



**University of the Philippines Manila
THE HEALTH SCIENCES CENTER
College of Nursing**

*WHO Collaborating Center for Nursing Leadership and Development
CHED Center of Excellence for Nursing Education
JV Sotejo Hall, Pedro Gil St., Ermita, Manila*



**DISASTER NURSING (N110)
STUDY GUIDE**

**Week 9: DISASTER RESPONSE
Priority Public Health Interventions**

Introduction

Welcome to Week 9!

Direct and indirect impacts of disasters and emergencies are most felt in community settings. The first 72 hours after a disaster is a critical window period for response activities and interventions (UNOCHA, 2017).

This section will discuss key public health approaches, strategies, and measures or interventions under disaster response.

Learning Outcomes

After studying this topic, you should be able to:

1. Describe the impacts on health by different types of disasters
2. Describe the specific interventions to address health issues and concerns
3. Discuss major approaches and key strategies in responding to public health issues during disasters
4. Describe general measures in ensuring control of communicable disease during disasters and emergencies

Impacts on Health by Disasters

While there general principles for disaster response work, nurses must be guided on the possible impacts of different disasters and emergencies to tailor fit their approaches, strategies, and interventions.

As a whole, **priorities for public health action in disasters and emergencies** include:

- **Demand for casualty treatment** (including from secondary hazards)
- **Risks for survivors** due to lack of shelter, blankets, heating, water, means to prepare food, etc.
- **Risks of endemic disease** due to disruption of water and sanitation, or proliferation of disease vectors
- (Later on) **Requirements for rehabilitation of people** seriously injured and need for **psychological support** for traumatized people

Table 1 shows a summary of the impacts per type of disaster, and the specific interventions for health that should be done.

Table 1. Public Health Impacts and Health Interventions per Disaster/Emergency (Dones, 2017)

TYPE OF DISASTER/ EMERGENCY	REMARKS	DIRECT		SPECIFIC HEALTH INTERVENTIONS
		Direct	Indirect	
Earthquake	<ul style="list-style-type: none"> Impact is greatest close to the epicenter but varies depending on the type of soil (its susceptibility to liquefaction) Injuries arise primarily from falling objects and collapsing buildings Secondary hazards add to damage and casualties: <ul style="list-style-type: none"> ➢ Aftershocks: many people, including many whose homes have not been destroyed, will be living in the open for several days/weeks for fear of aftershocks ➢ Fires, landslides, and tsunamis (in coastal areas) 	<ul style="list-style-type: none"> High mortality (instantaneous or rapid death) from: <ul style="list-style-type: none"> ➢ Severe crush injuries ➢ External or internal hemorrhage ➢ Asphyxia due to dust inhalation or chest compression Many people with minor cuts and bruises Some with simple fractures Minority with serious multiple fractures or internal injuries and crush syndrome (requiring surgery and other intensive treatment) Some with burns and electroshocks Respiratory diseases due to dust exposure (and possible asbestos fiber exposure from rubble) 	<ul style="list-style-type: none"> Disruption of water supplies and sewerage systems in urban areas, with possible cross-contamination – increases in endemic water-related diseases Exposure to the environment – hypothermia or hyperthermia Disruption of transport (e.g. blocking of roads, destruction of bridges, etc.) – people unable to reach health service even for routine health/medical care Impoverishment of people rendered destitute, leading to reduced ability to pay for health care and other services Delayed deaths (within a few days) may occur due to dehydration, hypothermia, hyperthermia, crush syndrome, wound infections or postoperative sepsis Myocardial infarction, chronic diseases (e.g. diabetes or hypertension) and mental health problems (including depression) may increase 	<ul style="list-style-type: none"> Search and rescue (SAR); recovery of bodies Casualty treatment Emergency shelter, water and sanitation Food (ready-to-eat) for a few days Psychosocial support Rehabilitation of people seriously injured Repair/reconstruction of damaged health facilities Replacement of damaged equipment and stocks
Landslides	<ul style="list-style-type: none"> Usually result from heavy storms, long-duration rainfall, earthquakes or volcanic eruptions. Areas prone to landslides are generally known from experience (historic data). Likelihood of landslides is increased by: <ul style="list-style-type: none"> ➢ Intense deforestation ➢ Soil erosion and the construction of roads ➢ Settlements ➢ Pipelines and other structures in hilly/mountain areas Impact is generally confined to a narrow belt where the slide passes 	<ul style="list-style-type: none"> High mortality from suffocation and severe trauma in a localized area Generally few injuries requiring treatment Mental health problems including depression 	<ul style="list-style-type: none"> Destruction of water springs and distribution systems Exposure to the environment if a whole settlement is affected – hypothermia in a cold climate Short- and long-term mental health problems, including depression, are possible 	<ul style="list-style-type: none"> SAR; recovery of bodies Limited casualty treatment Emergency shelter Rehabilitation of damaged water sources and distribution systems Treatment for mental health problems including depression

TYPE OF DISASTER/ EMERGENCY	REMARKS	DIRECT		SPECIFIC HEALTH INTERVENTIONS
		Direct	Indirect	
Volcanic eruption	<ul style="list-style-type: none"> A volcanic eruption may involve some or all of: <ul style="list-style-type: none"> ➢ Explosions ➢ Pyroclastic flows (travelling at high speed) ➢ Hot ash releases, lava flows and gas emissions Gas emissions (from a crater, or through fissures or by ground soil diffusion on the slopes of a volcano) may occur independently of an eruption Secondary hazards associated with eruptions may include: <ul style="list-style-type: none"> ➢ Hot mudflows ('lahars') ➢ Fires started by lava or hot ash ➢ Floods caused by melting ice or by snow or rain during or shortly after an eruption 	<ul style="list-style-type: none"> Volcanic mass, falling rocks and flying glass: <ul style="list-style-type: none"> ➢ Mediated trauma, crush type injuries and lacerations Hot ash, gases, rock and magma <ul style="list-style-type: none"> ➢ Skin and lung burns, asphyxiation and conjunctivitis or corneal abrasion Ash-fall, particularly in fine particles <ul style="list-style-type: none"> ➢ Aggravation of bronchial asthma and other chronic respiratory conditions (in children as well as in adults) Gases and fumes <ul style="list-style-type: none"> ➢ Possible acute respiratory distress Ash and acid rain <ul style="list-style-type: none"> ➢ Eye and skin irritation Hot mudflows or "lahars" <ul style="list-style-type: none"> ➢ Bury people with little chance of being rescued alive 	<ul style="list-style-type: none"> Injuries and asphyxiation of people in buildings that collapse under the weight of ash –especially wide-span buildings and particularly if the ash is wet Possible gastrointestinal problems due to ingestion of food or water contaminated by ash Accidents resulting from poor visibility and slippery roads due to ash Possible increase in malaria/water-borne diseases if lava flows and rock falls create unusual flooding and pooling of water Impoverishment of people who lose homes and livelihoods (property, livestock and/or agricultural land) leading to reduced ability to pay for health care (and other) services 	<ul style="list-style-type: none"> Evacuation of people from the ash-fall area until the ash has settled and no more eruptions are expected Provision of masks (or better, respirators) that retain small particles of ash for those who need to work in an ash-contaminated environment and for vulnerable groups (children, old people, those who have respiratory problems e.g. asthma) SAR; recovery of bodies Emergency shelter Restricting vehicle movements to essential traffic only Maintaining food security conditions over the long term (lava, ash and acid rain damage crops, soils and livestock)
Landslide	<ul style="list-style-type: none"> Usually result from heavy storms, long-duration rainfall, earthquakes or volcanic eruptions. Areas prone to landslides are generally known from experience (historic data). Likelihood of landslides is increased by: <ul style="list-style-type: none"> ➢ Intense deforestation, ➢ Soil erosion ➢ Construction of roads, settlements, pipelines and other structures in hilly/mountain areas Impact is generally confined to a narrow belt where the slide passes 	<ul style="list-style-type: none"> High mortality from suffocation and severe trauma in a localized area Generally few injuries requiring treatment Mental health problems including depression 	<ul style="list-style-type: none"> Destruction of water springs and distribution systems Exposure to the environment if a whole settlement is affected – hypothermia in a cold climate. Short- and long-term mental health problems, including depression, are possible 	<ul style="list-style-type: none"> SAR; recovery of bodies Limited casualty treatment Emergency shelter Rehabilitation of damaged water sources and distribution systems Treatment for mental health problems including depression
Cyclones/ Typhoons	<ul style="list-style-type: none"> Also called hurricanes or severe tropical storms Move inland from the sea A wide area is struck by high winds and heavy rains Greatest damage to life and property is from associated secondary events such as storm surges (tidal waves), flooding and landslides. 	<ul style="list-style-type: none"> Drowning Injuries and trauma due to flying debris and building collapse Asphyxiation due to entrapment in collapsed buildings Electrocution due to downed power lines 	<ul style="list-style-type: none"> Destruction of water storage and distribution installations Contamination of water supplies if chemical factories or storage facilities are impacted Impoverishment and increased food insecurity due to destruction of crops, trees, livestock, houses and household assets 	<ul style="list-style-type: none"> Information to people concerning dangers of contaminated water and how to assure safe drinking water Distribution of water treatment tablets to people, with clear instructions for (and if possible supervision of) their use Provision of water treatment chemicals to health facilities and

TYPE OF DISASTER/ EMERGENCY	REMARKS	DIRECT		SPECIFIC HEALTH INTERVENTIONS
		Direct	Indirect	
	<ul style="list-style-type: none"> Settlements located in low-lying coastal areas are worst affected, but flooding and landslides further inland can also be devastating 		<ul style="list-style-type: none"> Outbreaks of communicable diseases are rarely observed. However, the risk for water- and vector-borne disease can be exacerbated if changes in the physical environment increase human exposure to existing disease vectors Short- and long-term mental health effects are likely 	<p>disinfectants to any facilities flooded</p> <ul style="list-style-type: none"> Vector control measures (against vectors likely to proliferate) Heightened disease surveillance Raising awareness of the risks associated with clean-up activities Search and rescue Evacuating people, when necessary, establishing and managing temporary shelter sites (e.g. in schools) until flood waters recede Short-term food assistance (when needed) and assistance to restore food security Restoration of electric power and water supplies Rehabilitation of sewerage infrastructure Repair/restoration of transport routes and communications systems
Flashflood, Tidal wave, Tsunami	<ul style="list-style-type: none"> Narrow valleys may be hit by flash floods as a result of exceptionally heavy rains upstream in the catchment area, or dam bursts, including the breaking of natural dams formed when debris from landslides blocks a valley river bed Coastal areas may be hit by tidal waves/storm surges (associated with cyclones/typhoons) or tsunamis (due to undersea earthquakes) 	<ul style="list-style-type: none"> Drowning Some injuries, especially during hasty evacuations and clean-up activities (particularly small lacerations and punctures due to nails and broken glass in debris) Electrical shocks from downed power lines 	<ul style="list-style-type: none"> Contamination of water supplies by flood water and by overflowing latrines and septic tanks, leading to increased levels of diarrhea Wells near rivers can be contaminated and filled with sand Potential for increased transmission of endemic water- and vector-borne diseases after a flood due to: <ul style="list-style-type: none"> ➤ Emergence of new breeding sites ➤ Disruption of vector control activities ➤ Overcrowding in shelters Contamination of the environment by toxic chemicals is possible, if industries or waste disposal sites are flooded Long-term impoverishment of (and increased food insecurity among) people who have: <ul style="list-style-type: none"> ➤ Lost crops, ➤ Lost other means of livelihood or essential property 	<ul style="list-style-type: none"> SAR Evacuating people, when necessary, establishing and managing temporary shelter sites (e.g. in schools) until flood waters recede Short-term food assistance (when necessary), and assistance to restore food security Information to people concerning dangers of contaminated water and how to assure safe drinking water Distribution of water treatment tablets to people, with clear instructions and supervision of their use Provision of water treatment chemicals to health facilities and disinfectants to any facilities flooded Vector control measures Heightened disease surveillance Raising awareness of the risks associated with clean-up activities

TYPE OF DISASTER/ EMERGENCY	REMARKS	DIRECT		SPECIFIC HEALTH INTERVENTIONS
		Direct	Indirect	
			<ul style="list-style-type: none"> Risks of reduced nutritional status and reduced ability to access and pay for health care 	
Industrial/Chemical disaster	<ul style="list-style-type: none"> May include industrial and transportation accidents involving toxic chemicals and pollution incidents associated with mining activities. Sudden, acute incidents as a result of: <ul style="list-style-type: none"> Fire, explosion or other accident in the handling of chemicals at an industrial or storage site Impact of a natural disaster or terrorist attack on such sites, transportation of hazardous chemicals Silent releases from industrial or storage sites due to undetected leaks, or from waste sites. Outbreaks of illness may be the first sign of such releases Exposure may be limited to people within the site, or extend to the public outside via air or water pollution or, more slowly, through the contamination of soil and food 	<ul style="list-style-type: none"> Deaths and serious injuries from explosions, building collapses and transport accidents Burns Deaths and illness/internal damage from exposure to toxic chemicals: <ul style="list-style-type: none"> During release: from direct dermal exposure and inhalation Later: from dermal exposure through contact with contaminated objects and ingestion of contaminated food or water Eye or skin irritation, bronchoconstriction or central nervous system depression, can occur within a few minutes or hours of exposure chronic lung damage, respiratory difficulties and cancers Accidents involving volatile hydrocarbon compounds, herbicides, ammonia or chlorine have particularly serious public health effects Low socioeconomic status populations living near hazardous sites (including storage sites) are particularly at risk People with diabetes or asthma, and smokers, may be particularly susceptible 	<ul style="list-style-type: none"> Psychological and psychosocial effects: fear and anxiety, increase in disease and non-specific medical symptoms Social disruption if people are displaced Economic costs 	<ul style="list-style-type: none"> Registration, diagnostic testing, treatment and monitoring of exposed individuals, with advice from the nearest poisons center (in case of chemical poisoning) Information to the public on risks and precautions: e.g. sheltering from air pollution (staying indoors and closing all windows), restrictions if water, soil or food supplies are contaminated Evacuation, if necessary, and provision of essential services at the evacuation sites (if health risks are acute) Prevention or containment of fire-fighting water run-off (using drainage ditches or holding tanks) Monitoring the source of contamination and likely contaminated media well beyond the moment at which the release is thought to have been controlled Remediation measures to make the environment safe and clean
Radiation Emergency	<ul style="list-style-type: none"> May arise from: <ul style="list-style-type: none"> A nuclear accident in a nuclear reactor A radiological accident in a hospital, a research institution or industrial plant using radioactive materials The loss or improper disposal of radioactive sources, or during the transportation of radioactive materials. Terrorist activity using highly radioactive materials packed around 	<ul style="list-style-type: none"> Acute ('deterministic') effects in case of exposure to very high doses of radiation: skin burns, radiation sickness (nausea, vomiting and diarrhea), lung impairment or death Visual impairment may appear several months after the exposure to ionizing radiation, and eye cataracts some years later Late ('stochastic') effects: cancers and genetic (inheritable) defects 	<ul style="list-style-type: none"> Psychological and psychosocial effects: fear and anxiety, increase in disease and non-specific medical symptoms Social disruption if people are displaced 	<ul style="list-style-type: none"> First medical care for radiation victims based on principles of emergency medicine (physical and biological investigations by the emergency medical team): life-saving and urgent medical care of combined injuries Iodine prophylaxis using single large age-appropriate doses of stable iodine for the whole population at risk if the inhalation of radioactive iodine could result in high thyroid radiation doses (e.g. in an accident at a nuclear

TYPE OF DISASTER/ EMERGENCY	REMARKS	DIRECT		SPECIFIC HEALTH INTERVENTIONS
		Direct	Indirect	
	<p>traditional explosives (the so called "dirty bomb") cannot be ruled out</p> <ul style="list-style-type: none"> In the short term, people may be exposed to external irradiation and/or the internal radiation through inhalation. Later exposure may be through the ingestion of contaminated food 			<p>reactor or radioiodine production/distribution facility):</p> <ul style="list-style-type: none"> ➤ 12.5 mg for infants ➤ 100 mg for adults

DO NOT DISTRIBUTE

Approaches to Emergency and Disaster Management in the Community

In doing disaster response work in the community, there are two (2) main approaches:

- **Cluster**
- **Public health**

Table 2 shows the differences between these approaches. While these are two distinct approaches – **in reality, disaster response in the community combines both cluster and public health approaches** in order to achieve the goals of: (1) **providing risk-based, timely and anticipatory response actions to address basic, life-preservation and immediate needs of communities and government**; and (2) **affected communities/populations are able to continue life with dignity and prevent or minimize exacerbation of disaster/emergency situation** (NDRRMC, 2020).

Table 2. Community Approaches to Emergency and Disaster Management (Dones, 2017)

CLUSTER APPROACH	PUBLIC HEALTH APPROACH
<ul style="list-style-type: none">• Ensure more coherent and effective response• Mobilize groups of agencies, organizations and NGOs to respond in strategic manner across all key sectors or areas of activity each sector having clearly a designated lead• In support of existing government coordination structure and emergency response mechanisms	<ul style="list-style-type: none">• Population perspective• Community and individual interventions• Long-term perspective• Focus on meeting basic needs• Access for all but identify vulnerable populations

However, it is important to note that **the realization and success of disaster response (and early recovery) heavily depends on the quality, appropriateness, and completion of activities under the pre-impact/incident phase (disaster prevention, mitigation, and preparedness)** (NDRRMC, 2020).

Key Strategies for Disaster Response in the Community

Individuals, families, population groups, and communities are most vulnerable immediately after a disaster event or crisis situation. Depending on the type of disaster/emergency, recovery may take weeks, months or in some cases, years.

Keep in mind the following key strategies when doing disaster response activities on the ground:

1. **Meet physical needs (food, water, shelter)**
2. **Ensure safety**
 - a. Protect from ongoing risks
 - b. Avoid or minimize additional trauma
 - c. Reduce exposure to violence
3. **Thoughtful management of deceased bodies**
4. **Family reunification**
5. **Adhere to community rituals (whenever possible)**
6. **Conduct meaningful activities**
7. **Consult communities on locations of significant places (e.g. places of worship, burial sites, schools, health facilities, etc.)**
8. **Ensure information provided is relevant, accurate, and timely**
9. **Reduce negative impacts of media**

Priority Public Health Interventions

Found below are the **minimum level of necessary services to be provided** as you plan and prepare for the implementation of disaster response activities under the health sector/cluster and together with other sectors:

1. **Adequate shelter for displaced persons**
 - Evacuees should be protected from the elements (e.g. harsh sunlight, heat, rain, cold, strong winds, dust)
 - Secure against violence (ensure children and women are protected as these groups face the highest risk of physical violence and sexual abuse in shelters)
 - Provide allocations for privacy
 - Avoid overcrowding
 - Floor area per person: 3.5 m²
 - Fresh air ventilation per person per hour: 20-30 m³
 - Adequate ventilation: Combined openings at least 10% of floor area
 - Adequate lighting: 5-foot candle (minimum)
2. **Sufficient quantities of accessible drinking water**
3. **Facilities for excreta and liquid waste disposal**
4. **Protection of food supplies against contamination**
5. **Protection of individuals in affected population against vector-borne diseases through vector control activities and chemoprophylactic methods**

WATER, SANITATION, AND HYGIENE (WASH)

Safe and Clean Water

Post-disaster event, the **provision of adequate amounts of safe and clean drinking water** is of crucial importance. It should be first made accessible to victim-survivors and relief workers, and found in essential locations such as hospitals and treatment centers.

After ensuring drinking water is available and accessible in stricken/affected areas, **making water available for domestic uses** (e.g. cleaning, washing, bathing) **should be considered**.

- **Considerations in Assessing Water Supply:**
 1. Assess water resources for human consumption to ascertain the availability of water (quantity and quality) in relation to the demand.
 2. Estimate the demand, identify possible sources and assess the possibility of developing these resources.
 3. Consult local people in the identification of water sources to be developed.
 4. Tap the expertise of the local sanitary engineer in the assessment of the water resources and the conduct of sanitary survey
 5. Always consider seasonal factors in the assessment
- **Immediate Actions in Securing Water Supply:**
 1. Estimate water requirements and assess water supply possibilities.
 2. Make an inventory of water sources and assess all sources in terms of their quality and yield.
 3. Protect water sources from pollution. Provide water in good quantities and reasonable quality.
 4. Improve access to supplies by developing water sources and a storage and distribution system to deliver sufficient amounts of safe water, including reserve.
 5. Conduct regular sample collection and testing of water quality.
 6. If possible, use water sources that do not need treatment. If there is a large number of evacuees, decontamination of water is necessary. Treat water according to the characteristics of the raw water.
 7. Set up schedules for operation and maintenance.

- **Considerations in Determining Water Need:**

1. **Minimum demand (per person per day)**

- Calculate the following:
 - 2 liters for drinking
 - 10 liters for food preparation and cooking
 - 15 liters for bathing
 - 15 liters for laundry
 - 10 liters for sanitation and hygiene

2. **Quality**

- To preserve public health, **a large amount of reasonably safe water** is preferred over a small amount of purified water.

3. **Control**

- Bacteriological, biological, chemical, physical, and radiological quality of water must be deemed safe
 - There are no fecal coliforms per 100 ml at the point of delivery
 - People drink water from a protected or treated source in preference to other readily available water sources
 - Steps are taken to minimize post-delivery contamination
 - No negative health effect is detected due to short-term use of water contaminated by chemical (including carry-over of treatment chemicals) or radiological sources, and assessment shows no significant probability of such an effect

4. **Other Needs**

- **Hospital and clinics**
 - Outpatient: 5 liters per patient per day
 - Inpatient: 40-60 liters per patient per day
- **Mass feeding centers**
 - Humans: 20-30 liters per person per day
 - Animals:
 - Cow/carabao: 30 liters per day
 - Pig: 1.5 liters per day
 - Goat: 1.5 liters per day
 - Poultry: 2 liters per day

5. **Water Decontamination/Disinfection**

- Water purifier: 2 tablets per person per day
- HTH (high-test hypochlorite) Stock Solution: 1 liter/20 families/5 days
- Shock disinfection: 50-100 parts per million (ppm) of 60-70% of available chlorine
- Environmental cleaner-sanitizer

6. **Drinking Water Container:** 1 container of 10 liters per family

7. **Communal Water Storage Tank**

- 10 liters per person per day
- Volume of tank good for 2 days demand; half full in the evening; with free residual chlorine of 0.7 ppm

8. **Shallow Well:** for toilet flushing and cleaning

9. **Water Points**

- Distance between water point and users: **150 m (max)**
- **Minimum number of water points: 1 tap per 250 users**
- **Queuing time** at a water source is **no more than 15 minutes**
- It takes no more than 3 minutes to fill a 20-liter container

Sanitation and Waste Management

Immediate Actions

Once a suitable location has been identified and shelter facilities are being constructed/set-up, the following are immediate actions in relation to sanitation and waste management:

1. Establish sanitation teams for the construction and maintenance of facilities

2. Set up services for vector and vermin control
 3. Set up services for management of dead bodies
 4. Establish a monitoring and reporting system.
 5. Include environmental health as an integral part of health promotion
- **Considerations in Assessing Excreta Disposal:**
 1. What is the current defecation practice (including anal cleansing)? If it is open defecation, is there a designated area?
 2. Is the current defecation practice a threat to water supplies (surface or ground water) or living areas?
 3. Are there any existing facilities?
 - If so, are they used?
 - Are they sufficient?
 - Are they operating successfully? Can they be extended or adapted?
 4. What is the ratio of domestic facilities to population?
 5. What is the maximum one-way walking distance for users?
 6. Are people prepared to use pit latrines, defecation fields, trenches, etc.?
 7. What is the level of the groundwater table?
 8. Are soil conditions suitable for on-site excreta disposal?
 9. Do current excreta disposal arrangements encourage vectors?
 10. Are there materials or water available for anal cleansing? How do people normally dispose of these materials?
 11. How do women manage issues related to **menstruation**? Are there appropriate materials available for this?
 - **Considerations in Drainage:**
 1. Is there a drainage problem?
 - Flooding of dwellings or toilets
 - Vector breeding sites
 - Polluted water contaminating living areas or water supplies?
 2. Is the soil prone to water logging?
 3. Do people have the means to protect their dwellings and toilets from local flooding?
 - **Considerations in Solid Waste Management:**
 1. Is solid waste a problem?
 2. How do people dispose of their waste? What type of and how much solid waste is produced?
 3. Can solid wastes be disposed of on-site?
 4. Does it need to be collected and disposed of off-site?
 5. Are there health facilities and activities producing waste? How are wastes being disposed of? Who is responsible?
 - **Types of Excreta Facilities**
 1. Communal Trench Latrine: for 50 persons, 1.2 m x 0.3 m x 0.6 m
 - Use only soil for cover

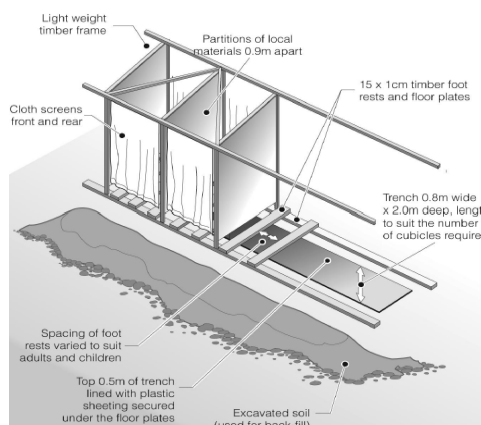


Figure 1. Deep Trench Latrine

2. Pit Latrine: 1 seat for 20 persons, 1.2 m x 0.6 m x 0.6 m
 - Locate latrine downhill from water sources
 - Should not penetrate ground water and should be at least 2 meters above water table

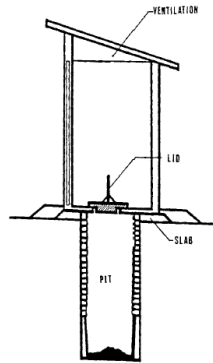


Figure 2. Simple Pit Latrine

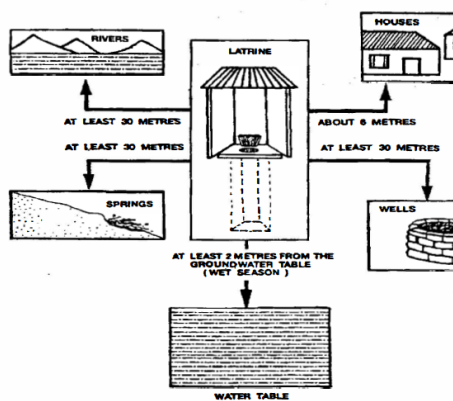


Figure 3. Recommended Location of Pit Latrine

3. Ventilated Improved Pit (VIP) Latrine: 1 seat for 20 persons, 0.8 m x 0.7 m x 3.0 m
 - Location must be downhill
 - Minimum safe distance of 30 m from nearest drinking source
 - Not close to trees
 - On slightly raised ground so rainwater can drain easily

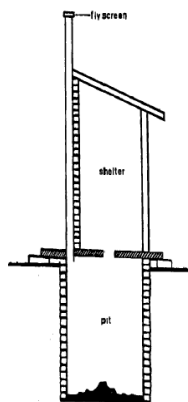


Figure 4. VIP Latrine

4. Pour-Flush Water-Sealed Toilet: 1 seat for 20 persons
 - Has a special pan cast in the floor slab and provides a water seal of 20-30mm
 - Built downhill and minimum safe distance of 30 m
 - Should only be built in soil permeable and can absorb water from the pit

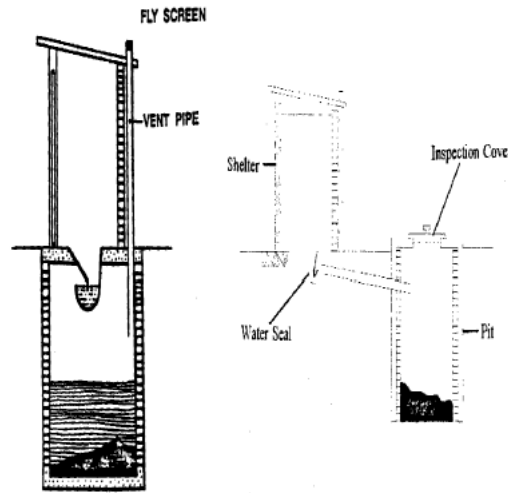


Figure 5. Pour-Flush Latrine with Shelter and Offset Pit

5. Others: “Antipolo,” Aqua Privy, Deep Pit Latrine, Reed Odorless Earth Closet (ROEC), Chemical Toilet: 1 seat for 20 persons

- **Considerations in Excreta Facilities:**
 1. Urinals: Urine Soakage, Four-Funnel Urinal
 2. Children's Feces: Should be disposed of immediately and hygienically
 3. **Distance of Latrines:** Appropriate distance should be followed to prevent contamination of food, water supply, and living quarters
 - From **users: 250 m (max)**
 - From **shelters: 30 m (min)**
 - From any **water source: 25 m** radius
 4. Bottom of Latrines:
 - Bottom of any latrine should be **at least 1.5 m above the water table. Drainage or spillage from defecation systems must not run towards any surface water source or shallow groundwater source**
- **Considerations in Liquid Waste Facilities:**
 1. Infiltration Trench, Grease Trap and Soakage Pit, Baffle Grease Trap, and Cold Water Grease Trap
 2. Location **not less than 25 m radius** from **any source of water supply**.
 3. Protect from vermin harborage and breeding
 4. There should be no standing wastewater around water points or elsewhere in the settlement
 5. Drainage: Run-in and run-off water management
 6. Shelters, paths, water and sanitation facilities should not be flooded or eroded by water
- **Considerations in Solid Waste Facilities:**
 1. Storage
 - **100-liters capacity per 10 families**
 - **Distance from users: 15 m (max)**
 - Bulk storage bin: centralized bin for temporary storage before collection

- No contaminated or dangerous health waste in living or public spaces
- 2. Collection
 - Organize a camp refuse collection team
- 3. Disposal
 - Burial: Communal Open Pit, 1.2 m x 1.2 m x 1.8 m
 - Cross Fire Trench Incinerator: for 20 families (2.4 m x 0.3 m x 0.3 m)
 - Barrel and Trench Incinerator, Bailleul Incinerator, Inclined Plane Incinerator, Open Corrugated Iron Incinerator, Rock Pit Incinerator, Drying Pan Incinerator and Open Turf Incinerator: for 10 families
 - Final disposal does not create health or environmental problems

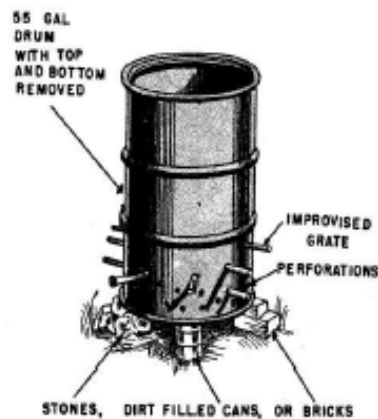


Figure 6. Barrel and Trench Incinerator

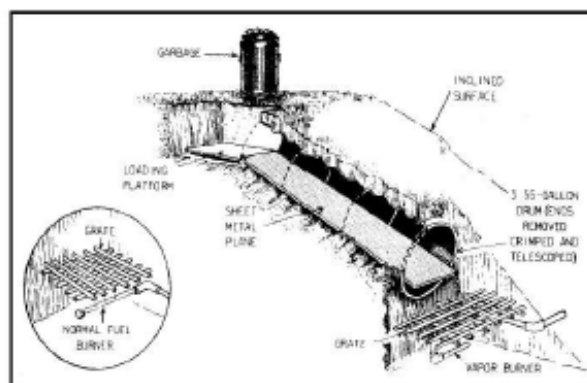


Figure 7. Inclined Plane Incinerator

• **Considerations in Health Care Wastes:**

1. Be aware of the public health and occupational risks from health care waste
 - **Vaccination, notably for Hepatitis B** should therefore be **provided to waste handlers**
 - All waste handlers should **wear protective clothing**
 - Handwashing and disinfection are a must
2. Minimize health care waste
3. Segregate
 - To be done at point of generation using dedicated, colored and/or marked containers
 - **Separate wastes into three (3) main categories:**
 - **Infectious sharps** (collect sharps in puncture proof containers with a lid that can be closed, mark with biohazard symbol)
 - **Non-sharp infectious wastes**
 - **Non-infectious wastes**

4. If **no separation of wastes** takes place, the **whole mixed volume of health care waste needs to be considered as being infectious**
5. Dispose properly
 - Wastes to be **buried** and should **not be incinerated**:
 - **Used infectious plastic syringes and needles**
 - **Other infectious PVC plastics** such as tubing, catheters, IV sets
 - **Anatomical wastes**

Vector and Vermin Control

Vectors (e.g. mosquitoes, flies) and vermin (e.g. rats, cockroaches) may harbor and spread diseases among humans when cleanliness and proper sanitation in the shelter/camp is not observed.

- **Considerations in Assessment**
 1. What are the vector-borne disease risks and how serious are these risks?
 2. If vector-borne disease risks are high, do people at risk have access to individual protection?
 3. Is it possible to make changes to the local environment to discourage vector breeding?
 - By drainage
 - By excreta disposal
 - By refuse disposal
 4. Is it necessary to control vectors by chemical means?
 5. What information and safety precautions need to be provided to households?
- **Preventive Measures**
 1. Conduct vermin population density survey
 2. Vulnerable populations are settled outside of the malarial/dengue zone
 - In areas of known malaria risk:
 - Spraying of shelters with residual insecticide and/or retreatment/distribution of insecticide-treated mosquito nets in areas where their use is well-known
 - In areas endemic of dengue:
 - Water storage containers should be covered to prevent them from becoming mosquito-breeding sites. Attempts should be made to eliminate pooled water which may be gathering amongst the debris.
 3. Modify vector breeding or resting sites
 4. Screen the windows and/or doors in the living quarters
 5. Rats, flies and other mechanical nuisance pests should be kept within acceptable levels
 6. Intensive fly control is carried out in high-density settlements when there is risk or presence of diarrhea outbreak
 7. Removal of breeding and harborage places of vectors and maintenance of sanitation. Garbage must be collected and appropriately disposed to discourage rodent vector breeding
 8. Larvae trapping
- **Considerations in Chemical Control for Vermin and Vectors**
 1. 1 sprayer for every 50 families
 2. 1 misting machine for every 50 families
 3. 1 fogging machine for every 500 families
 4. Fumigation for the camp, if needed (with proper precautions); done under the supervision of an emergency sanitary engineer
 5. Adulticides: for crawling and flying insects
 6. Rodenticide: for rats and mice (under some conditions)
 7. Larviciding: introduction of local bioremediation microbes

Deepening Your Understanding

Environmental Health in Emergencies and Disaster

To learn more about water, sanitation, and hygiene, and other technical details you may access the following resources:

- World Health Organization (2002). Environmental health in emergencies and disasters: A practical guide.
https://www.researchgate.net/publication/242467342_Environmental_health_in_emergencies_and_disasters
- Harvey, P., Baghri, S. & Reed, B. (2005). Emergency sanitation: Assessment and programme design
https://ec.europa.eu/echo/files/evaluation/watsan2005/annex_files/WEDC/es/es.htm

NUTRITION

In disasters and emergencies, the **five (5) most common causes of death** are **diarrhea, acute respiratory infection, measles, malnutrition, and malaria (in endemic areas)**. People affected by disasters are especially vulnerable to diseases when the disaster and its immediate consequences reduce disease resistance because of malnutrition, stress, fatigue, and unsanitary living conditions (post-disaster) (WHO, 2002). Existing malnutrition among individuals can be exacerbated by post-disaster situations, and the key is **nutrition preparedness**:

1. Planning: Every effort should be done to formulate an intersectoral and comprehensive plan for nutrition preparedness (i.e., NNC's Nutrition Preparedness in Disasters and Emergencies Plan or NPDEP)
2. Nutritional management is an institutional and multisectoral concern
 - It is equally the responsibility of the national government, local government and even non-government units.
 - Disaster Coordinating Teams implement the NPDEP while involving the Municipal Nutrition Action Officer in the creation of Disaster Response Team
3. Adequate Nutrition: During emergencies, **infants (<1y/o) and children (<5y/o)** are the **most vulnerable group**
 - Interrupted breastfeeding and inappropriate complementary feeding will heighten the risk for malnutrition, illness and mortality
4. Resource Generation and Mobilization
 - Maintain a stockpile of culturally acceptable food items that can be stored for a long period of time such as rice, canned goods, noodles, dried fish and canned/powdered milk.
 - Intensify campaign on creating vegetable gardens in schools and backyards.
 - Identify and coordinate with donor agencies and companies that can donate food during disasters
5. Public Education
 - Promote the acceptability and utilization of donated foods ideal for disasters (i.e. compact food)
 - Support **the innovation of nutritionally dense ready-to-eat foods**
6. Cultural and Indigenous Habits
 - Customs should be taken into consideration in food management
7. Gatekeepers
 - Identification of local/tribal leaders are critical for nutrition education, supplementation, and resettlement feeding

Energy Requirements

For initial planning purposes

Average daily energy requirement: 2,100 kcal per person per day

When the data are available, the planning figure should be adjusted according to:

- **Physical activity level:**
 - Add:
 - 140 kcal for moderate activity,
 - 350 kcal for heavy activity (e.g., during construction or land preparation works)
- **Age/sex distribution:** When adult males make up more than 50% of the population, requirements are increased; when the population is exclusively women and children, requirements are reduced.

Special needs of pregnant and lactating women

- Pregnant women
 - Need an **additional 300 kcal/day**
 - If malnourished, need another 500 kcal/day
 - Should receive iron and folate supplements
- Lactating women
 - Need an **additional 500 kcal/day**
 - If malnourished, need another 500 kcal/day
 - Should receive sufficient fluids, taking into account physical activity

Other nutritional requirements

- Protein: 10 to 12% of diet (i.e. 52 to 64 g)
- Fat/oil: 17% of diet (i.e. 50 g)
- Micronutrients: a range of micronutrients (vitamins and minerals) are required for survival and good health

Ideal foods for disaster

- Carbohydrate sources: rice, root crops, bread, noodles
- Protein sources: eggs, canned meat and fish, fresh meat and fish, dried meat and fish, milk
- Fat sources: cooking oil, margarine
- Vitamin and mineral sources: fruits and vegetables
- Others: coffee and other beverages

Nutritional Assessment

- The most widely accepted practice is to **assess malnutrition levels in children aged 6-59 months** as a **proxy for the population as a whole**. Table 3 shows the classification of acute malnutrition in children according to the child growth standards of the World Health Organization
- **Reports should always describe the probable causes of malnutrition**
- Nutritional edema should be reported
- Two-stage cluster sampling is normally used: 30 clusters are selected, then 30 children within each cluster

Table 3. Classification of Acute Malnutrition according to WHO Child Growth Standards

Classification of Acute Malnutrition			
	Mild Malnutrition	Moderate Malnutrition	Severe Malnutrition
Edema of both feet	No	No	Yes
Weight-for-Height	80-90% (-1 to -2 SD)	70-79% (-2 to -3 SD)	< 70% (-3 SD)
MUAC	12.5 to 13.5 cm	12.0 to 12.5 cm	<12 cm
Body Mass Index	17 to <18.5	16 to <17	<16

- For **children identified** as having **severe acute malnutrition, give vitamin A**. Give one dose in your presence and give one dose to the mother to give to the child at home the next day.
 - **6-11 months: 100,000 IU**
 - **1-5 years: 200,000 IU**
- There should be a **continual search for malnourished children** so that their condition can be identified and treated before it becomes severe.

Feeding Recommendations

- Breastfeeding's multiple advantages are especially important during emergencies
 - **Identify ways to breastfeed infants whose mothers are absent or incapacitated**
 - **Create and sustain an environment that encourages frequent breastfeeding for children under 2 years of age**

Table 4. Feeding Recommendations for Infants and Children

Age of Child	Feeding Recommendations
Up to 6 months of age	Encourage mothers to exclusively breastfeed as often as the child wants, day and night, at least 8 times in 24 hours. Do not give any other fluid or food
6 months to 12 months	Breastfeed as often as the child wants. In addition, give adequate servings of locally available complementary foods at least 3 times a day
12 months to 2 years	Breastfeed as often as the child wants. Give adequate serving of locally available complementary food at least 5 times a day.
2 years and older	Give three meals of family food per day. Also, give nutritious snacks, twice daily.

- A nutritionally adequate breastmilk substitute, fed by cup**, should be available for infants who do not have access to breastmilk
- Use of infant feeding bottles and artificial teats in emergency settings should be actively discouraged**
- Emergencies do not justify routine distribution of breastmilk substitutes**. Formula feeding may increase the considerable risk of infant/child morbidity and mortality. This is because safe and clean water for drinking, needed in formula milk, is not readily available in adequate quantities. Infants and children who are formula fed are at high risk of diarrhea and dehydration due to water potability concerns

Deepening Your Understanding

Nutrition in Disasters and Emergencies

To learn more about feeding and nutrition especially during disaster response, you may access the following resources:

- Disaster risk management for health: Nutrition. https://www.who.int/hac/events/drm_fact_sheet_nutrition.pdf
- World Health Organization (2020). Q&A malnutrition: emergencies and disasters. <https://www.who.int/news-room/q-a-detail/malnutrition-emergencies-and-disasters>
- United States Assistance for International Development (USAID) (2019). <https://www.usaid.gov/global-health/health-areas/nutrition/technical-areas/nutrition-emergencies-technical-guidance-brief>
- Bahwere, P. (2014). Severe acute malnutrition during emergencies: Burden, management, and gaps. *Food and Nutrition Bulletin*, 35(2):S47-251. <https://journals.sagepub.com/doi/pdf/10.1177/15648265140352S107>

MASS IMMUNIZATION

A single suspected measles case in the community/shelter is sufficient to prompt an **immediate immunization response**.

- Life-saving measles vaccine should be made available immediately targeting all infants and children 6-59 months of age
- The suggested target age group may be expanded up to 15 years, if feasible, in areas where there is **substantial crowding**

Each visit to health care facilities should be seen as an opportunity to vaccinate for routine EPI regardless of the reason for the visit. Vaccination program activities should be included as part of basic emergency health care service.

- **Mass vaccination against cholera and typhoid fever is NOT RECOMMENDED**
 - The most practical and effective strategy to prevent cholera and typhoid is to provide clean water in adequate quantities and adequate sanitation.
 - Sufficient soap and hygiene education will further prevent the transmission of both diseases.
- **Mass tetanus vaccination programs are NOT INDICATED**
 - However, tetanus boosters may be indicated for previously vaccinated people who sustain open wounds or for other injured people depending on their tetanus immunization history.
- **Mass vaccination for Hepatitis A is NOT RECOMMENDED**

DISEASE SURVEILLANCE

Ensuring Control of Communicable Diseases

The close proximity of displaced persons living in evacuation centers and temporary shelters increase the risk of transmitting and acquiring communicable or infectious diseases. Without sufficient measures, outbreaks and epidemics can easily occur in these settings and increase the number of deaths in addition to the ones caused directly by the disaster. The following steps outline essential public health actions during the early phase of disaster response (Dones, 2017):

1. **Conduct rapid health assessment**
2. **Provide general prevention measures** in coordination with other sectors including:
 - Food security, nutrition, and food aid
 - Water and sanitation
 - Shelter
3. **Provide community health education messages** including information on how to **prevent common communicable diseases** and **how to access relevant services**
 - Encourage people to seek early care for fever, cough, diarrhea, etc. (especially vulnerable groups such as infants, children, pregnant women, and older people)
 - Promote good hygiene practices (e.g. handwashing, bathing, toothbrushing, clean nails, etc.)
 - Ensure safe food preparation techniques
 - Ensure boiling or chlorination of water
4. **Implement** as indicated, **specific prevention measures** such as mass measles vaccination campaign, expanded program on immunization (EPI), and vector control
5. **Provide essential clinical services**
6. **Provide basic laboratory facilities**
7. **Set-up public health surveillance**
 - Detect outbreaks early
 - Report diseases of epidemic potential immediately
 - Monitor disease trends
8. **Control outbreaks**
 - Prepare
 - Detect (case finding)

- Confirm
- Investigate
- Control measures
- Evaluation

Deepening Your Understanding

Prevention and Control of Communicable Diseases in Emergencies and Disasters

To learn more about prevention and control of communicable diseases in the context of disaster response, read the following (**page 168-174**):

- World Health Organization (2002). Environmental health in emergencies and disasters: A practical guide. Chapter 11: Control of communicable diseases and prevention of epidemics.
https://www.researchgate.net/publication/242467342_Environmental_health_in_emergencies_and_disasters

References

Dones, L.B.P. (2017). Community health nursing interventions during disasters [PDF]. Philippine Nurses Association, Training on Emergency and Disaster Management.

National Disaster Risk Reduction and Management Council (2020). National disaster risk reduction and management plan (NDRRMP) 2020-2030. Quezon City, Philippines: Office of Civil Defense, Policy Development and Planning Service.

United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) (2021). Five essentials for the first 72 hours of disaster response. <https://www.unocha.org/story/five-essentials-first-72-hours-disaster-response>

World Health Organization (2002). Environmental health in emergencies and disasters: A practical guide.
https://www.researchgate.net/publication/242467342_Environmental_health_in_emergencies_and_disasters

Prepared by:

Asst. Prof. Kristine Joy L. Tomanan
Final version: 26 October 2022