Important Contact Information

Local Health Department _____

State Health Department _____

Emergency Management Authority_____

Hospitals_____

Police_____

Fire_____

American Red Cross_____

Public Health Management of Disasters: THE POCKET GUIDE

Linda Young Landesman, DrPH, MSW

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Washington, DC

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ABOUT THE AUTHOR

Linda Young Landesman, DrPH., MSW, is a national expert on the role of public health in disaster preparedness and response. She has edited and authored six books, including *Public Health Management of Disasters: The Practice Guide,* and has developed national standards for emergency medical services response. Dr. Landesman was the Principal Investigator for the first curriculum on the public health management of disasters, sponsored by the Centers for Disease Control and Prevention. This curriculum is currently being used nationwide.

Since 1996, Dr. Landesman has been an assistant vice president at the New York City Health and Hospitals Corporation. She has been appointed to the Weapons of Mass Destruction Committee of the New York City Department of Health and Mental Hygiene, the Advisory Committee of the Mailman School Center for Public Health Preparedness, and the Advisory Committee of the Mailman School World Trade Center Evacuation study. In addition, she is a member of the editorial board of the *American Journal of Public Health* and the Commissioner's Community Advisory Committee of the New York City Department of Health and Mental Hygiene.

Dr. Landesman earned her BA and MSW degrees from the University of Michigan and practiced clinical social work for 10 years. She received her DrPH in health policy and management from the Columbia School of Public Health. Dr. Landesman has had faculty appointments at the New School, Albert Einstein College of Medicine, and Mailman School of Public Health at Columbia University and is now on the faculty of the Public Health Practice Program at the University of Massachusetts–Amherst, where she teaches public health emergency management on-line.

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Overview

OVERVIEW

Public Health Management of Disasters: The Pocket Guide is intended to be a quick field resource to public health interventions in the days immediately preceding and following emergencies. If you need more detailed information, please refer to the *Public Health Management of Disasters: The Practice Guide, second edition,* by Linda Young Landesman, DrPH, MSW. To order, contact the American Public Health Association at http://www.apha.org or call (202) 777-2742.

This overview discusses the roles and responsibilities of public health authorities, disaster plans and information systems, and federal resources and describes the chapters in this guide.

Roles and Responsibilities of Public Health Authorities

Following a disaster, local public health authorities (PHA) have the primary responsibility for the health of a community. The PHA and other health care organizations must prepare in advance as both silo institutions and as part of the larger community planning effort. The PHA work with both health care organizations and disaster response agencies to coordinate the delivery of health care services, to respond to

Overview

any public health threats, and to develop and implement plans for the use and distribution of assets.

Once a disaster strikes, these agencies coordinate the development of a community action plan to address community health needs. This plan includes strategies to fulfill the following responsibilities:

- ensure the continuity of health care services (acute emergency care, primary care, and preventive care);
- monitor the environmental infrastructure (water, sanitation, and vector control);
- assess the needs of special populations (eg, elderly, disabled, homebound, and non–English-speaking);
- initiate injury prevention and surveillance programs;
- ensure that essential facilities will be able to function post-impact (hospitals, health departments, physicians' offices, storage sites for health care supplies, dispatch centers, paging services, and ambulance stations);
- issue health advisories as needed;
- allocate resources to match the needs of the disaster.

Plans, Surveillance, and Information Systems

The emergency management authorities (EMA) at the state and local levels write disaster plans to prepare their communities for responding to disasters. Disaster plans are routinely in place before any disaster strikes. Public health departments, as well as hospitals and health care agencies, should be part of the disaster plan. The disaster plan should also include mutual-aid agreements with surrounding and regional jurisdictions. In the event that additional assets are required, requests can also be made via the EMA through the Emergency Management Assistance Compact (EMAC), a state-to-state mutual aid, which moves assets across state lines quickly with some defined liability coverage.

Disaster epidemiology is used to develop strategies for preventing both acute and chronic health events due to natural or technological hazards. Disaster epidemiology includes the assessment of needs; assessment of the availability and use of health services; surveillance systems for descriptive and analytic investigations of disease and injury; research on risk factors contributing to disease, injury, or death; and information from surveillance systems to develop strategies to control disease.

Emergency information systems (EIS) are used in disaster epidemiology to collect data during the impact, response,

and early recovery stages. First, using the EIS, managers determine the potential public health outcomes for each disaster, such as crush injuries from earthquakes or diarrheal diseases from floods. Then, managers use the EIS to collect data from on-scene sources (such as hospitals, first-responder units, pharmacies, and shelters) in order to determine what health strategies and assets are required.

In addition, the Health Alert Network (HAN), a nationwide integrated information and communications system managed by the Centers for Disease Control and Prevention (CDC), is used as a platform for distribution of health alerts, prevention guidelines, and other information.

Incident Command System

The Incident Command System (ICS) is used to coordinate the response activities from a number of different disaster services agencies. The ICS is initiated in emergencies and includes the management, planning, operations, logistics, and finances involved in responding to a disaster. Each event has an incident commander responsible for on-scene management, and there may be a single command or a unified command.

The Public Health Incident Command System (PHICS) defines activities for clinicians; medical, safety, and environmental

personnel; managers; and support staff. The PHA establish the PHICS to define the roles, responsibilities, chain of command, and job titles of personnel involved in each incident.

Federal Resources

When an emergency starts, expect that it will take hours to days for a local response to get organized, even in the best of circumstances. While some public health emergencies can be handled with local and regional resources, others require federal assistance. Initially, call upon local and regional public health and medical resources through pre-established mutual-aid agreements. Should other assets be required (such as a team from the CDC, medical supplies from the Strategic National Stockpile, or other specialized services), they can be activated by following the procedures of the jurisdictional EMA pipeline.

The local EMA is responsible for determining that further assistance is required and for asking the state EMA to request a "presidential disaster declaration." Each community designates one agency as the local EMA contact that activates the emergency plan and the distribution of assets. You call that agency to describe what you need. It is often the county emergency manager, the chief of police, or the head of the fire department.

Activation of the Strategic National Stockpile (SNS) requires approval, through a declaration by the governor, unless the jurisdiction has a pre-established memorandum of understanding (MOU) with the SNS. The process is for the state PHA to make a request to the state EMA.

If teams are directly deployed from the CDC or through mutual aid agreements, have each team register with the local EMA so that they can be equipped and supported with communication, food, shelter, and so on. To ensure proper federal reimbursement, be sure to track all costs and submit documentation to the local EMA.

For more detail about the EIS and communications systems, please refer to Appendix A.

Chapter Descriptions

This Pocket Guide provides guidelines for public health interventions when disaster is imminent and during the days immediately following specific types of disasters.

Preparation describes the specific tasks to be carried out by public health personnel immediately before and in response to a disaster.

Strategies sets out strategies for how to prepare for and

respond to 13 different disasters, from blizzards to volcanoes.

Diseases illustrates how to recognize a bioterrorist event and how to prepare for and respond to infectious diseases and diseases common to disasters.

Mental Health covers how to organize the mental health services needed by victims of disasters.

Food Safety reminds aid workers how to store and handle food safely and how to take care of vaccines in a power outage.

Data Collection focuses on the public health data that needs to be collected and communicated to coordinating agencies. ◆

General Preparation When Disaster Is Imminent

GENERAL PREPARATION WHEN DISASTER IS IMMINENT

Checklist of Key Activities

Public health authorities may work with other agencies at all levels in carrying out the following activities[1]:

PREPARATION

- Consult your agency's disaster plan for the affected jurisdictions to determine your role, your region's and/or state's role, and when and how assistance comes from the Centers for Disease Control and Prevention (CDC) and other federal agencies.
- Compile complete names and contact information for the specific disaster area you will be serving.

PLANNING AND SUPPORT

- Assess the situation. Determine what functions your agency will need to provide. Communicate with government officials about the public health effects of potential disasters and the services you can provide.

[1] Some of these activities are adapted from Centers for Disease Control. *Public Health Emergency Response Guide for State, Local, and Tribal Public Health Directors, version 1.0,* 2004. Available at: http://www.bt.cdc.gov/planning/responseguide.asp. Accessed October 31, 2005.

Preparation

- Establish a community action plan that includes a response for populations needing special assistance, such as mental and behavioral health services.
- Ensure that a safety and health plan is established, reviewed, and followed for all locations where response is necessary. Ensure that medical personnel are available to evaluate and treat response personnel.
- Assign and deploy resources and assets as needed to sustain 24-hour response operations and to monitor both the allocation and status of health resources and assets.

CONTACT WITH OTHER AGENCIES

- Contact key health personnel within your department or agency who have responsibilities in an emergency and activate the Public Health Incident Command System (PHICS).
- Work with emergency management agencies on evacuation plans where needed for nursing homes, hospitals, home care facilities, and other institutions.
- Establish communications and coordinate with health and medical organizations. Verify their treatment and

support capacities. Activate the Health Alert Network (HAN).

- Initiate participation of the public health authority in your community's Emergency Operations Center (EOC).
- Engage legal counsel as part of the emergency response effort. Determine the actions required to issue a health order, such as a quarantine.

COMMUNICATION WITH THE PUBLIC

- Initiate communication activities and health advisories as part of your community's Joint Information Center (JIC):
  - — send specific messages through the HAN;
  - — when evacuation is indicated, work with the local emergency management authority to issue appropriate instructions to the public about taking shelter, turning off utilities, and taking "go packs" of items (see Appendix B).
- Determine what public health information needs to be communicated to responders, health professionals, and the public:

— pull out relevant public service announcements (PSAs):
  - air quality
  - alternative heat and energy sources
  - boil water orders and safe drinking water
  - carbon monoxide poisoning
  - (safe) clean-up
  - downed power lines
  - emergency supply kits (see Appendix B)
  - electrical safety
  - evacuation
  - food safety
  - prescription medications
  - smoke inhalation
  - special needs shelters
  - staying safe in your home and when going outside
  - other relevant topics;

— establish a toll-free public health information hotline;

— communicate public health messages in the appropriate language(s) to persons with limited English proficiency;

— turn on the radio or television so you know what the public is hearing.

- Evaluate when volunteers and donations are needed. Communicate with other agencies and the public.

DISASTER EPIDEMIOLOGY

- Initiate active health systems surveillance, including systems for monitoring deaths, illness, and injuries. Evaluate real-time data, and communicate as directed.
- Establish procedures. Document all response activities.

Emergency Hospital Privileges

The new standards of the Joint Commission on Accreditation of Health Care Organizations (JCAHO) will provide for the granting of emergency privileges for all health professionals where a state certification is required when a hospital's emergency management plan has been activated and the organization is unable to handle patient needs. The process will be similar to that previously used for physicians, but credentials must be verified using appropriate credentialing sources for each profession.

To grant emergency privileges, the following are necessary:

- The individual(s) responsible and alternative for granting emergency privileges are identified (chief executive officer or medical staff president or his or her designee), as are the responsibilities of the individual(s) in charge of granting emergency privileges.
- Mechanisms are developed to manage the activities of individuals who receive emergency privileges and to allow staff to readily identify these individuals.
- A privileging process is established with a verification procedure.

Hospitals granting emergency privileges must also have in place certain managerial and security procedures to fulfill the following responsibilities:

- maintain records of those credentialed;
- orient volunteers about hospital operations;
- request confirmation of active memberships and privileges and the American Medical Association profile;
- obtain a signed statement from the "non" staff

physician attesting to these facts and allowing the hospital to obtain necessary documents from the hospital where the physician currently holds privileges;

- verify medical credentials through databases (such as the National Practitioner Data Bank, the state's medical licensing authority, and Office of Professional Medical conduct) or a photo identification card.

To receive emergency privileges, a physician needs ***one*** of the following:

- a current picture hospital identification card;
- a copy of a current license to practice and a valid government-issued picture identification card;
- a disaster medical assistance team (DMAT) identification card;
- presentation by a current hospital or medical staff member(s) with personal knowledge regarding the practitioner's identity;
- identification indicating that the individual has been granted authority by a federal, state, or municipal entity to render patient care in emergency circumstances.

Physicians credentialed in an emergency need clear identification that includes a picture, name, and service in typed print saying "disaster privileges." A contrasting color may be needed. In the event of a power outage, a Polaroid camera and a label maker or wrist bands will be useful. ◆

Strategies for 13 Disasters

STRATEGIES FOR 13 DISASTERS

While most natural disasters are predictable, the majority of man-made disasters are not. Predictions of an impending disaster should signal public health authorities to begin pre-impact activities. The following are disease and injury prevention actions to take in a disaster.

General Strategies for Natural Disasters

PRE-IMPACT

- Conduct special outreach to people with special needs regarding preparations, needed supplies, and use of a buddy system.
- Work with the local emergency management authority to prepare people to evacuate where indicated, take shelter, turn off utilities, and take "go packs" of items (see Appendix B).
- Work with the emergency management authority on evacuation plans, where needed for nursing homes, hospitals, and home care facilities, including those with special needs.
- Begin collecting and analyzing data through active and passive surveillance, evaluate real-time data, and

Disasters

communicate as needed in a timely manner using established operations plans, procedures, or guidelines.

POST-IMPACT

- Prevent disease by providing health advisories on the following topics:
  - — injury prevention (eg, drowning, electrocution, and flying debris);
  - — maintaining safe and adequate supplies of food and water, including issuing "boil water advisories" where needed;
  - — vector (snake, insect, and rodent) control.
- Ensure continuity of public health programs, services, and infrastructure.
- Conduct a needs assessment in affected communities, including a review of public health infrastructure and wastewater and solid waste disposal.
- Assure that health services and supplies continue post-impact, including acute care (particularly for persons with chronic conditions, including those who are homeless), primary care, and emergency care.
- Inspect Red Cross shelters and feeding operations.

- Request volunteers from the American Red Cross and the Medical Reserve Corps.
- Establish environmental controls.
- Establish protective measures against potential disease vectors.
- Monitor the potential release of hazardous materials.
- During the recovery period, ensure an adequate supply of safe water and safe food.
- During clean-up, advise residents to do the following:
  - — use common sense and wear proper clothing, including gloves and a safety face shield;
  - — take precautions to avoid electrical shock;
  - — avoid wading in water because of the potential for downed power lines and broken glass;
  - — when returning to their residence: *(a)* return during the daytime; *(b)* check for structural damage before entering; *(c)* use battery-powered flashlights and lanterns rather than candles, gas lanterns, or torches; and *(d)* check for electrical, natural gas, or propane tank hazards.

Blizzard and Cold Wave

PRE-IMPACT

- Educate communities about the following preventive steps:
  - — prepare buildings for winter (eg, insulate pipes and install storm windows);
  - — collect winter clothing and supplies (eg, extra blankets, warm coats and clothes, water-resistant boots, and hats and mittens);
  - — assemble a disaster supply kit (eg, first-aid supplies, battery-powered weather radio, flashlight, and extra batteries);
  - — stock canned food, a non-electric can opener, and bottled water;
  - — winterize vehicles, fill the gas tank, and assemble a supply kit for the vehicle;
  - — stay away from downed power lines;
  - — engage in healthy snow removal (protecting backs, lungs, and hearts).

POST-IMPACT

- Conduct surveillance for the following health impacts:
  - — frostbite and hypothermia;
  - — carbon monoxide poisoning;
  - — blunt trauma from falling objects;
  - — penetrating trauma from the use of mechanical snow blowers;
  - — cardiovascular events (associated with snow removal).
- Work with your emergency management authority to get food to homebound people.

Drought

POST-IMPACT

- Assess and ensure food security, including availability, accessibility, and cultural consumption patterns.
- Ensure safe water, sanitation, and disease control.
- Conduct surveillance for the following health impacts:
  - — health and nutritional status by assessing weights and heights;
  - — diarrheal and respiratory disease, malnutrition, crowding, and unsanitary conditions;
  - — death rate.

Earthquake

POST-IMPACT

- Determine the time of day, type of housing, and population density to project the number of deaths and injuries where the quake struck.
- Issue media advisories with appropriate warnings and advice for injury prevention:
  - — warnings to turn off utilities and to check homes for hazards (eg, shattered glass and hazardous materials);
  - — advice for how to ensure safe water and safe food.
- Ensure the provision of emergency medical care to those who seek acute care.
- Ensure the continuity of medical care for those who have lost access to prescriptions, home care, and other medical necessities.
- Conduct surveillance for injuries, infectious disease, drinking water sources, and disruption of sewer and solid waste collection systems.
- Determine needed immunizations (eg, tetanus), and allocate resources to appropriate locations.

- Identify environmental hazards, and establish environmental controls.
- Facilitate the use of surveillance forms by search-and-rescue teams to record the following information:
  - type of building;
  - address of the site;
  - type of collapse;
  - amount of dust, fire, or toxic hazards;
  - location of victims and the nature and severity of their injuries;
  - disposition of patients;
  - follow-up contact information.

Explosion

PRE-IMPACT

- Prepare written communications and instructions for victims who experience deafness.

POST-IMPACT

- Notify the medical institutions and personnel to get ready to start providing emergency care, including otologic assessment and audiometry, burn and trauma care, and hyperbaric oxygen treatment.
- Activate the plan for surge capacity. To estimate the "first wave" of casualties, double the number of persons appearing for care in the first hour.
- Monitor respiratory cases presenting at emergency departments.
- Contact the Environmental Protection Agency, and have air monitors activated.
- Work with other agencies to identify potential toxic exposures and environmental hazards.
- Provide updates and health advisories to the public.

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- Establish a victim identification registry with hospitals.
- Plan with mental health services to receive and intervene with the patients' family and friends.

Flood

PRE-IMPACT

- Advise people evacuating to take "go packs" of items (see Appendix B).

POST-IMPACT

- Educate the public regarding the following:
  - routine sanitary procedures when re-entering and cleaning up a flooded home;
  - clean-up procedures and precautions, including mold clean-up;
  - risky behaviors (eg, stay out of cars near rising water);
  - water-borne diseases in flood water (eg, dysentery due to enterotoxigenic *Escherichia coli, Shigella,* hepatitis A, leptospirosis, and giardiasis);
  - risk of disease from eating or drinking anything contaminated with flood water or spoiled from lack of refrigeration;

  - keeping open cuts or sores as clean as possible;
  - seeking immediate medical attention for wounds that develop redness, swelling, or drainage;
  - vector (snake, insect, and rodent) control;
  - injury prevention from exposure to fires, explosions from gas leaks, downed live wires, hazardous waste contamination, and debris.
- Conduct a needs assessment on the public health infrastructure (eg, water, sewage, and electricity) and on health, medical, and pharmaceutical services and supplies.
- Conduct surveillance for injuries, increases in vector populations, infectious disease, drinking water sources, and disruption of sewer and solid waste collection systems.
- Determine needed immunizations (eg, tetanus), and allocate resources to appropriate locations.
- Work with the American Red Cross and your emergency management authority to ensure the availability of safe food and safe water.

Heat Wave

PRE-IMPACT

- Develop early warning surveillance. (Persons at greatest risk are older adults, infants, and those with a history of prior heatstroke, who are obese, or who use neurolepic or anticholinergic medications.)
- Identify the location of residents potentially at risk due to age, pre-existing conditions, lack of air conditioning, or other environmental or health factors.
- Work with utilities to educate the public about preventive actions during energy blackouts.
- Educate the public about the following:
  - — protection from heat, especially for older adults and children younger than 5 years;
  - — maintaining adequate hydration and reducing outdoor activity levels.

POST-IMPACT

- Move residents at greatest risk to air conditioned buildings for at least a few hours each day.

Hurricane

PRE-IMPACT

- Work with your local emergency management authority to prepare people to evacuate and to turn off their utilities.
- Assure evacuation plans for persons with special needs.

POST-IMPACT

- Educate the public about proper clothing and use of equipment during clean-up.
- Advise evacuees against wading in the water.
- Initiate multifaceted injury control programs.
- Educate the public about maintaining safe and adequate supplies of food and water. Work with your emergency management authority to ensure an adequate supply of safe water, safe food, and shelter.
- Conduct a needs assessment of affected communities, including the public health infrastructure.
- Conduct surveillance for drinking water sources; disruptions of sewer and solid waste collection systems;

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increases in vector populations and infectious disease, including gastrointestinal, respiratory, and skin disorders; injuries; and deaths.

- Make determinations of needed immunizations (eg, tetanus).
- Establish environmental controls.
- Establish protective measures against potential disease vectors.

Power Outage

POST-IMPACT

- Initiate the use of emergency generators. Work with suppliers on distribution where needed.
- Advise health facilities about maintaining blood, medication, and vaccine safety.
- Issue health advisories and alerts about the following:
  - — food spoilage;
  - — safe drinking water;
  - — staying warm or cool with extreme temperatures;
  - — power line hazards;
  - — avoiding carbon monoxide poisoning;
  - — avoiding heat stroke;
  - — vaccine storage and monitoring.
- Initiate restaurant inspections. Coordinate with the sanitation department regarding food disposal.
- Check the status of vaccine supply, and replace when needed.
- Identify environmental hazards or other unsafe conditions.

Radiation

PRE-IMPACT

- Evaluate levels of radiation hazard for high-risk population segments.
- Work with emergency management authorities to evaluate the need for sheltering in place or for evacuation, as indicated.
- Initiate a strategy to minimize the psychological effects of the event.

POST-IMPACT

- Activate decontamination units and procedures.
- Help provide uncontaminated clothing.
- Work with emergency management authorities to dispose of contaminated clothing.
- Issue advisories for high-risk groups (eg, pregnant women).
- Educate the public about consuming water and local food products.
- Communicate with health care providers about managing acute radiation syndrome.

- Initiate surge capacity in hospitals to care for victims of radiation exposures.
- Evaluate whether cows have to be condemned.
- Evaluate the need for stable iodide prophylaxis, as follows, and distribute if necessary:

  Stable Iodine Prophylaxis[2]—Exposure to radioisotopes of iodine following an accidental release can result in a significant increase in thyroid cancer, especially in young children....

  Stable iodine blocks the uptake of radioactive iodine by the thyroid. It is available in a number of forms and is most effective when taken as close as possible to the first exposure to radioactive iodine. A single dose will normally protect against inhalation exposure....

  The recommended single doses are:

Age	Recommended Dosage, mg
>12 y	100
3-12 y	50
1 mo to 3 y	25
<1 mo	12.5

[2] Wisner B, Adams J, eds. *Environmental Health in Emergencies and Disasters: A Practical Guide;* World Health Organization; 2003:194. Available at: http://www.who.int/water_sanitation_health/hygiene/emergencies/emergencies2002/en/. Accessed October 27, 2005.

Toxic Substances

PRE-IMPACT

- Pull out information from poison control centers, the Chemical Transportation Emergency Center (CHEMTREC), and industry databases about the clinical management of exposure to toxins.
- Activate emergency medical services and hospital preparedness activities.

POST-IMPACT

- Identify which hazard has been released through analysis of hazard assessments, impact of weather forecasts, and estimation models of plume dispersion.
- Ensure that medical personnel and responders have personal protective equipment.
- Evaluate the potential for adverse health effects by reviewing the Material Safety Data Sheets for toxic substances used, produced, or stored locally.
- Conduct vulnerability analyses to identify affected populations and the potential for adverse public health consequences.

- Determine if specific agents will reach toxic levels in the vicinity of vulnerable populations.
- Determine the minimal threshold of exposure that would trigger evacuation.
- Work with local hospitals to distribute appropriate antidotes, medications, and supplies.
- Provide emergency services and medical care to victims.
- Inform the public, providers, and responders as needed.
- Activate the Health Alert Network.

Tornado

PRE-IMPACT

- Educate the public about avoiding flying debris and protection from high winds.
- Educate the public to establish a protective shelter in a basement if possible, away from windows, while protecting their heads.
- Use redundant warning systems (eg, media alerts and automated telephone warnings).

POST-IMPACT

- Conduct a needs assessment using maps (detailing pre-existing neighborhoods, including landmarks) and aerial reconnaissance, including assessment of the public health infrastructure.
- Educate the public about the loss of shelter and utilities and the importance of maintaining safe and adequate supplies of food and water. Work with the emergency management authority to ensure an adequate supply of safe water, safe food, and shelter.
- Conduct surveillance for drinking water sources; disruptions of sewer and solid waste collection systems; increases in vector populations and infectious disease, including gastrointestinal, respiratory, and skin disorders; injuries; and deaths.
- Make determinations of needed immunizations (eg, tetanus).
- Educate the public about proper clothing and use of equipment during clean-up.
- Identify environmental hazards. Dispose of wastewater and solid waste as needed.
- Establish environmental controls.
- Establish a surveillance system based at both clinical sites and shelters.
- Initiate multifaceted injury control programs.
- Ensure that provisions have been made for acute medical care and continuity of care.

Volcano

PRE-IMPACT

- Develop effective warning schemes.
- Participate in volcano emergency planning workshops and emergency response exercises.
- Prepare educational materials.
- Designate areas for evacuation.
- Provide emergency air-monitoring equipment for detecting toxic gases.
- Stockpile and distribute masks and eye shields or goggles where indicated.
- Prepare for breakdown of water systems.
- Encourage protection by remaining inside sturdy houses with shuttered windows when evacuation is not indicated or possible.
- Strengthen roofs of building with supports or take shelter in the most resistant part of building.

POST-IMPACT

- Monitor air, particulates, and water quality.
- Stay indoors during the worst conditions.
- Identify environmental hazards.
- Provide warnings to the public as needed.

Wildfire

PRE-IMPACT

- Encourage the use of a family wildfire evacuation plan, including taking a "go pack" of items (see Appendix B).

POST-IMPACT

- Activate medical teams to treat burns, inhalation injuries, respiratory complications, and cardiovascular events.
- Monitor respiratory admissions to hospital.
- Work with the Environmental Protection Agency to activate air monitors.
- Track particulate counts, and advise officials and the public as needed.
- Provide updates and communicate warnings to the public.
- Distribute NIOSH-approved disposable particulate respirators (N-95 respirator) and/or educate the public about using a household dust mask and staying outdoors for only short periods while dust is falling. ◆

Diseases

DISEASES

Diseases can be caused by a bioterrorist attack, by natural vectors, or by the conditions people experience as a result of displacement. Disasters exacerbate most chronic conditions (eg, asthma, diabetes, and hypertension) because people lose access to their health care or run out of their medications. Most of those seeking care in the Astrodome after hurricane Katrina, where thousands of people were evacuated, needed help for their chronic conditions.

This chapter also describes how a point of dispensing can be quickly set up to provide medication and vaccination service

Definition of a Bioterrorist Event

A possible bioterrorist event includes ***one*** of the following:

- a single, definitively diagnosed or strongly suspected case of an illness that could be caused by a recognized bioterrorist agent and that occurs in a patient without a plausible explanation for his or her illness;
- a cluster of patients presenting with a similar clinical syndrome, with the cluster exhibiting either unusual characteristics (eg, age distribution) or unusually high

Diseases

morbidity or mortality but without an obvious etiology or explanation;

- an unexplained increase in the incidence of a common syndrome that is greater than seasonally expected levels.

Initial Tasks During a Public Health Infectious Disease Emergency

- Activate the response plan, the Public Health Emergency Operations Center located within the public health authority, and the Incident Command System.
- Determine the urgency of getting prophylaxis to the population.
- Activate the communications plan to the public, and disseminate information on the infectious disease emergency, prevention, and control.
- Increase surveillance at hospitals and clinics.
- Conduct epidemiological investigation as needed.
- Initiate distribution of vaccines and medicines where appropriate.
- Initiate specimen collection and laboratory analyses.

- Conduct infectious disease identification, treatment, and control.
- Institute quarantine or isolation where indicated.
- Coordinate activities with neighboring jurisdictions.
- Interface with appropriate state and federal counterparts, and notify key government officials of the need for additional resources where needed.

Point of Dispensing

When large numbers of persons require prophylaxis by medication or vaccine, organize a point of dispensing (POD) as follows:

- Include these key components:
  - screening station (eg, verify eligibility, fill out forms);
  - client registration (eg, logbook or spreadsheet on a computer);
  - triage area to assess whether persons *(a)* go to the dispensing station, *(b)* need to be medically evaluated, *(c)* need further evaluation, or *(d)* transfer to a health care facility;

- staffing at triage (eg, physicians, nurses, and physician assistants);
- collection of specimens, as needed (eg, nasal swabs);
- dispensing station for antibiotic distribution;
- other staffing (eg, nurses, physicians, and pharmacists);
- counselors (eg, mental health providers, medical advisors, and public health educators) at the POD entrance, near the POD exit, and as consultants for referring persons to hotlines and Web sites;
- clerical area for medical charting;
- space for filling out forms;
- security at the POD entrance, POD exit, and near pharmaceutical supplies;
- provision for printed material (eg, medication fact sheets and epidemiological interviews);
- briefings on the risks of exposure, disease symptoms, and side effects of the antibiotic.

■ Locate the POD in a place that is convenient to those who have to use it and that is large enough to distribute antibiotics or vaccine:

- to provide antibiotic prophylaxis for up to 10,000 persons in 72 hours, allocate at least 2,500 sq ft of space.

■ Before opening for operation, allocate sufficient time to ensure that adequate supplies have arrived and trained staff are ready:

- adequate staffing includes a dedicated physician-in-charge, liaison, supplies coordinator, and clinic manager;
- to provide antibiotic prophylaxis for up to 10,000 persons in 72 hours, allocate 50 to 55 persons per shift for round-the-clock coverage in l2-hour shifts.

■ Establish communications from the Incident Command Center to the POD, from the health department to the public, and from the health department to community medical providers.

■ Establish a plan for triaging the "worried well."

■ If the event involves bioterrorism or a criminal act, identify separate space for law enforcement agencies.

TABLE 1. DISEASES AFFECTING DISPLACED PERSONS IN DISASTERS*

DISEASE	SYMPTOMS	ENVIRONMENTAL RISK FACTORS	HEALTH HAZARDS
Acute upper respiratory tract infections	Symptoms of common cold; In pneumonia—chest pain and pain between shoulder blades	Crowding, poor hygiene	Influenza and pneumonia can result in severe complications in groups at risk
Cholera	Fever; severe liquid diarrhea; abdominal spasms; vomiting; rapid weight loss and dehydration	Same as diarrhea	Same as diarrhea
Diarrhea	Watery stools at least 3xday; may have fever, nausea, or vomiting	Contaminated drinking-water or food or poor sanitation	Dehydration, especially in children; dark color of urine, dry tongue, leathery skin
Diptheria	Inflamed and painful throat, coughing	Crowding, poor hygiene	A secretion is deposited in the respiratory tract which can lead to asphyxiation
Heat Stress	Elevated body temperatures, nausea, vomiting, headache	Excessive temperatures	Risk of coma
(Viral) hepatitis A	Nausea, slight fever, pale-colored stools, dark-colored urine, jaundiced eyes and skin	Poor hygiene	Long-term disabling effects
Malaria	Painful muscles and joints, high fever with chills, headache, possible diarrhea and vomiting	Breeding of *Anopheles* mosquitoes in stagnant water bodies	Disease may rapidly become fatal unless medical care provided first 48 hours
Measles	Fever, and catarrhal symptoms, followed by maculopapular rash	Crowding, poor hygiene	High case fatality rate
Meningococcal meningitis	Infected persons may show no symptoms for a considerable time. When an epidemic is in progress, headache, fever and general malaise suggest diagnosis	Crowding	Only fatal if untreated in early stage; neurological problems in survivors
Rabies	Fatigue, headache, disorientation, paralysis, hyperactivity	Bite from infected animal host	Fatal if untreated
Shigella dysentery	Diarrhea with blood in stool, fever vomiting and abdominal cramps	Contaminated drinking water or food, or poor sanitation, poor hygiene	Case fatality rate may be high
Tetanus	Muscle spasms, starting in the jaws and extending to rest of body over several days	Poor hygiene, injury	Fatal
Typhoid fever	Starts off like malaria, sometimes with diarrhea, prolonged fever, occasionally with delirium	Same as diarrhea	Without appropriate medical care, can lead to fatal complication in a few weeks
Louse-borne typhus	Prolonged fever, headache, body pains	Unhygienic conditions leading to lice infestations	May be fatal without treatment

* Adapted from Table 11.1 Diseases of displaced populations in disasters. In: Wisner B, Adams J, eds. *Environmental Health in Emergencies and Disasters: A Practical Guide*. Geneva: World Health Organization; 2002: 170.

TABLE 2. MOST COMMON EFFECTS OF SPECIFIC EVENTS ON ENVIRONMENTAL HEALTH*

1- Severe possible effect **2**- Less severe possible effect **3**- Least or no possible effect

	Earthquake	Hurricane	Flood	Tsunami	Volcanic Eruption
WATER SUPPLY AND WASTE DISPOSAL					
Damage to civil engineering structures	1	1	1	3	1
Broken mains	1	2	2	1	1
Damage to water sources	1	2	2	3	1
Power outages	1	1	2	2	1
Contamination (biological or chemical)	2	1	1	1	1
Transportation failures	1	1	1	2	1
Personnel shortages	1	2	2	2	1
System overload (due to population shifts)	3	1	1	2	1
Equipment, parts, and supply shortages	1	1	1	2	1
SOLID WASTE HANDLING					
Damage to civil engineering structures	1	2	2	3	1
Transportation failures	1	1	1	2	1
Equipment shortage	1	1	1	2	1
Personnel shortage	1	1	1	3	1
Water, soil, and air pollution	1	1	1	2	1
FOOD HANDLING					
Spoilage of refrigerated foods	1	1	2	2	1
Damage to food preparation facilities	1	1	2	3	1
Transportation failures	1	1	1	2	1
Power outages	1	1	1	3	1
Flooding of facilities	3	1	1	1	2
Contamination/degradation of relief supplies	2	1	1	2	1
VECTOR CONTROL					
Proliferation of vector breeding sites	1	1	1	1	3
Increase in human/vector contacts	1	1	1	2	1
Disruption of vector-borne disease control programs	1	1	1	1	1
HOME SANITATION					
Destruction or damage to structures	1	1	1	1	1
Contamination of water and food	2	2	1	2	1
Disruption of power, heating, fuel, water or supply waste disposal services	1	1	1	2	1
Overcrowding	3	3	3	3	2

* Reprinted from Pan American Health Organization. *Natural Disasters: Protecting the Public's Health.* Washington, DC: PAHO; 2000:51.

Diseases

Mental Health

MENTAL HEALTH

Grief and stress reactions are normal after a disaster, so mental health services should be part of a community's overall disaster plan.

Community Behavioral Services Needed After a Disaster

- Adult, adolescent, and child services.
- Assessments, crisis interventions, evaluations, telephone triage, and referrals.
- Counseling (bereavement, business, crisis, drop-in, individual, and group).
- Debriefing groups for healthcare and emergency workers.
- A family support center.
- Mobile mental health crisis teams.
- Multilingual services.
- Outreach to schools for students, parents, and teachers.

Mental Health

- Short-term treatment.
- A 24-hour hotline and emergency psychiatric service.

Supplementing Staff

Where there is a need to expand the capacity of mental health providers, deployment of mental health staff will depend on the number of people affected and the circumstances of the event. As a guide, in previous disasters, 25 mental health care personnel were deployed per 250 victims.

Use a pre-established mechanism to credential volunteer providers, including registration and orientation. If your community does not have a plan in place to provide behavioral services, see *The Public Health Management of Disasters: The Practice Guide,* second edition, for more information.

Setting Up Family Assistance Centers

In far-reaching disasters, one of the first activities is the establishment of a central place where victims, families, and loved ones can go for relief. Consider establishing two distinct assistance centers: one for the victims and their families and friends and one for the responders and caregivers. Sufficient space is needed for all of the functions, and private space must be carefully planned to minimize retraumatization, such as when families have to identify the bodies of loved ones.

Services provided at assistance centers include the following:

- Child care.
- Crisis counseling and follow-up phone calls.
- Assistance (disaster Medicaid, emergency financial, employment, housing, food stamps, legal, relief application through FEMA, and immigration).
- Distribution of gifts and donations received.
- Meals for victims, families, responders, and caregivers.
- Medication assessments.
- Phone banks.
- Small Business Association (SBA) loans and workman's compensation.
- Stress management for relief workers.
- Training for FEMA interpreters. ◆

Food and Vaccine Safety

TABLE 3. COMMON FOOD BORNE DISEASES CAUSED BY BACTERIA*

DISEASE (CAUSATIVE AGENT)	PRINCIPAL SYMPTOMS	TYPICAL FOODS	PREVENTION AND CONTROL MEASURES
Food poisoning. diarrhea *(Bacillus cereus)*	Diarrhea, cramps, occasional vomiting	Meat products, soups, sauces, vegetables	Cook all potential food sources thoroughly, serve at correct temperature, cool rapidly.
Food poisoning, emetic *(B. cereus)*	Nausea, vomiting, sometimes diarrhea and cramps	Cooked rice and pasta	Minimize hot holding times.
Botulism: food poisoning (heat-labile toxin of *Clostridium botulinum*)	Fatigue, weakness, double vision, slurred speech, respiratory failure, sometimes death	Type A&B: Vegetables, fruits; meat, fish, and poultry products; condiments; Type E: fish and fish products	Purchase commercially processed foods, serve foods sauteed or infused in oils, promptly discard leftovers.
Botulism; food poisoning infant infection (heat-labile toxin of *C. botulinum*)	Constipation, weakness, respiratory failure, sometimes death	Honey, soil	Do not feed honey to infants
Campylobacteriosis *(Campylobacter jejuni)*	Diarrhea, abdominal pain, fever, nausea, vomiting	Infected food-source animals	Cook animal foods thoroughly, cool rapidly, avoid cross-contamination, use pasteurized milk.
Food poisoning *(Clostridium perfringens)*	Diarrhea, cramps, rarely nausea and vomiting	Cooked meat and poultry	Cook animal foods thoroughly, cool rapidly, avoid cross-contaminations.
Foodborne infections, enterohemorrhagic *(Escherichia coli)*	Watery, bloody diarrhea	Raw or uncooked beef, raw milk	Cook animal foods thoroughly, cool rapidly, avoid cross-contaminations.
Foodborne infections, entroinvasive *(E. coli)*	Cramps, diarrhea, fever, dysentery	Raw foods	Teach food handlers good hygiene practice, have food handlers wear gloves, minimize holding time.
Foodborne infections, enterotoxigenic *(E. coli)*	Profuse watery diarrhea; sometimes cramps,vomiting	Raw foods	Teach food handlers good hygiene practice, have food handlers wear gloves, minimize holding time.
Listeriosis *(Listeria monocytogenes)*	Meninfoencephalitis; stillbirths; septicemia or meningitis in newborns	Raw milk, cheese, and vegetables	Use pasteurized milk, cook foods thoroughly.

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* Reprinted from Owen AL, Splett PL, Owen GM, *Nutrition in the Community: The Art and Science of Delivery Services, 4th ed.* Boston, MA: WCB McGraw Hill; 1999:xxx.

Food Safety

TABLE 3. COMMON FOOD BORNE DISEASES CAUSED BY BACTERIA

DISEASE (CAUSATIVE AGENT)	PRINCIPAL SYMPTOMS	TYPICAL FOODS	PREVENTION AND CONTROL MEASURES
Salmonellosis *(Salmonella species)*	Diarrhea, abdominal pain, chills, fever, vomiting, dehydration	Raw, undercooked eggs; raw milk, meat and poultry	Cook animal foods thoroughly, minimize hot holding time, chill food rapidly, avoid cross-contamination.
Shigellosis *(Shigella species)*	Diarrhea, fever, nausea; sometimes vomiting, cramps	Raw foods	Cook animal food thoroughly, minimize hot holding time, chill food rapidly, avoid cross-contamination.
Staphylococcal food poisoning (heat-stable enterotoxin of *Staphylococcus aureus*)	Nausea, vomiting, diarrhea, cramps	Ham, meat, poultry products, cream-filled pastries, whipped butter, cheese	Restrict food handlers with skin lesions or respiratory infections from handling foods.
Streptococcal foodborne infection *(Streptococcus pyogenes)*	Various, including sore throat, erysipelas, scarlet fever	Raw milk, deviled eggs	Use pasteurized milk, teach foods handlers good hygiene practices, chill foods rapidly
Foodborne infections, *(Vibrio parahaemolyticus)*	Diarrhea, cramps; sometimes nausea vomiting, fever, headache	Fish and seafood	Cook fish and seafood thoroughly, minimize hot holding time.

Food Safety

TABLE 4. MEASURES FOR ENSURING FOOD SAFETY*

STEP	HAZARD	ACTION
Supply/purchase	Contamination of raw foodstuffs	Obtain foods from reliable supplier Specify conditions for production and transport
	Contamination of ready-to-eat foods	Purchase foods from reliable supplier
Receipt of food	Contamination of high-risk foods with pathogens	Control temperature and time of transport
Storage	Further contamination	Store foods in closed container or wrapped Control pests
	Growth of bacteria	Control temperature and duration of storage, rotate stock
Preparation	Further contamination, via hands or in other ways	Wash hands before handling food Prevent cross-contamination via surfaces, cooking utensils Separate cooked foods from raw foods Use boiled water, especially if food won't be cooked again
	Growth of bacteria	Limit exposure of food to room temperature
Cooking	Survival of pathogens	Make sure that food is cooked thoroughly (i.e., all parts have reached at least 165°F)
Cooling and cold holding	Growth of surviving bacteria or their spores, production of toxins	Cool food as quickly as possible to a temperatures below 40°F (e.g., place foods in shallow trays and cool to chill temperatures) Avoid overfilling the refrigerator or cold storage room During long periods of cold storage, monitor the temperature fluctuations by occasional measurement
	Contamination from various sources	Cover food properly, avoid all contact with raw foods and nonpotable water Use clean utensils to handle cooked food
Hot holding	Growth of surviving bacteria or their spores, production of toxins	Ensure that food is kept hot (ie, above 140°F)
Reheating	Survival of bacteria	Ensure that the food is thoroughly reheated
Serving	Growth of bacteria, spores, production of toxins Contamination	Ensure that leftovers, or foods prepared in advance, are thoroughly reheated Prevent contact with raw foods, unclean utensils, and nonpotable water Do not touch food with hands Serve food when it is still hot

*Adapted from Table 9.1 Control measures for ensuring food safety. In: Wisner B, Adams J, eds. *Environmental Health in Emergencies and Disasters: A Practical Guide.* Geneva: World Health Organization; 2002:150.

Food Safety

Safe management practices for food handling and vaccines are critical to preventing further illness.

Elements Needed at a Mass Feeding Station[3]

- Water supplies.
- Toilets for staff and others, with at least 1 toilet for every 50 people.
- Hand-washing facilities at food-handler stations and near toilets.
- Facilities for liquid wastes from kitchens—must have grease trap or strainer.
- Facilities for solid wastes from kitchens—dispose of waste in rubbish bins that are tightly covered.
- Basins, tables, and chopping blocks thoroughly disinfect with strong chlorine solution after each meal.
- Facilities for dish washing with separate basins for washing, eating, and cooking.

[3] Adapted from Box 9.2. Elements needed at mass-feeding stations. In: Wisner B, Adams J, eds. *Environmental Health in Emergencies and Disasters: A Practical Guide.* Geneva: World Health Organization; 2002:155.

- Adequate materials for cooking and refrigeration to prepare food sufficient for one meal.
- Layout to prevent cross contamination, with adequate space and separation of raw food and animal products.
- Adequate serving pieces. Use disposables if there are no facilities to thoroughly wash and rinse.
- Control of rodents and other pests:
  - — use traps for flies;
  - — screen kitchen areas;
  - — dispose of sullage and waste;
  - — never place rodenticides on surfaces used for food preparation.
- Food safety information-place posters in full view by those in the food preparation areas.

Vaccine Safety During Power Outages[4]

The following provides guidance regarding vaccine storage issues during power outages. Keep in mind that power may be restored at different times to different parts of a community or region. If in doubt about what to do with the vaccines, check with your local public health authority or the manufacturer.

- **Do not open freezers and refrigerators** until power is restored. Keeping all refrigerators and freezers closed will help conserve their cold mass.
  - — As soon as possible after the power is restored, record the temperature in both the refrigerator and the freezer and the duration of the outage (ie, power was off between X hour and Y hour, and when power was restored, temperature was Z°).
  - — Continue to monitor the temperatures until they reach the normal 2°C to 8°C in refrigerators or -15°C or less in freezers.

[4] CDC/NIP Impact of Power Outages on Vaccine Storage resources page. Centers for Disease Control Web site. Available at: http://www.cdc.gov/nip/news/poweroutage.htm. Accessed October 27, 2005. And personal communication with Drs Stephen Friedman and Sheila Palevsky, New York City Department of Health and Mental Hygiene.

Be sure to record the duration of increased temperature exposure and the maximum room temperature observed. This will provide data on the maximum temperature and the maximum duration of exposures to elevated temperatures.

- **Do not transfer vaccine from the refrigerator to the freezer.** If the power is restored and the vaccine freezes, it may not be usable.
- **Do not disconnect the power cord** so that the unit will operate as soon as power is restored.
  - — Most refrigerated vaccines are relatively stable at room temperature for limited periods of time. The vaccines of most concern are MMR, varicella vaccine, and combinations including varicella, which are extremely sensitive to elevated temperatures. MMR may retain potency at room temperature, depending on the duration of exposure.
  - — If alternative storage with reliable power sources and secure access is available (ie, hospital with generator power), transfer can be considered. If transporting vaccine, measure the temperature of the refrigerator(s) and freezer(s) when the vaccines are removed. When transporting the vaccine,

follow proper cold-chain procedures for storage and handling. Transport in a cooler appropriately packaged with an ice pack(s), and if possible, record the ambient temperature during transport. If uncertain about the ability to maintain the cold chain, leave the vaccine in the refrigerator.

— If you do not have a secure place with a reliable power source, do not transfer the vaccine.

- **Do not discard vaccines.** Vaccine that has been affected by changes in temperature does not differ in appearance from potent vaccine.

  — Separate questionable vaccine from new vaccine and store it in containers that are marked, stapled and banded, and at the proper temperature, until its efficacy has been determined.

  — If concerned about the exposure or efficacy of any vaccine stock, do not administer the vaccine until you have consulted with the state or local health department and verified that it can be used.

  — Vaccine that is no longer usable can be returned to the distributor for a refund of the excise tax.

Manufacturers have telephone numbers to assist public health authorities and immunization providers in responding to inquiries about vaccine stored in refrigerators where power was lost. If contacted, manufacturers will ask how long the vaccine was without power and the temperature of the refrigerator or freezer when the power came back on.

For information about vaccines in power outages, call your local or state immunization program or the manufacturer:

- sanofi-pasteur (formerly Aventis) Power Outage Hotline at (800) 432-2463
- GlaxoSmithKline at (888) 825-5249
- Merck's National Service Center at (800) 672-6372
- Wyeth-Lederle at (800) 99-WYETH (or 800-999-9384) ◆

Data Collection

DATA COLLECTION

Collecting, analyzing, and communicating information about community health status, resources, and emerging needs are key public health authority responsibilities.

Data Collection for Decision Making

Collect the following information about the incident:

- Demographic characteristics of affected areas.
- Assessment of casualties, injuries, and selected illness.
- Numbers and characteristics of displaced populations.
- Coordination of volunteers, categorized by type needed (eg, medical, mental health, and search and rescue).
- Management of healthcare infrastructure.
- Storage and distribution of relief materials, including food, water, and medical supplies.
- Public information and rumor control.

Data Collection

Schedule of Data Collection

DAYS 1 AND 2

Key baseline information needed for immediate relief includes the following:

- Ongoing hazards.
- Injuries (ie, number, categories, and severity, to help prioritize relief activities).
- Deaths.
- Environmental health and the status of community lifelines (eg, water, sewer, and power).
- Health facilities (ie, physical integrity and functioning, and the need for temporary medical shelters and external medical assistance).

DAYS 3 THROUGH 6

Information to guide secondary relief (more than 96% of critically injured patients will already have received medical care) include the following:

- Persistent hazards causing or contributing to deaths still occurring.
- Injuries due to clean-up and secondary impact from the disaster (eg, fire, electrocution, and hazardous material release).
- Availability of and access to primary health care.
- Environmental health and utilities.
- Needs related to food, water, sanitation, shelter, and energy.

AFTER DAY 6

The information needed includes the following:

- Illness and injuries, but health facility reports of infectious disease are less likely since outbreaks are uncommon after sudden impact disasters unless major population displacement or disruptions of the public health system occur.
- Status of the health facility infrastructure, number of health personnel, and availability of medical and pharmaceutical supplies.
- Environmental health (eg, water quantity and quality, sanitation, shelter, and solid waste disposal) and vector populations (eg, mosquitoes and arboviruses).
- Diarrheal disease and acute respiratory infections in shelters or caused by disruption of environmental health services. ◆

Appendices

APPENDIX A

EMERGENCY INFORMATION AND COMMUNICATION SYSTEMS

Emergency Information Systems (EIS)

Emergency information systems (EIS) are used to collect data during the impact phase, the response phase, and the early stages of disaster recovery. An example of an EIS is a syndromic surveillance system. Through syndromic surveillance, public health professionals collect data that precede diagnosis and that warrant further public health assessment and potential response. Syndromic surveillance data are usually collected at the point of medical care (eg, emergency departments) and from existing data streams that help monitor disease patterns. Example data streams include the following:

- ambulance run sheets;
- clusters of medical signs and symptoms;
- emergency department chief complaint,
- laboratory test requests;
- over-the-counter drug use;

Appendices

- prescriptions;
- school or work absenteeism.

Before initiating an EIS, it is necessary to determine the potential public health outcomes for each type of disaster (eg, crush injuries from earthquakes, or diarrheal diseases from floods) and which disaster-related morbidities and mortalities require public health monitoring. EIS epidemiologists need portable computers with linkages to existing electronic disease reporting and access to other data reporting systems, such as the National Electronic Disease Surveillance System (NEDSS).

Communication

Communications before, during, and after a disaster strikes dictate the success of prevention and relief efforts. Communities look to public health authorities for information and guidance, and our colleagues, especially those in governmental agencies, seek our assistance in evaluating and informing them and the public about health risks.

ESTABLISH A LOCAL JOINT INFORMATION CENTER

Establish a local Joint Information Center (JIC) to provide information consistent with information provided by the state JIC. During the impact and post-impact phases of a disaster, public health authorities communicate internally to provide information to other responders and to solve problems. Internal communications also occur among an organization's staff and include call-up and notification of the emergency, assignments to work, sharing of information, status reporting, monitoring and tracking of public health concerns, and so on. External communication occurs among health departments, hospitals, community providers, ambulatory care facilities, the emergency management authority (EMA), first responders, laboratories, pharmacies, veterinarians, community decision-makers, community-based organizations, other responders, volunteers, the media, area residents, and the general public.

COMMUNICATE WARNINGS AND RESPONSE NEEDS

Messages communicated to the public should be positive and reassuring, yet factual. These bulletins must translate technical information into lay language that people can act upon. Messages should be clear, concise, credible, and include information about the nature of the expected hazards, specific step-by-step actions regarding safety precautions, where to go and what to bring when evacuating, and requirements for shelter-in-place, where necessary.

COMMUNICATION SYSTEMS

The Emergency Alert System (EAS), the country's primary warning system, provides national, state, and local authorities with the ability to give emergency information to the general public via broadcast stations, cable, and wireless cable systems.

Public health officials must have alternative systems for communication and be able to establish a link to the community's emergency alert system. Train staff how to use established radio systems and radio frequencies. Utilize protocols developed among the local 911 system, hospitals, and health departments for regular notification as part of the community's emergency response.

The following are available wireless communication systems:

- radio paging (one-way, two-way);
- cellular (commercial, Nextel, GSM);
- wireless extensions to PBX (Spectralink);
- free-space transmission (microwave, infrared);
- satellite phones (Globalstar, Motient);
- OnStar (GPS);
- amateur (ham) radio;
- 800-MHz radio.

800-MHz Radio Operations. If available and operational in your community, use the multichannel, multisite, trunked, 800-megahertz (MHz) radio system to provide two-way radio communications. Follow protocols for utilizing radio transmitter-receivers operating on multiple frequencies and for the length of conversations. Radio transmissions should not last more than 30 seconds. If, while using a portable radio, the listener is unable to hear a transmission, the user should relocate his or her position. If poor reception is not corrected by relocating, portable users may need to spell out their message using the phonetic alphabet listed below. All times should be denoted as military time (eg, 1:00 P.M. is 13:00).

Phonetic Alphabet for Use With 800-MHz Radios

A = Adam	H = Henry	O = Oscar	V = Victor
B = Boy	I = Ida	P = Paul	W = William
C = Charlie	J = John	Q = Queen	X = X-Ray
D = David	K = King	R = Robert	Y = Young
E = Eddie	L = Lincoln	S = Sam	Z = Zebra
F = Frank	M = Michael	T = Thomas	
G = George	N = Nora	U = Union	

APPENDIX B

GO PACK AND EMERGENCY SUPPLY KITS[5]

Go Packs—When You Need to Evacuate

Emergency management officials recommend packing certain supplies in an easy-to-carry backpack or duffel bag—a "go pack" of items that you can grab if you have to leave your home in a hurry. You should include the following items in a waterproof plastic box:

- Battery-operated radio and flashlight, with new batteries.
- Contact and meeting place information for your household.
- Cash (at least $50–$100 in small bills and ATM cards).
- Extra set of car and house keys.
- Copies of important personal documents in a water proof container.
- Bottled water and nonperishable food (such as granola and energy bars).

[5] Adapted from New York City Department of Health and Mental Hygiene. *Preparing For a Public Health Emergency,* pp 4-5. Available at: http://www.nyc.gov/html/doh/downloads/pdf/bt/bt-prepare-brochure.pdf. Accessed October 31, 2005.

- Sturdy shoes, lightweight raingear, hat, and gloves.
- First-aid kit.
- Prescription medications for about a week—be sure the medication has not exceeded its expiration date.
- Medical supplies.
- List of medications each household member takes, including dosages, and a copy of each prescription slip.
- Names of physicians and their phone numbers.

In addition, people with disabilities should know where to go if they need shelter, transportation, and support services; keep needed assistive devices and equipment nearby; know their evacuation options; and repeatedly practice their plan.

The "go pack" may include an extra cane, hearing aid batteries, a walker, a ventilator, lightweight emergency evacuation chair, augmentative communication equipment, insulin supplies, food and water for guide dog, and so on. Some states will not permit patients on Medicaid to receive more than a 30-day supply of medication. It is important to check your local state rules and determine what is allowable. Finally, if the individual receives Social Security benefits (SSI or SSD), the "go pack" should include a copy of the most recent award letter.

Emergency Supply Kit for Shelter in the Home

An emergency supply kit is a stash of essential items to keep in your home in the event that you have to take shelter there for a few days. If you must stay indoors for safety reasons, you should be able to meet your primary needs. As a general rule, families should have enough supplies for 3 days. Here are some items to include in your emergency supply kit:

- Portable radio and flashlight, with new batteries for each.
- Supply of drinking water (1 gallon per day per person).
- Nonperishable foods (such as granola and energy bars, crackers, peanut butter, canned foods with a manual can opener, and nonperishable pasteurized milk).
- First-aid kit (bandages, antibiotic ointment, sterile cloths, pain reliever, alcohol pads, tweezers, scissors, latex or other sterile gloves, and eyewash solution).
- Prescription medications (make sure to replace them when they expire).
- Personal hygiene items (such as moist towelettes, toothbrush and toothpaste, feminine hygiene products, and toilet paper).

- Sanitation supplies (such as soap, bleach, and plastic trash bags).
- Whistle (in case you need to draw attention to your location).
- Special need items for babies, the elderly, and family members with disabilities.
- Sturdy shoes, lightweight raingear, hat, and gloves.
- Copies of important personal documents (such as insurance cards, birth certificates, marriage license, and photo identifications) in a waterproof and portable container.

Family Disaster Plan

Knowing what to do, who to contact, and how to take care of your family are key elements of a disaster plan:

- Make sure each member of your family has contact information for other family members (see the front inside cover for a convenient emergency reference sheet).
- Select an out-of-town relative or family friend whom everyone can contact in case of an emergency; if local phone circuits are busy, long-distance calls may be easier to make.

- Select two predetermined locations where your family can meet if your home is affected by the emergency: one near your home, and one farther away in case your immediate area is affected. Know the quickest routes ahead of time.
- Check the safety plan for your child's school. Know the school phone number and procedures for picking your child up in an emergency. Make sure the school has all of your current contact information.
- Arrange for the needs of elderly, disabled, or ill family members who may need special assistance in emergencies.
- Plan for pet safety and care, and make sure pets have clear contact and identification information on their collars. If you have a dog, make sure it is licensed and has a microchip. For more information, visit the Web site of Animal Care and Control of New York City at http://www.nycacc.org
- Practice your plan with all members of your household.
- Consider personal hygiene supplies.
- Consider child care supplies or other special care items.

APPENDIX C

COMMON DISASTER-RELATED ACRONYMS

ACIP	Advisory Committee on Immunization Practices
APHL	Association of Public Health Laboratories
ARC	American Red Cross
BLS	Basic Life Support
BSL	Bio Safety Level
CCP	Casualty Collection Point
CCRF	Commissioned Core Readiness Force
CDC	Centers for Disease Control and Prevention
DFO	Disaster Field Office
DHHS	Department of Health and Human Services
DHS	Department of Homeland Security
DMAT	Disaster Medical Assistance Team
DMORT	Disaster Mortuary Response Team
DRM	Disaster Recovery Manager
EAP	Emergency Action Plan
EAS	Emergency Alert System
EBS	Emergency Broadcast System
EC	Emergency Coordinator
EIS	Emergency Information Systems

EMA	Emergency Management Authority
EMAC	Emergency Management Assistance Compact
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
EOC	Emergency Operations Center
EPI-x	Epidemic information exchange
EPA	Environmental Protection Agency
ERC	Emergency Response Coordinator
ERT	Emergency Response Team
ERT-A	Advance Element of the Emergency Response Team
ESF	Emergency Support Function
EST	Emergency Support Team
FBI	Federal Bureau of Investigation
FCC	Federal Coordinating Center
FCO	Federal Coordinating Officer
FECC	Federal Emergency Communications Coordinator
FEMA	Federal Emergency Management Agency
FERC	FEMA Emergency Response Capability
FRCM	FEMA Regional Communications Manager
GIS	Geographic Information System
GPMPS	Global Mobile Personal Communication System
GPMRC	Global Patient Movement Requirements Center

GPS	Global Positioning System
GSM	Global System for Mobile Communications
HAN	Health Alert Network
HAZMAT	Hazardous Material
HEICS	Hospital Emergency Incident Command System
HET-ESF	Headquarters Emergency Transportation-Emergency Support Function
HHS	Department of Health and Human Services
HICPAC	Healthcare Infection Control Practices Advisory Committee
ICS	Incident Command System
IMS	Incident Management System
IRAT	Immediate Response Assessment Team
JCAHO	Joint Committee on Accreditation of Health Care Organizations
JIC	Joint Information Center
JIS	Joint Information System
LRN	Laboratory Response Network
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MRC	Medical Reserve Corps
MRE	Meals Ready to Eat
NBC	Nuclear, Biological, Chemical

NCC	National Coordinating Center
NDMOC	National Disaster Medical Operations Center
NDMS	National Disaster Medical System
NDMSOSC	National Disaster Medical System Operations Support Center
NECC	National Emergency Coordination Center (FEMA)
NEDSS	National Electronic Disease Surveillance System
NGO	Non-Governmental Organization
NIC	NIMS Integration Center
NICC	National Interagency Coordination Center
NIMS	National Incident Management System
NIOSH	National Institute for Occupational Safety and Health
NIH	National Institutes of Health
NOAA	National Oceanic and Atmospheric Administration
NNRT	National Nurse Response Team
NPRT	National Pharmacy Response Team
NRP	National Response Plan
NRT	National Response Team
NVOAD	National Voluntary Organizations Active in Disaster
OEP	Office of Emergency Preparedness, US Public Health Service

OSC	On-Scene Coordinator
OSG	Office of Surgeon General
OSEP	Office of Security and Emergency Preparedness
OTPER	Office of Terrorism Preparedness and Emergency Response
OVAG	Organic Vapor Acid Gas (chlorine, hydrogen chloride, and sulfur dioxide)
PHICS	Public Health Incident Command System
PHIN	Public Health Information Network
PIO	Public Information Officer
POD	Point of Dispensing
PPE	Personal Protective Equipment
PHA	Public Health Authority
RACES	Radio Amateur Civil Emergency Services
REC	Regional Emergency Coordinator
SCO	State Coordinating Officer
SEMO	Stare Emergency Management Office
SNS	Strategic National Stockpile
USAR	Urban Search and Rescue
VMAT	Veterinary Medical Assistance Team