

exist. *Corynebacterium diphtheriae* is an aerobic gram-positive bacillus.

For those who are not vaccinated and contract the disease, active immunization and strong antibiotics are the best course of treatment. For those who are infected and are exposed to diphtheria, they must receive a booster of diphtheria toxoid plus active immunization and strong antibiotics. The most common vaccination program is the diphtheria toxoid mixed with tetanus and or pertussis vaccines. Vaccination provides the best preventative treatment.

### EPIDEMIC IN POST-SOVIET COUNTRIES

The fall of the Soviet Union in 1991 engendered the Newly Independent States (NIS) and Baltic States with a fragmented health infrastructure and delays in implementing control measures. During the early 1990s, diphtheria was at epidemic levels in these states. This rapid increase in new cases of diphtheria was the first comprehensive epidemic in industrialized countries in over three decades.

Much research in the literature conclude that the main contributing factors to this epidemic include a large population of susceptible adults and children, decreased childhood immunization programs, loss of a vaccination and preventative programs, poor socioeconomic conditions, deteriorated health infrastructure, and high population movement and migration. A large-scale and well-coordinated international effort met these challenges in the mid-1990s with **aggressive control strategies and high-yield outcomes**.

The legacy of this epidemic includes a reexamination of the global diphtheria control strategy, new laboratory techniques for diphtheria diagnosis and analysis, and a model for future public health emergencies in the successful collaboration of multiple international partners. Diphtheria remains a global health threat and the most recent epidemic in post-Soviet nations is a stark reminder of diphtheria's potency.

**SEE ALSO:** Adolescent Health; Adult Immunization; Center for Disease and Control and Prevention (CDC); Childhood Immunization; Epidemic; Immunization/Vaccination; National Immunization Program (NIP).

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## Disasters and Emergency Preparedness

The common understanding of a “disaster” assumes that some spectacular event has occurred in a particular time and space. Such a perspective is limiting because some disasters, such as famines and epidemics, or creeping environmental disasters (e.g., desertification, water depletion of lakes) involve diffuse processes occurring over long durations.

For this reason, it is best to think of a disaster in more general terms, as the convergence of sociopolitical and biophysical processes that results in an event in which there is severe physical damages and a disruption of the routine functioning of a community and/or ecosystem. By this definition, all disasters have human and material dimensions. It is particularly important to recognize this dual nature of disasters when considering how certain populations are more vulnerable than others to the effects of a disaster.

For example, analyses of the impacts of Hurricane Katrina on New Orleans, Louisiana, in 2005, and the heat wave on Chicago, Illinois, in 1995, reveal how certain marginalized communities were more heavily impacted than other groups because of the way the cities were physically and socially segregated by race and income. Similarly, analyses of the 1984 Union Carbide chemical leak disaster in Bhopal, India, reveal how those lowest on the economic scale experienced the highest fatality rate because the shanty town conditions in which these victims resided led to greater and more direct chemical exposures.

## THE DISASTER MANAGEMENT CYCLE

The disaster management cycle describes a continuum of interlinked activities aimed at the reduction of risk before disaster onset and the pursuit of postdisaster recovery efforts. It is a cycle because what is learned during the recovery phase can be used to produce more effective risk-reduction activities for similar disasters that may occur in the future. The disaster management cycle consists of five parts. The recovery phase consists of 1.) response, 2.) rehabilitation, and 3.) reconstruction activities, while the reduction phase involves 4.) mitigation and 5.) emergency preparedness. Mitigation and emergency preparedness are complementary. The former involves those measures intended to reduce the vulnerability of places to disaster and to reduce the disaster impacts. Mitigation includes such things as the enforcement of building and land use regulations, the control of hazardous substances, and the implementation of safeguards to protect critical infrastructure elements such as power supplies and communications networks. The overall objective of emergency preparedness is to ensure that appropriate systems, procedures, and resources are in place to provide prompt and effective assistance to disaster victims. In essence, it involves those measures that enable organizations, communities, and individuals to rapidly and effectively respond to disasters. The emergency preparedness component includes the formulation of disaster plans; the special provision for emergency action (i.e., evacuation plans, temporary safety shelters, the mobilization of relief

agencies, emergency warning, and communication systems); and public education/awareness programs and training programs (i.e., practice exercises and drills). Although related to other stages of the disaster management cycle, preparedness measures tend to be more strongly oriented toward action by organizations such as police and fire departments, utility companies, hospitals, social service agencies, military, mass media, and nongovernmental agencies.

There are many disruptive elements associated with disasters, including property damage, loss of livelihood, interruption of essential services, economic losses, physical and mental health impacts. Notwithstanding their dual nature, disasters may be classified as natural or technological depending on the nature of the particular causative agent. Examples of the former include earthquakes, tornadoes, hurricanes, and floods, while the latter includes chemical spills, industrial explosions, and nuclear accidents.

## TECHNOLOGICAL DISASTERS

On a macroscale, globalization has contributed to issues of vulnerability and marginalization in the context of technological disasters and has played a role in the unequal distribution of risks and hazards around the world. For instance, in the aftermath of the Bhopal tragedy, it was found that Union Carbide's sister companies in developed countries had more stringent safety measures and occupational health practices in place to protect workers and prevent industrial accidents. The significance of such differences is that the potential for industrial disasters may be higher in the developing world relative to the developed world.

Furthermore, multinational corporations may choose to locate some of their companies in impoverished areas because it is less costly (because they will not have to abide by stringent environmental and health regulations and standards). Those living in such areas are more likely to accept these risk-producing industries because they have no other options to consider in regard to economic gains. This is also true for the location of toxic waste sites and other activities that have a high disaster potential. For example, research has found that toxic waste sites in the United States are more likely to be found near poor African-American neighborhoods, thus increasing the disaster potential for this social group.



*The objective of emergency preparedness is to ensure that appropriate resources are in place to provide effective assistance.*

In the aftermath of a technological disaster such as a chemical contamination event, community members sometimes suffer for decades on a number of fronts (i.e., emotionally, mentally, physically, socially, financially, etc.). Further, low levels of contaminants may sometimes remain in the environment long after the disaster onset, thereby contributing to the experience of chronic, debilitating disease and illness—in effect leaving behind a toxic legacy. Such problems were experienced, for example, by survivors of the nuclear disaster in Chernobyl (1986), and those living in the contaminated Love Canal, New York, site (which brought to the fore the issue of toxic waste in 1978) as well as those residing near the many abandoned industrial sites (known as brownfields) throughout the world. Technological disasters of this type may have severe mental health impacts often described in terms of the syndrome of post-traumatic stress disorder (PTSD). Symptoms of PTSD include nightmares, emotional numbing, withdrawal, insomnia, and irritability. These may be exacerbated by the social conditions that emerge in the posttechnological disaster milieu.

Unlike natural disasters where the physical harm to the body is immediately apparent (e.g., a broken arm caused by falling off a tree), with a technological disaster such as a nuclear or chemical contamination event, the harm is much more insidious. For example, exposure to chemical contaminants may lead to feelings of dread and anxiety because of the uncertainty caused by the lag time between exposure and the development of the disease (e.g., cancer). Moreover, because a technological disaster is often attributed to a human error, victims in the disaster aftermath are often involved in stressful legal cases involving compensation, blame, and the search for those responsible. These circumstances lead to a corrosive community that is characterized by a lack of trust, suspicion, and fragmentation which also contribute to the mental health impacts of a technological disaster. On the other hand, in the face of natural disasters, a sense of community cohesiveness emerges with the common rationalization that the disaster was merely an unfortunate and nonpreventable act of nature. In these circumstances, a therapeutic community may emerge in which people band together in a spirit of goodwill to respond to the natural disaster. Both types of social responses should be considered in developing appropriate emergency preparedness plans.

## NATURAL DISASTERS

Popular accounts of natural disasters tend to “naturalize” the disaster. Unlike the case of human-made disasters where failures in technology represent a *loss* of control over systems we have created, natural disasters are often viewed as the inevitable *lack* of control over natural agents. Consequently, the social and political underpinnings of the “natural” disaster are not considered as part of emergency planning. The impacts of a natural disaster, however, are the result of the interplay of human activities related to land use, living standards, and public policies in addition to the natural agent itself.

For example, in the case of the Chicago heat wave, it was found that intense heat was deadly only in combination with particular social and physical circumstances in which socially isolated members of the black community (such as elderly individuals who were poor and lived alone) were afraid, or unable to, venture out in dangerous neighborhoods to seek air conditioning, nor could they leave their doors and windows open for fear of crime. The city’s emergency plan did not consider this. Similarly, Hurricane Katrina revealed the inadequacy of the emergency plans in New Orleans by emphasizing evacuation by car, neglecting those who simply could not afford this luxury and as a result were stranded in the flood conditions.

Ideally, the development of effective and efficient emergency preparedness strategies should incorporate the lessons learned from the mistakes made in response to similar disasters of the past. In a positive light, this did, in fact, occur in 1999 when Chicago experienced another severe heat wave. In this instance, issues related to vulnerable and marginalized groups were more effectively addressed.

## EMERGENCY PREPAREDNESS MYTHS

Preparedness measures defined in many emergency management plans are often inadequate. These deficiencies may be partially addressed by focusing more attention on tighter coordination among organizations who work with vulnerable groups (such as social service organizations, police, and nongovernmental agencies). Furthermore, attention should focus on measures to ensure clearer communication among people who need information; and greater cooperation among individuals and organizations, particularly between the military and civilian groups.

Second, in drafting emergency preparedness measures, disaster managers should take into consideration the myths and realities of disasters. The Pan American Health Organization (2000) lists several of these. For example, it is a myth that medical volunteers with any kind of medical background are needed at times of emergencies because it is the local population who almost always covers the immediate lifesaving needs. As such, only those medical personnel with those specialized skills that are not available in the affected area may be needed. Similarly, it is a myth that any kind of international assistance is needed, and that it is needed immediately. The reality is that a hasty response that is not based on an impartial evaluation only contributes to the chaos. It is, therefore, better to wait until the genuine needs have been assessed because in actuality, most needs are met by the victims themselves and their local agencies, not by foreign intervenors. It is popularly thought that disasters bring out the worst in human behavior, such as looting and rioting, but in reality, this is not always true. Although there may be some isolated cases of antisocial behavior (that is often emphasized in media accounts, perhaps for the dramatic effect, as was the case in the Hurricane Katrina coverage), for the most part, people respond spontaneously and generously during disasters. It is also commonly thought that the affected population will be too shocked and helpless to take responsibility for their own survival. However, studies have shown that many find new strength during an emergency, as seen for example, by the thousands of volunteers who spontaneously united to sift through the rubble in search of victims in the aftermath of the 1985 earthquake in Mexico City. It is also a myth that disasters are random killers, because as we have discussed above, the fact of the matter is that the impact of disasters are felt most by vulnerable groups such as the poor, the elderly, women, and children.

Emergency preparedness may be enhanced by incorporating elements of vulnerability analysis. This includes an integrated multidisciplinary approach that seeks to understand those circumstances that put people and places at risk based on an analysis of the complex interactions between social, natural, and engineered systems. By providing information about the sectors at risk such as the physical (e.g., buildings, infrastructure, critical facilities), the social (e.g., vulnerable groups, livelihoods, local institutions, poverty),

and the economic (i.e., direct and indirect financial losses) as well as by focusing on the kind of risk (e.g., damage to public infrastructure, housing, or casualties), a more integrated approach to emergency preparedness may be developed—one that is sensitive to the totalizing nature of all disasters.

As illustrated by our discussion of technological and natural disasters, the fact that all types of disasters have a sociopolitical basis should be taken more seriously in emergency preparedness planning. This could be accomplished, for example, by taking into account grassroots input and local knowledge into emergency preparedness planning by collaborating with lay participants, community members and environmental justice activists on specifically action-oriented strategies. Lay–expert collaborations have been found to be a necessary component for more successful regulatory processes and policies in general. This would also hold true for the development of sound emergency preparedness plans and measures because the success and failure of such efforts will ultimately depend on citizen understanding and public buy-in.

SEE ALSO: Environmental Health; Pan American Health Organization (PAHO); Post-Traumatic Stress Disorder.

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## Disease and Poverty

There is a direct correlation between poverty and disease. Poverty creates a cyclical relationship with disease for vulnerable groups and countries in that poverty causes people and countries to be hopeless, unaccountable, and irresponsible and these in turn