Know \square Ref
since the flood?	
	a Drownod
0282 If VES how many household members	h Motor vohicle related injury or other
have been injured or died from the following	blunt trauma
since the flood?	c Electrical injuny
	d Burn including suppurp
	f Lacoration abrasion
	Ruiso/contusion
	g. Bruise/contusion
	i. Impalement/puncture wound
	i. Brain injury/concussion
	I. Dog bite
	n. chemical exposure
	0. Other
Q29. Since the flood, has anyone in your	□Yes □No □Don't Know □Ref
household required medical care?	
Q30 . Does anyone in your household need	□Yes □No □Don't Know □Ref
medical care or supplies now? If yes, collect	
referral information.	
Q31. Will anyone in your household need	□Yes □No □Don't Know □Ref
medical care or supplies in the next 3 days to 1	
week?	
Q32. Can everyone in your household get	□Yes □No □Don't Know □Ref
the medical care and supplies he or she needs?	
	1=Lack of transportation

Q32a.If NO, what is preventing you/them from	2=No medical services available
getting the medical attention you/they need?	3=Financial reasons
	4=Debris or damage roads
	5=Afraid to travel
	6=Other:
Q33. Has any household member died during or	□Yes □No □Don't Know □Ref
after the flood?	
Q34. Has anyone in your household had any of	1=No symptoms
the following since the flood?	2=Difficulty concentrating
(select ALL that apply):	3=Trouble sleeping
	4=Loss of appetite
	5=Racing or pounding heartbeat
	6=Agitated or frantic behavior
	7=Violent behavior or threatening violence
	8=Suicidal thoughts or attempts
	9=Drug or alcohol intoxication or
	withdrawal
	10= Bereavement: loss of family
	members, friends, neighbors
	88=Others
	99=Don't Know
Q35. Are emotional concerns preventing you or	□Yes □No □Don't Know □Ref
any household members from taking care of	
yourself/himself or others?	
Q36. What is your households greatest need	1=No current needs
right now? (select one)	2=Food
	3=Electricity
	4=Water
	5=Medical care
	6=Medications
	7=Transportation
	8=Physical help with cleanup and repairs
	9=Financial help with cleanup and repairs
	10=Trash removal
	88=Other, specify
	99=Don't Know

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Module Three: Disaster-related Morbidity and Mortality Surveillance MethodsTM

Acknowledgement

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Disclaimer

The findings and conclusions in this facilitator guide are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

U.S. Centers for Disease Control and Prevention Office of Noncommunicable Disease, Injury and Environmental Health, National Center for Environmental Health, Health Studies Branch



MODULE 3: DISASTER-RELATED MORBIDITY AND MORTALITY SURVEILLANCE METHODS

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Estimated Time: 6 hours (30 minute introduction, up to 1.75 hours of independent reading, up to 1.25 hours of group discussion, up to 1.25 hours of practice exercises, up to 45 minutes of skills assessment, and 30 minute module review and wrap-up)

Distribute: Participant Workbook for this module (if not already distributed)

Explain: The skills the learners will learn and how they will learn them by reading this Workbook. Note that learners will have opportunities to apply what they learn by completing practice exercises and skill assessments. Explain that brief, facilitator-led discussions will clarify or elaborate key concepts

Provide: An overview of how the skills taught in the third module, Disaster-related Morbidity and Mortality Surveillance methods, will build on the information from the previous module to prepare them further to support disaster response activities and conduct epidemiological responses and surveillance

- Module 1 provides an overview of disaster types, how they occur, and the consequences they have for society.
- Module 2 contains information about the use of a rapid needs assessment (RNA) for disaster response and the various components needed to plan, execute, and report results collected from the assessment.
- Module 3 introduces disaster-related morbidity and mortality surveillance, the importance of surveillance during a disaster, different types of disaster surveillance methods, and challenges or difficulties you might face when conducting surveillance during a disaster.

Introduce: Lessons in Module Three

Tell: Learners to read each lesson until they see the STOP sign

OVERVIEW OF MODULE THREE – DISASTER SURVEILLANCE METHODS

Surveillance is the ongoing, systematic collection, analysis, and interpretation of injuries, illnesses, and deaths for planning, implementation, and evaluation of public health practice.³¹ Surveillance enables public health to track and identify any adverse health effects in the community.³² During a disaster, you should consider surveillance when you need to understand a disaster's impact on affected populations. You should have a clear understanding of how you as an epidemiologist can plan for and put disaster surveillance activities in place.

³¹ Thacker SB, Berkelman RL. Public health surveillance in the United States. Epidemiol Rev. 1988;10:164-90.

³² Thacker SB, Stroup DF. Public health surveillance. In: Brownson, RC and Petitti, DB, editors. Applied epidemiology: theory to practice. New York: Oxford University Press; 1998a. p. 105–35.

In this module, you will learn about disaster-related morbidity and mortality surveillance, the importance of surveillance during a disaster, various disaster surveillance methods, and challenges or difficulties you might face when conducting surveillance during a disaster. This module consists of two lessons:

- Lesson 1: Overview of Disaster Surveillance
- Lesson 2: Disaster Surveillance Methods

Content is drawn from several sources, including the following:

- Pan American Health Organization, Epidemiologic Surveillance After Natural Disaster
- The Johns Hopkins and the International Federation of Red Cross and Red Crescent Societies, Public Health Guide for Emergencies
- World Health Organization, Disaster Surveillance

LEARNING OBJECTIVES

After completing Module Three, you will be able to do the following:

- Describe the purpose and importance of disaster surveillance
- Explain the differences in surveillance methods
- Explain the steps for setting up a surveillance system during a disaster
- Describe the challenges in establishing a surveillance system during a disaster
- Explain how to conduct morbidity and mortality surveillance in a disaster setting

ESTIMATED COMPLETION TIME

Module Three will take approximately six hours to complete, including some discussion time with your mentor or facilitator.

PREREQUISITES

Before participating in this training module, we recommended that you complete the following training courses:

- Module One: Epidemiologic Response to Disasters
- Introduction to surveillance (FETP core curriculum)
- Surveillance system development (FETP core curriculum)
- Surveillance data collection (FETP core curriculum)

Lesson 1: Overview of Disaster Surveillance

Overview: This lesson describes the purpose and importance of surveillance, particularly as it relates to controlling or reducing disaster-caused injuries, illnesses, and deaths, as well as some of the common public health disaster surveillance challenges.

Total Estimated Time: 70 minutes

Reading and Activities: up to 40 minutes

Group Discussion: up to 30 minutes

LESSON 1: OVERVIEW OF DISASTER SURVEILLANCE

Independent Reading: Tell learners to read the first two sections of Lesson 1— Introduction and Defining Disaster Surveillance – until they see the STOP sign (pages 3-5).

TIME: 10 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

INTRODUCTION

As you learned in Module One, many significant damages can happen after a disaster, such as illness, potential disease outbreaks, death, displaced populations and crowded shelters, shortand long-term psychological effects, significant damage to buildings and other structures, and devastating financial loss.³³

In this lesson, you will learn about the purpose and importance of surveillance, particularly as it relates to controlling or reducing disaster-caused injuries, illnesses, and deaths, as well as some of the common public health disaster surveillance challenges.

After completing this lesson, you will be able to do the following:

- Describe the purpose and importance of disaster surveillance
- Discuss the objectives of disaster surveillance
- Describe challenges in establishing a surveillance system during a disaster

³³ Noji EK. The Public Health Consequences of Disasters. New York, NY: Oxford University Press: New York.1997.

DEFINING DISASTER SURVEILLANCE

To respond appropriately and effectively to disasters, government and health officials must have timely and accurate information. One way to gather such information is through disaster surveillance. In simple terms, **disaster epidemiology** is the use of epidemiology to measure the short- and long-term health effects of disasters and to predict the consequences of future disasters.³⁴ **Disaster surveillance** is an epidemiology tool that assesses health effects, monitors the effectiveness of relief efforts, responds to public concerns and media inquiries, and assists in planning for future disasters.³⁵ Disaster surveillance systems provide information and feedback from the data you collect. That information and feedback provides the basis on which interventions are planned as well as insights into future disasters.

Purpose of Disaster Surveillance

After a disaster, you might be called on to help answer questions, such as which problems are occurring, where and why they are occurring, who is impacted, and what problems are causing the most injury, illness, or death. Disaster surveillance is one method by which you answer these questions. As an epidemiologist, your role in disaster surveillance is to

- define and detect outbreaks and health problems,
- estimate the magnitude of a health problem,
- identify groups at risk for negative health outcomes,



- inform and monitor the effectiveness of response and relief efforts, or
- assist with planning for future disasters and recommend ways of decreasing the consequences of future disasters.

When you implement your disaster surveillance system, you should promptly analyze and disseminate your findings because health and other government officials need your results to take action. In fact, this is the primary purpose of surveillance: to provide timely, accurate, and relevant information to drive decisions and interventions during a disaster.³⁶

Importance of Disaster Surveillance

You should put together a surveillance system to receive timely information about health problems. In this way, diseases and outbreaks can be detected early and programs and

³⁴ Centers for Disease Control and Prevention. Preparedness and response for public health disasters: Disaster epidemiology. Atlanta: CDC [updated 2012 Jan 13; cited 2013 Nov 10]. Available from: <u>http://www.cdc.gov/nceh/hsb/disaster/epidemiology.htm</u>

³⁵ CDC. Disaster Surveillance. Presentation at COCA conference call: disaster surveillance; December 18 2007.

³⁶ Last JM. A Dictionary of Epidemiology. 2nd ed. New York: Oxford University Press; 1988.

interventions can be most effective.³⁷ In other words, you can use disaster surveillance to uncover potential disease outbreaks and track when and where injuries, illnesses, and deaths occur.

Also, disaster surveillance helps you to make informed decisions on which actions to take. For example, it can help you determine where to direct resources (e.g., humanitarian aid or financial) and how to target interventions and relief efforts. Surveillance can also help in planning for future disasters. Here are potential objectives of a public health disaster surveillance system:

- Follow disease trends for early detection and control
- Estimate the magnitude of a health problem
- Monitor a population's health and identifying priority, immediate, and long-term health needs
- Ensure resources are targeted to the most vulnerable groups
- Evaluate the coverage and effectiveness of program interventions
- Identify research needs and evaluating control strategies³⁸

Implementing a disaster surveillance system provides situational awareness; provides information that can prevent or reduce injury, illness, or death; and helps guide prevention strategies for future disasters.



Lead a discussion to review key lessons learned. Complete the Knowledge Checks and Discussion Questions. To guide additional discussion, you may use the following questions and suggested answers. (15 minutes)

³⁷ Johns Hopkins Bloomberg School of Public Health; International Federation of Red Cross and Red Crescent Societies. Public Health Guide for Emergencies, 2nd ed. Geneva: IFRCRCS; 2008 [cited 2013 Nov 10]. Available from: <u>http://www.jhsph.edu/research/centers-and-institutes/center-for-refugee-and-disaster-</u>

response/publications_tools/publications/_CRDR_ICRC_Public_Health_Guide_Book/Forward.pdf ³⁸ Wetterhall SF, Noji EK. Surveillance and epidemiology. In: Noji EK, editor. The public health consequences of disasters. New York: Oxford University Press; 1997. P. 37-64.

Potential Discussion Question

Why is disaster surveillance important?

Possible answers:

Disaster surveillance allows you to receive timely information about health problems which allows diseases and outbreaks to be detected early and programs and interventions can be most effective. It can help you make informed decisions such as directing resources and targeting interventions. Some examples of objectives are as follows:

- Follow disease trends for early detection and control
- Estimate the magnitude of a health problem
- Monitor a population's health and identifying priority, immediate, and long-term health needs
- Ensure resources are targeted to the most vulnerable groups
- Evaluate the coverage and effectiveness of program interventions
- Identify research needs and evaluating control strategies



KNOWLEDGE CHECK

______ is an epidemiology tool that assess health effects, monitors the effectiveness of relief efforts, responds to public concerns and media inquiries, and assists in planning for future disasters.

- A. Disaster epidemiology
- B. Rapid needs assessments
- C. Disaster surveillance
- D. Disaster response

DISCUSSION QUESTION #1

Why should you conduct surveillance during a disaster?

Possible answers include the following:

- To follow trends in the health status of a population over time
- To detect and respond to epidemics/outbreaks
- To establish health care and public health priorities
- To ensure those with greatest need are prioritized
- To evaluate the effectiveness of programs and services

Independent Reading: Tell learners to read the next two sections of Lesson 1 – Disaster Surveillance and Surveillance Challenges in a Disaster Setting – until they see the STOP sign (pages 6 - 10).

TIME: 30 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

DISASTER SURVEILLANCE: MORBIDITY AND MORTALITY CONSIDERATIONS

Two indicators often define disaster-related surveillance: morbidity and mortality. Your surveillance system objectives, as well as local health and government priorities, will help you determine which indicator(s) to track.

Morbidity refers to the state of being ill or diseased or the incidence of illness in a population; mortality refers to incidence of death in a population.³⁹ The mortality rate is the most. important indicator of serious stress affecting a displaced population.

Equation 1. Mortality rate

Mortality Rate =

Death occurring during a given time period

x 10ⁿ Size of the population among which the death occurred

During a disaster, you may collect morbidity and mortality data to⁴⁰

- Identify potential threats to person(s) requiring immediate public health action(s); •
- estimate the magnitude of a health problem; •
- monitor a population's health and identify priority, immediate, and long-term health • needs;
- provide data for situational awareness; •
- ensure resources are targeted to the most vulnerable groups; •
- identify research needs and evaluate control strategies; and •
- communicate findings to decision makers within the preparedness community.

³⁹ Agency for Toxic Substances and Disease Registry. Glossary of Terms. Atlanta: ATSDR [updated 2009] Jan 1; cited 2013 Nov 10]. Available from: <u>http://www.atsdr.cdc.gov/glossary.html#G-M-</u>⁴⁰ Spears, J. Partners in Data Recovery and Reporting; Presentation from National Disaster Epidemiology

Workshop; 2013 May 8; Atlanta, GA.

Morbidity Surveillance

Morbidity surveillance in a disaster measures the disease state of an individual or the incidence of illness in a population. Disaster-related morbidity surveillance helps you detect disease outbreaks and track disease trends, as well as inform decisions about action items, such as allocating resources, targeting interventions to meet specific needs, and planning for future disasters.⁴¹ Morbidity surveillance collects information on

- incidence rate,
- prevalence rate,
- age- and sex-specific morbidity rate.

Data sources for morbidity surveillance in a disaster include

- hospitals,
- clinics and other medical care facilities,
- community health and relief workers, and
- shelter service and delivery sites.

Additionally, the CDC has developed multiple, ready-to-use templates for morbidity and mortality surveillance. You can use these tools to supplement existing surveillance systems or temporarily replace disaster-damaged surveillance systems. Access these tools on the CDC Emergency Preparedness and Response Web site

(http://www.emergency.cdc.gov/disasters/surveillance/).

Mortality Surveillance

As stated, the mortality, or death rate, is the most important indicator by which to measure the effect of a disaster on a population.⁴² Important mortality data to collect include

- demographic characteristics,
- time and location of death, and
- cause and manner of death.

Common data sources for mortality data include

• medical examiner or coroner's office,

⁴¹ Centers for Disease Control and Prevention. Disaster Epidemiology: Frequently Asked Questions. Atlanta: CDC [updated 2012 Jan 13; cited 2013 Nov 10]. Available from http://www.cdc.gov/nceh/hsb/disaster/fags.htm

⁴² Johns Hopkins Bloomberg School of Public Health; International Federation of Red Cross and Red Crescent Societies. Public Health Guide for Emergencies, 2nd ed. Geneva: IFRCRCS; 2008 [cited 2013 Nov 10]. Available from: <u>http://www.jhsph.edu/research/centers-and-institutes/center-for-refugee-and-disaster-</u>

response/publications_tools/publications/_CRDR_ICRC_Public_Health_Guide_Book/Forward.pdf

- 911 call centers,
- hospitals,
- mortuary service providers (e.g., funeral homes), and
- religious institutes (e.g., churches, mosques, synagogues)

SURVEILLANCE CHALLENGES IN A DISASTER SETTING

Although we have discussed many of the benefits of conducting disaster surveillance; you may encounter challenges while in the field. The following describes some difficulties in implementing public health disaster surveillance and steps you can take to overcome those difficulties

Table 1. Surveillance challenges and solutions⁴³

Challenge	Description
Missing baseline data	Challenge : Baseline information about a disease or the health status of those affected is usually missing or nonexistent. This can occur because large amounts of the population are displaced, health infrastructure is severely damaged, or no previous surveillance system is available. Thus, it will be difficult for you to determine a true increase in a disease or a worsening health status in the affected population since you do not have a starting number for comparison.
	Potential solution : Missing baseline data is a very difficult challenge to overcome. While a perfect solution may not exist, when possible, you should gather available data through previously established surveillance systems, published data, census records, or surveys of the affected population.
Difficulty obtaining denominator data	Challenge : You need data on the size of the at-risk population (the denominator data) to calculate health condition rates. Rates permit valid comparisons of morbidity and mortality between populations that differ in size and composition. Difficulty obtaining denominator data may occur because the population under surveillance changes frequently (e.g., moving in and out of shelters or refugee camps), is unpredictable, or traditional census or population data may not adequately reflect the current affected population as residents may have evacuated an area or may have been displaced. As a result, your population denominator may not be accurate or stable.

⁴³ Pavignani E, Colombo S. Analyzing Disrupted Health Sectors: A Modular Manual. Geneva: World Health Organization, Department of Recovery and Transition Programmes Health Action in Crises.2009. Available from: http://www.who.int/hac/techguidance/tools/disrupted_sectors/adhsm_en.pdf?ua=1

	Potential solution: You may need census data to determine
	parameters, such as rates of infection in well-defined populations
	(e.g., refugee camps). You can usually obtain such data from the
	agency running the camp. Still, while this might be appropriate in
	refugee camps with good registration data, in a war scenario with
	shifting populations such reliable data rarely exists and limits this
	method's use. In this case, when possible, you may need to conduct a
	survey to obtain denominator data
Domogod	Challenge: The local bespitals and bealth care systems might be
infrastructuro	coverely demaged or destroyed, which means limited or po
IIIIastructure	bealthears services. If this bappane, outside relief and bealth
	ergenizatione (e.g., Red Crees) may provide temperary medical
	organizations (e.g., Red Cross) may provide temporary medical
	assistance and care. For example, nospital surveillance cannot occur
	If nospitals are not operating. In such cases, temporary medical care
	is often established, but may not have the same surveillance capacity
	as do hospitals. Additionally, the few operating medical care facilities
	are likely to be overwhelmed and unable to conduct surveillance.
	Logistical problems or obstacles to surveillance can, and often do,
	occur in a disaster setting. Electricity (power) and telephone outages
	affect communication networks and transportation systems, or
	destroyed roads or affected transportation systems slow or stop data
	collection. Such problems can interrupt the usual reporting
	mechanisms, leading to an underreporting of health events.
	Potential solution: During times of damaged or destroyed
	infrastructure, flexibility is important. For example, collect data with
	pencil and paper if technology is not functioning or available. Think
	about creative ways to gain information from resources unaffected by
	the disaster. Satellite imagery can identify the extent of a disaster by
	providing overhead photos both before and after the event.
	For demograd healthcare systems, called data hy working with
	For damaged healthcare systems, collect data by working with
	temporary onsite healthcare providers (e.g., Red Cross) and
	community leaders.
Lack of	Challenge: The need to repeatedly collect the same types of
standardization in	information quickly from multiple sources under difficult conditions can
data collection and	be challenging.
reporting	Potential solution: Ideally, you should standardize data collection
	and reporting. During the preparedness phase, epidemiologists

should develop methods to standardize surveillance, with a process
that is simple, flexible, and acceptable to multiple organizations.
Preexisting, standardized surveillance templates are available.
Challenge: During a disaster, competing priorities (e.g., providing
medical care, restoring infrastructure) that involve many different
stakeholders, including government and health agencies. may affect
what data you are able to collect and when you are able to collect it.
Potential solution: Competing priorities are difficult obstacles to
overcome. Having a clear surveillance objective may help with
decision-making among interested parties. Working to establish
cross-sectional coordination, between, for example, disaster
management officials and ministries of health, may help facilitate
disaster surveillance activities.

Thus, while disaster-related morbidity and mortality surveillance has many uses, it is important to take into account that data must be collected rapidly under poor conditions and be pulled together quickly in a logical format while potentially being hindered by forces beyond your control.



Lead a discussion to review key lessons learned. Complete the Knowledge Checks and Discussion Questions. To guide additional discussion, you may use the following questions and suggested answers (15 minutes)

Potential Discussion Question

In a disaster setting, what does morbidity and mortality measure?

Possible answer:

Morbidity measures a person's disease state or the incidence of illness in a population.

Mortality measures the incidence of death (number of deaths) in a population. <u>The</u> mortality rate is the most important indicator by which to measure the effect of a <u>disaster on a population</u>.



KNOWLEDGE CHECK

In a disaster setting, what does mortality measure?

A. The number of deaths in a population

B. The incidence of illness in a population

C. The prevalence of illness and death in a population

D. The number of people affected by the disaster in a population

DISCUSSION QUESTION #2

What are three challenges you might face when putting together a disaster surveillance system?

Possible answers include the following:

- Missing baseline data
- Difficulty obtaining denominator data
- Damaged healthcare infrastructure
- Lack of standardized data collection and reporting
- Competing priorities

After you are completed with the discussion, summarize the key learning points from Lesson 1 outlined in the Lesson 1 Summary

LESSON 1 SUMMARY

In this lesson, we define surveillance as the ongoing, systematic collection, analysis, and interpretation of injuries, illnesses, and deaths, for the use in planning, implementation, and evaluation of public health practice. Similarly, disaster surveillance is an epidemiology tool that assesses health effects, monitors relief effort effectiveness, responds to public concerns and media inquiries, and assists in planning for future disasters. Data derived from disaster surveillance activities provide timely, accurate, and relevant information that drives decisions and interventions during a disaster. The two indicators of disaster surveillance are morbidity and mortality. Morbidity is the tracking of injury or illness related to a disaster, and mortality is the tracking of fatalities or deaths. Although public health disaster surveillance is a useful and important tool, when conducting surveillance activities, challenges often arise. Understanding these challenges and preparing for or developing potential solutions will benefit you when you undertake surveillance activities during a disaster.

Lesson 2: Disaster Surveillance Methods

Overview: This lesson focuses on planning for disaster surveillance, considerations for designing or using existing surveillance systems, and morbidity and mortality surveillance during a disaster

Total Estimated Time: approximately 3 hours

Reading and Activities: up to 65 minutes

Group Discussion: up to 45 minutes

Practice Exercise #1: 75 minutes, including a 45-minute review

LESSON 2: DISASTER SURVEILLANCE METHODS

Independent Reading: Tell learners to read the first three sections of Lesson 2— Introduction, Planning for Disaster Surveillance, Steps for Designing and Conducting a Disaster Surveillance System – until they see the STOP sign (pages 12-17).

TIME: 30 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

INTRODUCTION

In Lesson 1, you learned about the purpose and importance of public health disaster surveillance and common challenges or problems encountered when conducting surveillance during a disaster. In this lesson, you will learn about planning for disaster surveillance, considerations for designing or using existing surveillance systems, and morbidity and mortality surveillance during a disaster.

After completing this lesson, you will be able to do the following:

• Explain the steps for setting up a surveillance system during a disaster



- Describe disaster surveillance methods
- Identify considerations for designing or using existing surveillance systems
- Describe how to conduct morbidity and mortality surveillance during a disaster

PLANNING FOR DISASTER SURVEILLANCE

Recall from Lesson 1 that surveillance is the systematic or regular collection of data, data analysis, and distribution or sharing of information to people (e.g. health officials or government officials) who can use it.⁴⁴ The ultimate surveillance goal is public health actions based on data collected from surveillance activities. Particularly for disaster surveillance, public health actions and interventions are geared toward estimating the magnitude of an illness or disease, detecting outbreaks, or documenting the distribution and spread of injury or death in populations affected by a disaster.

Disasters are chaotic and may require you to conduct surveillance activities in an unstable environment. In disaster settings, the routine surveillance system normally in place may not function, may be severely compromised or disrupted, or may not provide data quickly enough for timely decisions.⁴⁵

As you plan and prepare to conduct surveillance activities, several considerations will help you address some of the unique difficulties you may face as a result of a disaster's challenging circumstances:



Syndromic surveillance – If routine surveillance is disrupted during a disaster's early stages, we recommended that you temporarily establish a local, syndromic surveillance system. The syndrome-based surveillance model should be flexible and provide a fast reporting system. Reestablish the routine surveillance system as soon as possible.⁴⁶

Logistics – Consider limiting the number of diseases under surveillance, taking into account the limited skill or willingness of relief workers to collect health data and the compromised logistical or infrastructure networks (e.g., limited or no Internet access, power outages, damaged laboratories).⁴⁷

Partners and stakeholders – In working with government officials, health care organizations, relief agencies and other stakeholders and partners, make sure you take into account the political, financial, and human resources needed to set up a successful public health disaster surveillance system. The support of high-ranking government or

⁴⁴ Thacker SB, Stroup DF. Public health surveillance. In: Brownson, RC and Petitti, DB, editors. Applied epidemiology: theory to practice. New York: Oxford University Press; 1998a. p. 105–35.

 ⁴⁵ Pan American Health Organization. Natural Disasters: Protecting the Public's Health. Washington, D.C. 2000. Report No.: 575. Available from: <u>http://www.preventionweb.net/files/1913_VL206114.pdf</u>
 ⁴⁶ *ibid*

 ⁴⁷ United States. Pan American Health Organization. Epidemiologic Surveillance after Natural Disaster.
 By Josefa Ippolito-Shepherd. Washington, DC: PAHO, 1982. Available from http://helid.digicollection.org/en/d/Jph09ee/2.html. 12 Sept. 2013.

ministry of health officials is important to ensure political commitment and funding to mobilize resources.⁴⁸ For example, you will need someone or some agency to assign you adequate epidemiologic and clerical staff who also have transportation to the field and priority access to health records.

As part of the planning and preparation process, gather background data on the disasteraffected geographical areas, the major disease risks in the affected area (e.g., cholera or malaria), and the at-risk and affected populations. In addition to information provided by the health system, by relief workers, and by local community groups, consider gathering information from unconventional sources – such as newspaper, Internet, or blog accounts – each of which can provide important early warnings.⁴⁹

STEPS FOR DESIGNING AND CONDUCTING A DISASTER SURVEILLANCE SYSTEM

Careful planning is important for developing a strong disaster surveillance system. The information collected and analyzed from surveillance activities helps ensure direction of resources to the areas or populations with the most need, evaluation of program or intervention outcomes, and provision of data for future disaster surveillance systems. While some slight variations might occur, take the following steps to develop a disaster surveillance system:

- Establish objectives
- Determine variables to survey (e.g., case definitions)
- Determine data sources and collect data
- Analyze data
- Disseminate data

The following steps are important in establishing a strong, disaster-situation surveillance system.

Establish Objectives

During disaster, surveillance systems provide data to drive program or intervention activities, monitor poor health outcomes in affected populations, or track injury and death in affected communities. To achieve this purpose, the objectives should be clear and should describe how to use the surveillance information to inform public health action. According to the *Objectives of Surveillance – Inputs and Outputs in Field Epidemiology Manual*, objectives may include a)

⁴⁸ Nsubuga P, White ME, Thacker SB, et al. Public Health Surveillance: A Tool for Targeting and Monitoring Interventions. In: Jamison DT, Breman JG, Measham AR, et al., editors. Disease Control Priorities in Developing Countries. 2nd edition. Washington (DC): World Bank; 2006. Chapter 53. Available from:: http://www.ncbi.nlm.nih.gov/books/NBK11770/

⁴⁹ Pan American Health Organization. Natural Disasters: Protecting the Public's Health. Washington, D.C. 2000.xi, 119 p.—(Scientific Publication, 575). Available from:

assess public health status to inform actions to control occurrence of disease, b) define public health priorities to inform policy and planning, c) evaluate programs to inform decisions about interventions, or d) initiate a research agenda to inform follow-up activities and mitigation efforts.⁵⁰

Determine Variables (Case Definitions)

After you have developed the objectives, you will need an operational definition of the health problem or condition for surveillance. This definition is necessary for accurate recognition and counting of the problem or condition. The operational definition consists of one or more criteria and is known as the **case definition** for surveillance. A case definition is a set of standard criteria for classifying whether a person has a particular disease, syndrome, or other health condition. A case definition must be simple, clearly defined, understandable, and must be practical for use in a disaster setting. Categorize a case using one of the following methods:⁵¹

Clinical case – a clinical syndrome generally compatible with the disease, as described in the clinical description. A general clinical impression that this is a case of disease.

Epidemiologic case – a case in which a) the patient has had contact with one or more persons who either have or have had the disease or have been exposed to an infection point source (i.e., a single source of infection, such as an event leading to a food bornedisease outbreak to which all confirmed case-patients were exposed) and b) plausible transmission of the agent by the usual modes of transmission. A case may be considered epidemiologically linked to a laboratory-confirmed case if at least one case in the chain of transmission is laboratory-confirmed.

Laboratory case – a case that is confirmed by one or more of the laboratory methods listed in the case definition under laboratory criteria for diagnosis

Some case definitions require laboratory confirmation, while others rely on multiple signs or symptoms for a condition where no laboratory test is readily available. When developing a case definition, the elements can include the degree of certainty in the diagnosis:

- Suspected a case classified as suspected for reporting purposes
- Probable a case classified as probably for reporting purposes
- Confirmed a case classified as confirmed for reporting purposes

 ⁵⁰ Pan American Health Organization. Natural Disasters: Protecting the Public's Health. Washington, D.C.
 2000. Report No.: 575. Available from: <u>http://www.preventionweb.net/files/1913_VL206114.pdf</u>
 ⁵¹ *ibid*

It is important that you carefully develop the case definition(s) as the definition must meet the surveillance system's needs.⁵² When diagnosing an illness, disease, or other health condition for disaster surveillance, the case definition criteria might differ from the clinical criteria.⁵³ And in a disaster situation you may have to depend on initial impressions such as a chief complaint rather than confirmatory information such as laboratory results or discharge diagnoses. You will need to find a balance between diagnosis degree of certainty and reporting timeliness.

Data Sources and Data Collection

The surveillance system objectives will help determine the data sources. In a non-disaster event, data will typically come from medical and death records from healthcare providers and medical facilities. If traditional information channels are disrupted or missing, consider using nontraditional sources for information such as humanitarian aid agencies, civil defense organizations, religious officials, or police.⁵⁴

Analyze Data

After you have gathered surveillance data, analyze those data by person, place, and time. Generally, analysis of data to determine the attack rate or incidence proportion seeks to compare occurrence of illness and death in different geographic areas or periods. **Incidence** is the occurrence of new cases of disease or injury in a population over a specified period. **Incidence proportion** is the proportion of an initially disease-free population that develops disease, becomes injured, or dies during a specified (usually limited) period of time.

Equation 2. Incidence proportion



A rate is helpful because it takes into account the size of the population where cases were derived. Usually, a calculation of the number of cases and rates is followed by a description of the population in which the condition occurs (person), where the condition occurs (place), and the period over which the condition occurs (time).⁵⁵ When analyzing data by person, age and

⁵² Centers for Disease Control and Prevention. Case definitions for infectious conditions under public health surveillance. MMWR 1997; 46(RR10): 1-55.

⁵³ Centers for Disease Control and Prevention, Office of Workforce and Career Development. Principles of Epidemiology in Public Health Practice. 3rd ed. Atlanta: GA. CDC. 2012. Available from: <u>http://www.cdc.gov/ophss/csels/dsepd/SS1978/SS1978.pdf</u>

⁵⁴ ibid

⁵⁵ Centers for Disease Control and Prevention, Scientific Education and Professional Development Program Office. Principles of Epidemiology in Public Health Practice, 3rd ed. Available from: <u>http://www.cdc.gov/osels/scientific_edu/ss1978/lesson3/section2.html</u>

sex are common variables. When analyzing data by place, the rate is often calculated by adjusting for differences in the size of the population in the assigned geographical areas. The results are typically shown on a map or table. Analyzing data by time is usually done when you want to describe trends and detect changes in disease occurrence or frequency. In the disaster setting, calculating proportions might not be possible due to a lack of denominator data. Analysis might then be limited to calculating incidence only. Often epi curves are created to produce a visual display of the onset of health problems associated with the disaster. The epi curve displays the time trend, distribution, pattern of spread, and magnitude of health problem ⁵⁶

Disseminate Data

As state, data from disaster surveillance estimate the magnitude of a disease health condition, detect outbreaks, or document the distribution and spread of injury or death in populations impacted by a disaster. Thus timely, regular data dissemination is a critical surveillance component. You must disseminate (i.e., spread abroad) or distribute (i.e., apportion) data in a clear and concise manner. Decision-makers, stakeholders, and partners at all levels must understand your data so they can readily act on the recommendations your data support. Graphs and maps are useful tools that assist in rapid data review and comprehension



Lead a discussion to review key lessons learned. Complete the Knowledge Checks and Discussion Questions. To guide additional discussion, you may use the following questions and suggested answers (20 minutes)

Potential Discussion Question

What are the key steps in setting up a disaster surveillance system?

Possible answer:

First, you must establish objectives that are clear and should describe how to use the surveillance information to inform public health action. Then, determine which variables to survey including their case definitions. You must determine the data sources based on your objectives and available resources. Remember both traditional and nontraditional sources. After you collect the data, you should analyze those data by person, place, and time. Finally, it is critical that you disseminate the information in a clear, concise, and timely manner.

⁵⁶ Centers for Disease Control and Prevention. Create an epi curve. CDC [cited 2013 Nov 10]. Available from: <u>http://www.cdc.gov/training/QuickLearns/createepi/1.html</u>



KNOWLEDGE CHECK

Which of the following is not a key step of a disaster surveillance system?

- A. Establish objectives
- B. Determine variables
- C. Conduct a needs assessment
- D. Analyze data

DISCUSSION QUESTION #3

What are the differences between the degrees of certainty in the diagnosis to meet the need of the surveillance system?

Some case definitions require laboratory confirmation, while others rely on multiple signs or symptoms for a condition where no laboratory test is readily available. When developing a case definition, the elements can include the degree of certainty in the diagnosis:

- Confirmed a case classified as confirmed for reporting purposes
- Probable a case classified as probably for reporting purposes
- Suspected a case classified as suspected for reporting purposes

DISCUSSION QUESTION #4

Why is determining the incidence proportion important? Incidence proportion is the proportion of an initially disease-free population that develops disease, becomes injured, or dies during a specified (usually limited) period of time. It is important for the following reasons:

- To compare occurrence of death and illness in different geographic areas or periods.
- To determine the proportion of an initially disease-free population that develops disease, becomes injured, or dies during a specified (usually limited) period.
- A rate is helpful because it takes into account the size of the population from which cases were derived.

Independent Reading: Tell learners to continue to read the next sections of Lesson 2 – Considerations for Designing or Using Existing Surveillance Methods and Surveillance Methods – until they see the STOP sign (pages 18-21).

TIME: 20 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

CONSIDERATIONS FOR DESIGNING OR USING EXISTING SURVEILLANCE METHODS

As discussed in Lesson 1, disaster surveillance is the ongoing, systematic collection, analysis, and interpretation of data for use in planning, implementation, and evaluation of public health programs. In designing or using an existing disaster surveillance system, set clear, prioritized objectives. Ensure the surveillance system is sustainable for short- or long-term use, depending on the objectives. Once you have established the objectives, use them to limit your data collection and sites to the simplest possible, objective-oriented solution. Surveillance is time and resource intensive, so only use the most efficient method of reaching your objectives. Take into consideration data quantity versus timeliness and simplicity. During a disaster, data collection conditions are often chaotic and unpredictable. Because you do not want to burden or overwhelm staff, you should only collect needed information. You should balance the quantity of the data with how long it will take to collect and analyze those data.

As an epidemiologist, your role in a disaster is to determine the extent of damage to human health, identify the needs of a population, and recommend interventions to reduce further illness or death. Disaster-related morbidity and mortality surveillance is one tool to accomplish these goals. In preparing to set up a disaster surveillance system, several considerations will help you determine whether you need to design and set up a new system or whether you can modify a preexisting system. Begin by determining whether surveillance is the most efficient way to meet your objectives, or could you use an existing, in-place system which, with slight modifications or enhancements, would meet your objectives.⁵⁷ To help you decide on the best course of action, consider the following:

Preexisting information – The preferred method or course of action is to maximize the use of preexisting surveillance data for "baseline" information and modify established, epidemiologic surveillance systems for disaster settings. Determine whether working within the parameters of health resources and systems already available is a viable option, particularly if you are not familiar with preexisting systems and surveillance

⁵⁷ Western KA. Epidemiologic surveillance after natural disaster. Washington (DC): Pan American Health Organization; 1982. Report No.: 420. [cited 2013 Sept 12]. Available from: http://helid.digicollection.org/en/d/Jph09ee/2.html

resources. With scarce resources and limited time, avoiding duplication of efforts is very important.⁵⁸

Syndromic surveillance – If the health infrastructure is severely damaged or if establishing a new surveillance system will be too time-consuming, consider using syndromic surveillance. Syndromic surveillance integrates signs and symptoms, primary complaints or presumptive diagnoses, or other characteristics of the disease, rather than specific clinical or laboratory diagnostic criteria. In areas particularly devastated by a disaster, syndromic surveillance can provide an earlier indication of an unusual increase in illnesses, injury, or death to shape early intervention efforts. Keep in mind, however, that syndromic surveillance is intended to supplement, not to replace, traditional disaster surveillance.⁵⁹

Sentinel surveillance – Different surveillance strategies meet different needs for timely, accurate, and reliable data. Sentinel surveillance occurs when data are gathered from a limited number of sites and is an alternative to population-based surveillance and national surveillance. Although sentinel surveillance is extremely useful for detecting large public health problems, it might not capture rare events, such as the early emergence of a new disease—these infections might emerge anywhere in the population. Sentinel surveillance is particularly useful for monitoring trends. It is less costly than other surveillance methods, but that is because data collection is limited.⁶⁰

Ad hoc surveillance – In addition to using the existing surveillance system, in a disaster setting you have the opportunity to develop and employ a supplemental or ad hoc surveillance system in which medical relief workers take part. A supplemental or ad hoc surveillance system will be useful for areas hit by a disaster that lack a preexisting surveillance infrastructure. Or in circumstances where tents, temporary shelters, or other venues provide medical care because the hospitals and clinics are overwhelmed or unavailable due to road closures, damaged buildings, or other infrastructure challenges.⁶¹

If available data and alternative sources of data will not suffice, establishing a new disaster surveillance system might be your only option. Carefully consider whether you can use existing

⁵⁸ ibid

⁵⁹ ibid

⁶⁰ Nsubuga P, White ME, Thacker SB, Anderson MA, Blount SB, Broome CV, et al. Public health surveillance: a tool for targeting and monitoring interventions. In: Jamison DT, Breman JG, Measham AR, Alleyne G, Claeson M, Evans DB, et al., editors. Disease Control Priorities in Developing Countries. 2nd ed. Washington: World Bank; 2006. P. 997-1015. Available from <u>http://www.ncbi.nlm.nih.gov/books/NBK11770/</u> ⁶¹ ibid

data collection methods—even if not ideal—rather than establishing a new surveillance system. An existing system requires less effort to establish than would a new disaster surveillance system.

Whether you design a new system or modify an existing system, when collecting health data, use generally recognized and accepted data collection forms. You might like to use some other available forms, but the Environmental Hazards and Health Effects, Health Studies Branch (DEHHE/HSB) at the Centers for Disease Control and Prevention (CDC) have also prepared Morbidity and Mortality Disaster Surveillance Forms

(<u>http://emergency.cdc.gov/disasters/surveillance/</u>). And with any form you use, you need to watch for whether that form asks for personal identifying information as extra precautions should be taken to ensure the confidentiality and privacy of respondents or cases.

SURVEILLANCE METHODS

Surveillance is either active or passive. **Active surveillance** employs staff members to regularly contact heath care providers or the population to seek information about health conditions for a limited time period (usually weeks or months). Active surveillance provides the most accurate and timely information, but is expensive. Active surveillance has several benefits in a disaster setting.⁶²

- Active surveillance activities complement regular reporting functions that might be disrupted because of the disaster
- Active surveillance can be used in non-traditional settings. If, for example, a segment of the population is moved to an evacuation center, regular reporting mechanisms lack the flexibility to set up in such locations.
- Active surveillance allows for public health officials to quickly detect infectious disease outbreaks, define or measure morbidity or illness among an affected population, and target relief efforts. Similarly, active surveillance can monitor relief effort effectiveness.

Passive surveillance is a system in which a health jurisdiction regularly receives reports from hospitals, clinics, public health units, or other sources. Passive surveillance is a relatively inexpensive strategy that can cover large areas. It has a low data collection burden and it provides important information for monitoring a population's health. Nevertheless, because passive surveillance depends on people in various institutions to provide data, data quality and

⁶² CDC. Disaster Surveillance. Presentation at COCA conference call: disaster surveillance; December 18 2007.

timeliness are difficult to control.⁶³ Also, passive surveillance relies on health officials to submit health reports. Reporting can be slow if the responsible health officials do not report regularly.



Lead a discussion to review key lessons learned. Complete the Knowledge Checks and Discussion Questions. (10 minutes)



KNOWLEDGE CHECK

______ integrates signs and symptoms, primary complaints or presumptive diagnoses, or other characteristics of the disease, rather than specific clinical or laboratory diagnostic criteria.

- A. Sentinal surveillance
- **B. Syndromic surveillance**
- C. Ad hoc surveillance
- D. Mortality surveillance

DISCUSSION QUESTION #5

What is the difference between active and passive surveillance?

Active: employs staff members to contact regularly heath care providers or the population to seek information about health conditions for limited periods (usually weeks or months). Active surveillance provides the most accurate and timely information, but it is expensive.

Passive: a system in which a health jurisdiction receives reports submitted from hospitals, clinics, public health units, or other sources for unlimited period. It is inexpensive, has a low data collection burden, and can cover a large area. Data quality and timeliness, however, are difficult to control.

⁶³Nsubuga P, White ME, Thacker SB, Anderson MA, Blount SB, Broome CV, et al. Public health surveillance: a tool for targeting and monitoring interventions. In: Jamison DT, Breman JG, Measham AR, Alleyne G, Claeson M, Evans DB, et al., editors. Disease Control Priorities in Developing Countries. 2nd ed. Washington: World Bank; 2006. P. 997-1015. Available from: <u>http://www.ncbi.nlm.nih.gov/books/NBK11770/</u>
Independent Reading: Tell learners to continue to read the next section of Lesson 2 – Disaster Surveillance Indicators and Data Collection Forms – until they see the STOP sign (pages 22-24).

TIME: 15 minutes

NOTE: If learners have read the material and completed the activities before class, skip this step

DISASTER SURVEILLANCE INDICATORS AND DATA COLLECTION FORMS

Recall from Lesson 1 that morbidity (disease or illness) and mortality (deaths) are the two essential indicators of a disaster surveillance system. In most countries, morbidity and mortality reporting is a legally required part of a vital statistics program; many countries have complete data available for these indicators. During a disaster, however, these traditional reporting systems may not function. And you may want to collect data on health conditions not traditionally reported (e.g., amputations, watery diarrhea).

One example of a supplemental surveillance system used in a disaster-setting is the Surveillance in Post Extreme Emergencies and Disasters (SPEED) launched by the Philippine Department of Health and World Health Organization in 2010. SPEED is an early warning disease surveillance system for disaster situations. Its aim is to determine early and potential disease outbreaks and monitor disease trends. During a disaster, SPEED captures data and generates in a timely manner information relevant to health emergency managers from the grassroots up to the national level. SPEED uses syndromic surveillance and focuses on the 21 most common health conditions encountered after a disaster. Since 2010, SPEED has been used in a number of disasters, including in 2011 Typhoon Quiel (international name Nalgae) and Typhoon Sendong (international name Washi).⁶⁴

Disaster-related Morbidity and Mortality Surveillance Indicators

The following table has morbidity and mortality indicators and potential information sources.

⁶⁴ Surveillance in post extreme emergencies and disasters. Center for Health Market Innovations; c2014 [cited 7 July 2014]. Available from: <u>http://healthmarketinnovations.org/program/surveillance-post-extreme-emergencies-and-disasters-speed</u>

Surveillance	Indicators	Sources of Information
Morbidity	 Incidence rate Prevalence rate Age/sex-specific morbidity rate Proportional morbidity rate 	 Outpatient and admission records, shelters, refugee camp clinics Laboratories Feeding center(s) records Community health worker records
Mortality	 Crude Mortality Rate (CMR) Age-specific mortality rate Cause-specific mortality Case Fatality Rate (CFR) 	 Hospital death registers Religious leaders or centers (e.g., churches or mosques) Community reporters (including Community Health Workers) Burial shroud distribution Graveyards Camp administration

Table 2. Morbidity and mortality surveillance indicators and sources of information⁶⁵

Disaster Surveillance Data Collection Forms

Traditional data sources can be used during a disaster to collect surveillance information. However, you may also need supplemental active surveillance if traditional systems are disrupted or if persons seek care outside typical acute care settings.⁶⁶ In these situations, you can use surveillance forms to collect standardized data. Surveillance forms capture morbidity and mortality data. Table 3 describes supplemental form purpose and use.

response/publications_tools/publications/_CRDR_ICRC_Public_Health_Guide_Book/Forward.pdf ⁶⁶ Schnall AH, Wolkin AF, Noe R, Hausman LB, Wiersma P, Soetebier K, Cookson ST. Evaluation of a standardized morbidity surveillance form for use during disasters caused by natural hazards. Prehospital and Disaster Medicine. 2011; 26(2):90.

⁶⁵ Johns Hopkins Bloomberg School of Public Health; International Federation of Red Cross and Red Crescent Societies. Public Health Guide for Emergencies, 2nd ed. Geneva: IFRCRCS; 2008 [cited 2013 Nov 10]. Available from: <u>http://www.jhsph.edu/research/centers-and-institutes/center-for-refugee-and-disaster-</u>

Table 3	3.	Description	of form	types ⁶⁷
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	Morbidity	Mortality
Purpose	Capture individual-level active surveillance of health conditions	Identify the number of deaths related to the disaster and provide basic mortality information
Setting	Acute care facilities (e.g., hospitals) Nontraditional health care setting (e.g., shelter with medical tent)	During a disaster, medical examiners and coroner's office, hospitals, religious institutes (church, mosque) or funeral homes
Use	Use the form to record information about chief complaints and specific infectious syndromes, mental health conditions, injuries, and chronic diseases that best describe the reason the patient seeks immediate care	Use this form for all known deaths related to the disaster. This form does not replace the death certificate

The CDC has developed standardized morbidity and mortality forms you can access at: <u>http://www.emergency.cdc.gov/disasters/surveillance/</u>. Abbreviated forms can be used if summary or less-detailed information is sufficient or when the burden of collecting detailed, individual information is substantial.



Lead a discussion to review key lessons learned. Complete the Knowledge Checks and Discussion Questions (15 minutes). After you are finished with the discussion, continue on to the practice exercise (instructions below)

⁶⁷ Centers for Disease Control and Prevention. Emergency preparedness and response: public health assessment and surveillance after a disaster. Atlanta: CDC [updated 2014 Sept 5; cited 2014 Sept 5]. Available from: <u>http://www.bt.cdc.gov/disasters/surveillance/</u>

KNOWLEDGE CHECK

Which of the following is not a surveillance indicator for morbidity?

- A. Proportional morbidity rate
- **B. Case Fatality Rate (CFR)**
- C. Incidence rate
- D. Prevalence rate

DISCUSSION QUESTION #6

What is the purpose of surveillance forms? Do you have any pre-existing standard surveillance forms to use in a disaster in your jurisdiction?

Surveillance forms capture morbidity and mortality data. While traditional data sources can be used during a disaster to collect surveillance information, you may need supplemental active surveillance if traditional systems are disrupted or if persons seek care outside typical acute care settings. In these situations, you can use surveillance forms to collect standardized data.

Practice Exercise Instructions

Depending on the size of the group, tell learners to complete this exercise individually, with a colleague, or as part of a small group. Instruct them to read through the case study and answer the questions related to each case. Have learners record their answers in the space provided in the participant workbook. Once completed, review the exercise and discuss possible answers.

TIME: up to 30 minutes to complete, then reconvene the group to discuss the answers (up to 45 minutes)

PRACTICE EXERCISE

PRACTICE EXERCISE #1

In this practice exercise, you will apply the concepts learned in this module. Please read through the following case study and answer the questions.

Background

On April 18th, a radiation contamination incident occurred at a nuclear fuel processing plant in Eastern Europe. Due to human error, one of the reactors at the plant underwent a partial nuclear meltdown. The tank temperature rapidly increased, causing the uranium fuel rods to melt and spill into the containment systems. Reactor temperature rose precipitously. Then a chemical explosion released dried radioactive waste into the air, creating a radioactive cloud reaching over 525 kilometers. Although no immediate casualties occurred as a result of the explosion, the rapid spread of the radioactive cloud resulted in the long-term contamination of a more than 800-square kilometer area. The International Nuclear Event Scale (INES) rated the accident a Level 6 (serious accident) that would likely require a long-term disaster response effort.

As part of their response effort, the Ministry of Health and government officials wanted to monitor health status in the affected areas and wanted to respond to immediate, blast-related health threats.

Adapted from: World History Project. Kyshtym Disaster. http://worldhistoryproject.org/1957/9/29/kyshtymdisaster; Kyshtym disaster. http://www.spiritus-temporis.com/kyshtym-disaster/explosion.html; International Nuclear Event Scale. http://www.iaea.org/ns/tutorials/regcontrol/refs/39inesleaflet.pdf; <u>http://www.merriamwebster.com/dictionary/meltdown</u>.

What are the initial steps in setting up surveillance for the radiological event?

- First the ministry of health and government officials should establish decontamination zones, population monitoring in community reception center and address uncertainty of health care infrastructure, staff and resource remaining in radiation affected localities and surrounding areas.
- Establish surveillance objectives (Discuss potential objectives for this event. Examples include assess public health status of those living in fallout zone and determine emerging health threats such as acute radiation sickness. Determine case definition and associated variables. (Discuss case definition. Examples include those exhibiting acute radiation sickness or those with blast injuries. Discussion should be around ability to have clinical, epidemiologic, and laboratory cases, as well as distinction between confirm, probable and suspect case)
- Determine data sources (Discuss potential places to collect data and the feasibility of data collection. Potential answer: all hospital emergency rooms within fallout zone)

Describe the considerations to help you determine whether you need to design and set up a new surveillance system, or modify a preexisting system.

- Do you have an electronic, hospital-based surveillance system available?
 - o If yes, is the system operational?
 - o If yes, does the system capture the variables you outlined above?
- If a preexisting system is not available, determine whether a new system is feasible.
 - How would you design the ad hoc system?
 - What hospitals would be included in the new system?
- How would you capture the surveillance data (e.g., paper forms, electronic submission)?

What types of data would you collect as part of your surveillance? Describe why.

- <u>Chief complaints</u> provides information on the primary symptoms associated with suspected or confirmed illness following the explosion.
- <u>Number of new cases (incidence) of suspected or confirmed disease(s) following</u> <u>the accident</u> – provides information on the number of new cases reported within a specific period following the explosion.
- <u>Age</u> provides insight on whether the exposure affected different age groups differently.
- <u>Sex</u> provides insight on whether the exposure affected males and females differently
- <u>Geographic location</u> given the spread of the radioactive cloud, geographic location of cases will provide insight into the geographic spread of disease.
- <u>Time of symptoms onset</u> Knowing when symptoms started with respect to the timing of the explosion is helpful to determine possible chronic, ongoing explosion effects.

Traditional (passive) systems were disrupted and many persons needed care outside typical acute care settings. How then do you collect morbidity and mortality data?

Initiate active surveillance to capture morbidity and mortality data using supplemental surveillance forms.

- Morbidity: Use forms to record information about the chief complaints, such as injuries, chronic diseases of those affected by the explosion, and mental health conditions.
- Mortality: Use forms for all known deaths related to the explosion. This form does not replace the death certificate.

After you are completed with the scenario, summarize the key learning points from Lesson 2 outlined in the Lesson 2 Summary

LESSON 2 SUMMARY

In this lesson, we have defined disaster surveillance as the systematic collection, analysis, and interpretation of relevant health data. Data derived from disaster surveillance activities are useful to establish morbidity and mortality trends, set priorities, and plan and assess relief efforts. The information obtained from the surveillance activities is useful in preparing for future disasters.

SKILLS ASSESSMENT

Independent Skills: Tell learners to complete this exercise individually. This is designed to test knowledge gained from Module Three. Instruct them to read each of the questions in the practice exam and select the best answer. Have participants record their answers in the space provided in the participant workbook. Once completed, review the exercise and discuss possible answers.

TIME: up to 30 minutes to complete, then reconvene the group to discuss the answers (up to 15 minutes)

- 1. Which of the following is NOT a characteristic of public health surveillance?
 - A. Systematic data collection
 - B. Ongoing
 - C. One-way
 - D. Timely dissemination of data
- 2. Morbidity measures the disease state of a person or the incidence of illness in a population
 - A. True
 - B. False
- 3. What does mortality surveillance measure in a disaster setting?
 - A. The incidence of illness or disease in a population
 - B. The incidence of death in a population
 - C. The rate of live births during a disaster
- 4. Which of the following best describes passive surveillance?
 - A. Laboratories, physicians, or other healthcare providers regularly report cases of disease to health officials using a standard case definition of that particular disease.
 - B. Local health agencies initiate the collection of specific cases of disease from laboratories, physicians, or other healthcare providers.
 - C. The ongoing, systematic collection, analysis, interpretation, and application of realtime disease indicators that allow for detection before public health authorities would otherwise identify them.
- 5. Surveillance is essentially concerned with the gathering of information necessary for rational planning, operation, and evaluation of activities.
 - A. True
 - B. False

6. Which of the following best describes active surveillance?

- A. Laboratories, physicians, or other health care providers regularly report cases of disease to the local health officials using a standard case definition of that particular disease
- B. Local health officials initiate the collection of specific cases of disease from laboratories, physicians, or other health care providers
- C. The ongoing, systematic collection, analysis, interpretation, and application of realtime indicators for disease that allow for detection before public health authorities would otherwise identify them.

7. Which of the following is a disadvantage of syndromic surveillance?

- A. Small outbreaks are not detected
- B. Data collection is through automated means
- C. Early, real-time information gathering
- D. Health department staff burden is low for data collection
- 8. The lack of baseline surveillance data before a disaster makes no difference in confirming certain disease increases.
 - A. True
 - B. False
- 9. A(n) ______ is a set of standard criteria for classifying whether a person has a particular disease, syndrome, or other health condition
 - A. Sentinal surveillance
 - B. Case definition
 - C. Syndromic surveillance
 - D. Objective

10. An epidemiologist's role in disaster surveillance is to

- A. Define quickly and detect outbreaks and health problems
- B. Identify groups at risks for poor health outcomes
- C. Identify and determine the needs of groups in a population who have a high risk for poor health outcomes
- D. Inform the relief response efforts and monitor their effectiveness; and
- E. Assist in planning for future disasters and recommend ways to decrease the consequences of future disasters.
- F. All of the above

This is the completing of Module Three. Please thank the learners for attending, ask if they have any remaining comments or questions, and provide any contact information for any additional follow-up questions.

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