

A Public Health Approach to Preventing the Health Consequences of Armed Conflict

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We must address the roots of violence. Only then will we transform the past century's legacy from a crushing burden into a cautionary lesson.

—Nelson Mandela, World Report on Violence and Health¹

Public health professionals are playing an increasingly important role in responding to the health consequences of armed conflict.* These efforts have been focused primarily on mitigating the health burden of armed conflict, either while it is occurring or in its aftermath. Mitigating the health burden typically involves assessing the health impact of armed conflict to help target and guide prevention and treatment strategies, as well as implementing programs to prevent the spread of disease and malnutrition in affected populations. However, public health professionals can do much more to apply their skills and expertise to preventing the health consequences of armed conflict by giving greater attention to (1) preventing armed conflict from occurring in the first place, and (2) addressing consequences that have received relatively little attention, such as injuries and mental health problems.

The need for more effective prevention strategies arises from the devastating impact that armed conflict has on health. Armed conflict not only directly causes premature death, disability, psychological trauma, and physical injury, but it can also destroy the integrity of health care systems and public

*For the purposes of this chapter, armed conflict includes violent conflict between states (countries) and within states, including war, terrorism, and state-perpetrated violence, such as genocide.

health services, such as water and sanitation systems. These disruptions lead to famine, epidemics, social dislocations, and other forms of violence—all of which may persist long after armed conflict has ended.

In this chapter, we propose an agenda for expanding the role and capacity of public health in addressing the health consequences of armed conflict. We begin by describing a unified model that integrates (1) the stages of the public health approach to prevention with (2) the temporal phases of armed conflict. This model enables us to visualize points at which public health professionals can strengthen their contributions to prevention.

A Framework to Guide Public Health

The Public Health Approach to Prevention

This approach is rooted in science. It begins with defining the problem. It then (1) identifies underlying causes and associated risk and protective factors; (2) develops and tests interventions that lower the risks; and (3) broadly disseminates and implements these interventions (Figure 20-1).² Several of the steps used in this approach are likely to occur simultaneously. The knowledge

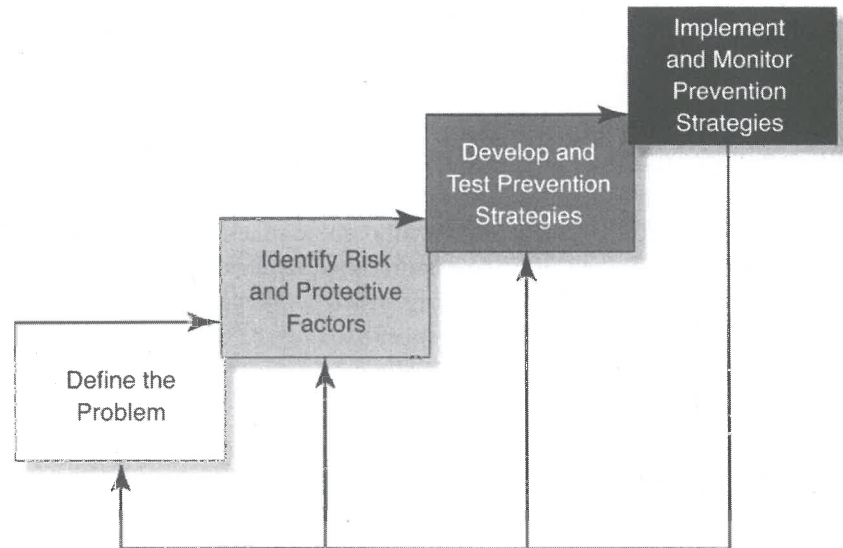


Figure 20-1. Public health approach to prevention. (Source: Adapted from Mercy JA, Rosenberg ML, Powell KE, et al. Public health policy for preventing violence. *Health Affairs* 1993;12:7-29.)

gained through the later steps ultimately helps to refine and clarify the knowledge gained through the earlier steps.

The first step of the public health model—defining the problem—helps us to understand the magnitude and characteristics of a problem by collecting and interpreting descriptive data on health events. In this step, one attempts to describe the health events in terms of person, place, and time. Information is collected on the demographic characteristics of the persons involved, such as age, socioeconomic status, and whether they are refugees or internally displaced persons; the geographic characteristics of the event, such as whether it occurs in a high-income or low-income country; and the temporal characteristics of the event, such as month and year of occurrence. Understanding the magnitude and characteristics of the problem helps in setting public health priorities and identifying vulnerable populations. Furthermore, this step provides the baseline data necessary to monitor progress toward achieving health goals. Data typically are collected through point-in-time analyses or through public health surveillance.

The second step of the model involves identifying risk and protective factors for specific health outcomes. In this step, one attempts to determine why certain individuals, families, communities, or even nations are at greater or lesser risk than others for developing health problems. Public health scientists use a variety of analytical approaches to identify risk factors, including cohort and case-control studies as well as research designs that make use of ecological, cross-sectional, and time-series data. The second step of the model builds on the first step by providing insights into the potential causes of health problems that then can be used to suggest specific prevention programs and policies.

In the third step, one uses the information obtained in the previous two steps to develop and test prevention programs and policies. After interventions have been developed, evaluation methods can be used to measure their effectiveness in reducing adverse health outcomes or promoting favorable health outcomes. These evaluation methods include experimental studies, such as randomized control trials; and quasi-experimental studies, such as time-series analyses and ecological studies. They also include various types of economic evaluations, such as cost-effectiveness, cost-benefit, and cost-utility studies.

In the fourth and final step in the model, one broadly disseminates and implements those prevention strategies that were shown to be effective in the previous step. Effectiveness should be monitored after interventions are implemented in the field. Although the third step may have shown specific prevention strategies to be effective, those strategies may not have the same impact when implemented more broadly. Population differences or barriers to implementation may prevent strategies identified as effective in highly controlled settings from being equally effective in the field. This last step also

includes efforts to train key people in how to implement prevention activities and communicate important information about prevention through the mass media.

The Temporal Phases of Armed Conflict

Armed conflict can be divided into three temporal phases that represent the stages through which conflict progresses: preconflict, conflict, and postconflict. Each phase offers different opportunities for prevention. Because the underlying causes of conflict often begin to emerge years before an outbreak of violence, the recognition of these causes provides an opportunity to intervene before the actual conflict takes place.³ In addition, in countries where the potential for armed conflict is high, communities or societies can be made more resilient to potential health consequences before conflict occurs. In the conflict phase, many opportunities arise to prevent or mitigate the severity of the health consequences. The postconflict phase is important because the health consequences of armed conflict continue long after a ceasefire and because armed conflict could re-emerge if the underlying causes have not been fully resolved. However, although the distinction of these temporal phases is useful, the phases may not always be easily distinguished. For example, the start of the postconflict phase may be hard to identify because a period of unrest may exist before "normalcy" is established.

The Unified Model

The unified model provides a framework that illustrates the roles that public health can play in preventing the health consequences of armed conflict (Table 20-1). This model combines the public health approach to prevention with the temporal phases of armed conflict. The cells of this model provide both actual and potential examples of public health activities, some of which are discussed later in this chapter. The model also highlights areas where public health could expand its role and capabilities; they give direction to public health professionals for future activities.

Combining the public health approach to prevention with the three temporal phases of armed conflict enables us to more fully recognize the different types of data collection, research, and prevention strategies available during each of these phases. In addition, we must consider various logistical aspects of implementing these strategies. During the conflict phase, for example, prevention strategies need to be developed in a way that considers the challenges of implementation in the midst of political instability, social turmoil, and violence.

Table 20-1. Actual or Potential Examples of Public Health Contributions to Preventing the Health Consequences of Armed Conflict

Temporal Phase of Armed Conflict	Stage of Public Health Approach	Actual or Potential Contributions
All phases	Define the problem	<ul style="list-style-type: none"> • Develop standardized definitions and terminologies to guide data collection.* • Identify creative strategies to monitor the health consequences of armed conflict (such as cluster surveys).* • Modify the international classification of disease (ICD) codes to distinguish among mortality and morbidity associated with major forms of armed conflict.*
Preconflict phase	Define the problem	<ul style="list-style-type: none"> • Develop a surveillance system of risk factors for armed conflict.*
	Identify causes	<ul style="list-style-type: none"> • Identify risk and protective factors associated with the development of armed conflict.*[†] • Determine how preconflict societal and cultural factors influence rates of conflict-related injury, illness, and mental trauma.*[†]
	Develop and test interventions	<ul style="list-style-type: none"> • Develop strategies that can contribute to preventing armed conflict (such as conducting research to understand how best to prevent violent political transitions).* • Evaluate the efficacy and effectiveness of strategies designed to prevent armed conflict (such as economic sanctions, and United Nations [UN] peacekeeping efforts).* • Evaluate the efficacy and effectiveness of strategies to prepare communities and nations in advance of armed conflict to reduce likelihood of injury or illness (such as landmine risk education and vaccines to protect against bioterrorism).*
	Implement interventions	<ul style="list-style-type: none"> • Identify the most effective methods for implementing and disseminating strategies to prevent armed conflict.* • Identify the most effective methods for implementing and disseminating strategies to prepare communities and nations at risk for violence.*
Conflict phase	Define the problem	<ul style="list-style-type: none"> • Identify the best methods for collecting data on mental trauma and sexual violence during ongoing conflict.* • Determine the impact of ongoing conflict on nutrition, communicable diseases, injury, mental trauma, and sexual violence. • Determine key data elements for surveillance of landmine/unexploded ordnance (UXO) injuries.

(continued)

Table 20-1. (continued)

Temporal Phase of Armed Conflict	Stage of Public Health Approach	Actual or Potential Contributions
Postconflict phase	Identify causes	<ul style="list-style-type: none"> • Identify risk and protective factors associated with continued armed conflict.* • Identify individual and community-level risk and protective factors for conflict-related mental trauma, sexual violence, and landmine/UXO injuries during conflict.* • Identify individual and community-level risk and protective factors for communicable diseases and malnutrition during conflict.
	Develop and test interventions	<ul style="list-style-type: none"> • Evaluate the efficacy and effectiveness of interventions designed to shorten the duration of armed conflict.* • Evaluate the efficacy and effectiveness of the following: <ul style="list-style-type: none"> – Mental health interventions implemented early in the conflict phase* – Interventions and policies designed to prevent perpetration of and victimization from sexual violence* – Mine risk education to prevent landmine/UXO injuries* • Evaluate interventions to reduce the incidence of communicable diseases and malnutrition.
	Implement interventions	<ul style="list-style-type: none"> • Improve effective interventions to make them more simple and affordable.* • Determine how effective interventions can be adapted for culturally diverse populations.*
	Define the problem	<ul style="list-style-type: none"> • Determine the impact of armed conflict on postconflict rates of violence (such as suicide and intimate partner violence).* • Measure the long-term physical and mental health consequences of sexual violence and landmine/UXO injuries.* • Determine the impact of armed conflict on nutrition, communicable diseases, injury, and mental health in postconflict settings. • Determine the key data elements for surveillance of landmine/UXO injuries.
	Identify causes	<ul style="list-style-type: none"> • Identify risk and protective factors associated with recurring armed conflict.* • Identify risk and protective factors for other forms of violence (such as suicide and interpersonal violence) in postconflict settings.* • Identify individual and community-level risk and protective factors for mental trauma and landmine/UXO injuries in postconflict settings.*

Table 20-1. (continued)

Temporal Phase of Armed Conflict	Stage of Public Health Approach	Actual or Potential Contributions
	Develop and test interventions	<ul style="list-style-type: none"> • Identify individual and community-level risk and protective factors for communicable diseases and malnutrition in postconflict settings. • Evaluate the efficacy and effectiveness of interventions designed to prevent relapse into conflict.* • Evaluate the efficacy and effectiveness of interventions aimed at preventing the long-term consequences of mental trauma.* • Evaluate the cost-effectiveness of landmine/UXO injury prevention programs.* • Develop and evaluate interventions to reduce the incidence of communicable diseases and malnutrition.*
	Implement interventions	<ul style="list-style-type: none"> • Identify the most effective methods for reconstructing infrastructures and health services.*

*Activities in which public health could expand its role and capabilities.

†These research activities are placed in the preconflict phase because their intent is to identify risk and protective factors that will lead to strategies to prevent conflict from occurring, even though this research may entail comparing countries that have experienced conflict with those that have not.

Applying the Unified Model

Using this model, we broadly describe what public health workers are currently doing to prevent the health consequences of armed conflict. Through examples, we show areas in which public health could expand its role and capacity in prevention. These examples address a range of health consequences of armed conflict, including those related to mental health problems, physical injuries, and infectious diseases. The examples provided are not intended to comprise a comprehensive list, but rather to illustrate some of the ways in which public health can go beyond its traditional roles.

All Phases

Understanding the magnitude and characteristics of the health consequences of armed conflict will help to inform and track prevention efforts during all three phases. One of the major obstacles to making progress in describing this problem is the inconsistency in the definitions and terminologies used to describe the different types of armed conflict and their health outcomes. These inconsistencies limit our ability to fully interpret available data and to make comparisons over time and across communities and countries. In addition, the

literature on the health outcomes of armed conflict does not consistently distinguish direct from indirect consequences, or military from civilian deaths and injuries.

Public health professionals could make a fundamental contribution to efforts to monitor and study the health consequences of armed conflict by bringing together epidemiologists and professionals in other relevant scientific disciplines to develop a set of standard definitions to guide data collection that are internationally agreed upon. This effort should include developing standardized terminologies and definitions for describing the health outcomes associated with armed conflict. First, one must distinguish among the different types of armed conflict, such as war, genocide, and terrorism, while recognizing that some overlap may exist among them. In addition, one must identify the various types of victims, including both military (armed) combatants and civilians. One must also distinguish between direct and indirect health consequences of armed conflict. Direct health outcomes include physical and psychological injury, disability, and death that results from torture, combat, or tactics of intimidation, such as sexual assault. Indirect health outcomes include communicable diseases, malnutrition, chronic diseases, and other forms of violence that result from social disruptions. These disruptions include, for example⁴:

- Destruction of clinics, hospitals, and public health programs that support safe food and clean water
- Damage to the social foundations of society, such as work, education, practice of religion, and other activities that are a part of daily life
- Forced displacement of people, making them refugees or internally displaced persons.

Other severe hindrances to the availability and quality of existing data on the health consequences of armed conflict include the following⁵:

- Most affected countries lack reliable health registration systems.
- Conflict disrupts existing surveillance systems.
- Rapid population shifts and movements make collection of data on the affected population difficult.
- Access is lacking for health services from which data are typically collected.
- Parties to a conflict may manipulate data.

Given these impediments, creative strategies are needed to improve our ability to monitor health consequences, such as the use of cluster surveys or clinic-

based surveillance systems operated by nongovernmental organizations (NGOs). Rapid assessment procedures also have been suggested to provide valid information on various health outcomes, such as injury-related morbidity and mortality. These rapid assessment procedures are quicker, simpler, and less costly than standard data collection methods in settings that lack the technical and financial resources necessary for sophisticated surveillance methods.⁶

However, efforts to improve existing data collection systems also may yield benefits. Existing world health statistics on mortality, for example, do not enable distinction among deaths resulting from different forms of armed conflict, such as war and genocide.⁷ After standardized definitions have been developed, the International Classification of Disease (ICD) codes could be amended so that world mortality statistics could be used to monitor the health consequences of the major categories of armed conflict. In addition to developing surveillance systems to collect information on the health outcomes of armed conflict, there are other types of surveillance systems specific to each of the temporal phases that also should be considered.

Preconflict Phase

In preconflict settings, after an adequate research base is formed, the potential exists for developing a surveillance system that monitors risk and protective factors for armed conflict. For example, countries undergoing rapid demographic or economic changes, such as sudden increases in population or unemployment, may be at greater risk for certain forms of armed conflict.⁵ If these and other risk factors can be confirmed through research, they could provide the basis for a system to help forewarn global and community leaders about regions or countries at high risk for armed conflict, enabling diplomatic or other preventive measures to be implemented. In the event that armed conflict cannot be prevented, such an early warning system could help international organizations prepare more timely and efficient humanitarian aid responses to address the complex emergencies associated with armed conflict⁸ (see Chapters 22 and 23).

In addition to developing and implementing surveillance systems that monitor risk and protective factors for armed conflict, public health also can become more involved in conducting research to identify these factors. Previous theoretical and empirical work has identified potential risk and protective factors (Table 20-2), but few of these factors have been confirmed through research. In addition, we do not fully understand the extent to which such factors operate alone or in combination with other factors to produce armed conflict.^{3,5} One example of research in this area identified factors explaining why violent conflict between Hindus and Muslims was common in

Table 20-2. Potential Risk Factors for Armed Conflict**Demographic Factors**

- High infant mortality
- Excessively high population densities
- Insufficient supply of food or access to safe water
- Disputes over territory or environmental resources that are claimed by distinct ethnic groups

Societal and Community Factors

- Inequality among groups
- Fueling of group fanaticism along ethnic, national, or religious lines
- Ready availability of small arms and other weapons

Political Factors*

- Lack of a democratic process
- Rapid changes in regimes
- Unequal access to power

Economic Factors*

- Grossly unequal distribution of resources
- Unequal access to resources
- Control over key natural resources

Other

- Deterioration in public services
- Cycles of violent revenge

*Unequal distribution of resources and unequal access to these resources and to political power—whether by geographic area, social class, religion, race, or ethnicity—have been suggested to contribute to conflict between groups.

Sources: Adapted from Zwi AB, Garfield R, Loretti A. Collective violence. In Krug EG, Dahlberg LL, Mercy JA, et al. (eds.). *World Report on Violence and Health*. Geneva: World Health Organization, 2002, pp. 213–239; Carnegie Commission on Preventing Deadly Conflict. *Preventing Deadly Conflict: Final Report*. New York: Carnegie Corporation of New York, 1998.

some Indian cities and rare in others. This study found that cities with strong associational forms of civic engagements involving both Hindus and Muslims, such as integrated business organizations, trade unions, political parties, and professional associations, were protected from outbreaks of ethnic violence, whereas communities with weaker or no associational forms of civic engagement were more likely to experience ethnic violence.⁹ Policies and programs aimed at creating various types of integrated community associations may be effective in reducing some forms of armed conflict.

Public health professionals also can develop and evaluate interventions to prevent armed conflict and its health consequences. The identification of risk and protective factors in the previous step, for example, could be used with existing knowledge about the basic epidemiology of the problem to develop and test interventions designed to prevent armed conflict and its associated health consequences from occurring in the first place. For example, cross-national research suggests that countries in political transition, such as from autocratic to

democratic regimes, may be at highest risk for civil war and violent political repression.^{10,11} Programs and policies that assist these transitional countries in developing institutions that facilitate the peaceful transfer of power and service systems that address basic human needs may be effective in preventing violent political repression.¹⁰ Public health professionals and other scientists can perform research to further understand how best to prevent violent transitions and bring these strategies to the attention of policy makers.¹²

In addition, public health can bring together epidemiologists and professionals in other relevant scientific disciplines to evaluate the effectiveness of existing prevention strategies. Economic sanctions, for example, may play an important role in preventing armed conflict, and several strategies have been offered to strengthen this approach.³ Retrospective and prospective research could be conducted to evaluate the effectiveness of sanctions and the various approaches used to implement them. This information could then be provided to policy makers to help guide the development of evidence-based policies.

Public health also can participate in preparing a community or country in advance of armed conflict (such as terrorism), to reduce the likelihood and severity of illness and injury in the event that such violence occurs. For example, the Centers for Disease Control and Prevention (CDC) has implemented several strategies to prevent illness in the event of a bioterrorist attack in the United States. These activities have included, but are not limited to, improving the effectiveness and safety of the current anthrax vaccine and developing rapid diagnostic tests for detecting potential bioterrorism agents.¹³ Having safe and effective vaccines and rapid diagnostic tests would be critical to controlling and containing an event. Although the effectiveness of these specific interventions remains to be seen, this concept of preparedness may be applicable to other health consequences of armed conflict, such as injuries from landmines/unexploded ordnance (UXO) and psychological trauma.

After effective interventions have been developed to prevent armed conflict or to prepare communities or countries, the challenge will be how best to implement them. Many countries at risk for armed conflict are resource-poor and potentially unstable, which could create barriers to effective implementation. Even without complete scientific knowledge of what works to prevent armed conflict, the best available information should be used to help prepare communities or nations at risk for pending armed conflict. One way in which public health professionals can assist in this preparation is by disseminating information to people in at-risk communities or countries on ways that they can protect themselves from injury and illness. For example, public health professionals could disseminate information that has been shown to be effective on landmine/UXO-related injury prevention in areas where landmines and ordnance have been used.

Conflict Phase

Public health has contributed significantly to describing the magnitude and characteristics of the health consequences of armed conflict during this phase. National and local surveys conducted during conflict have demonstrated the impact of armed conflict, ranging from injuries to malnutrition. For example, it has been shown that diarrheal diseases are a major cause of morbidity and mortality among populations affected by armed conflict.¹⁴ After the influx of 800,000 Rwandan refugees into the Democratic Republic of Congo in 1994, diarrheal illnesses caused 85 percent of the 50,000 deaths reported during the first month.¹⁵ Major advances also have been made in survey methodology, so that health outcomes can be more accurately described. For example, the field of emergency nutrition assessments has made significant advances during the past decade. Standard cluster survey formats are now available for conducting anthropometric surveys.¹⁶ In addition to improving survey methodologies to more accurately describe health problems previously studied, public health professionals also have contributed to addressing the gap in knowledge about health outcomes not previously well studied, such as those related to mental health and reproductive health.^{17,18}

Another way that public health can contribute during the conflict phase is to help identify risk and protective factors for illness and injury in the midst of ongoing conflict. In fact, public health professionals already have established that certain risk factors promote communicable disease transmission in complex emergencies, such as mass population movement and resettlement in temporary locations, overcrowding, economic and environmental degradation, impoverishment, scarcity of water, poor sanitation and waste management, inadequate or no shelter, poor nutrition, and poor access to health care.¹⁴ They also have identified risk factors for malnutrition, such as poor breast-feeding practices, diarrheal and other infectious diseases among infants, and human immunodeficiency virus (HIV) infection.¹⁹ However, further study is needed to determine risk factors for other health consequences, such as those associated with injury and mental health. For example, two studies in Afghanistan demonstrated that children were at greater risk for injuries from UXO, such as unexploded grenades and mortar shells, whereas adults were at greater risk for injuries from landmines.^{20,21} Furthermore, these studies identified playing and tending animals as risk behaviors for children, and military and economic-necessity activities, such as traveling and farming, as risk behaviors for adults. More studies are needed to confirm these hypothesized risk factors and to determine whether they can be generalized to other countries. This type of information can then be used to develop and test landmine risk-education interventions that can be implemented during both the conflict and postconflict phases.

There are also few studies that describe the risk factors for psychological trauma during ongoing conflict. One study that examined psychological trauma among displaced persons during conflict in Nepal found that (1) being female, being 41 to 50 years old, and "feeling miserable" on arrival at a new place were associated with symptoms consistent with depression; and (2) experiencing greater than three traumatic events and "feeling miserable" on arrival at a new place were associated with posttraumatic stress disorder (PTSD).²² Such studies can help identify groups at high risk for psychological trauma so that interventions can better target these populations.

Public health has contributed significantly to the development of successful interventions to address two of the leading causes of death—communicable diseases and malnutrition—in complex emergencies.^{14,19} There are prevention and control interventions for the major high-mortality communicable diseases, including guidelines for on-site planning for refugee camps; clean water supply and sanitation programs to reduce fecal-oral transmission of disease; vaccines against measles, meningococcal meningitis, poliomyelitis, and yellow fever; and vector-control activities, such as indoor residual spraying and insecticide-treated nets to help prevent malaria.¹⁴ Therapeutic feeding programs also have helped to reduce malnutrition-related mortality.¹⁹

However, for other health consequences, such as mental health and injury, development of better interventions depends on further research. For example, few evidence-based intervention studies of early mental health interventions have been performed during complex emergencies; such interventions include offering population-wide psychological first aid or identifying and triaging to psychiatric treatment those who have severe mental disorders.¹⁷ Creative strategies are needed to evaluate these types of interventions, given the difficulty of performing such studies during conflict. One such study evaluated the efficacy of a counseling intervention aimed to alleviate distress in wartime Bosnia and Herzegovina and found it to be effective, demonstrating that most people who received counseling clinically recovered or experienced improved functioning.²³

Although public health has contributed significantly to the development of proven interventions to prevent communicable diseases during armed conflict, the delivery mechanisms for these prevention strategies are often compromised in countries affected by violent conflict. This compromise of delivery mechanisms is due, in part, to insecurity, loss of health care providers, damage to infrastructure, and poor coordination.¹⁴ These challenges are greatest in complex emergencies affecting large geographical areas or entire countries.¹⁴ Existing interventions may be implemented more systematically with higher levels of coordination among governments, United Nations agencies, and NGOs.¹⁴ In addition, given the logistical constraints of implementing

interventions during ongoing conflict, simpler, more effective, and more affordable methods are needed to prevent communicable diseases. For example, insecticide-treated nets are very effective in preventing malaria; however, it has been challenging to make these nets widely available and usable to refugees or internally displaced persons sleeping under plastic sheeting and tents.¹⁴ The need for more novel and convenient methods of protection has led to testing of insecticide-treated plastic sheeting and bedding.^{14,24} This is an example of modifying an intervention when faced with barriers to implementation. Therefore, during the implementation step, the effectiveness of various interventions needs to be monitored so that appropriate modifications can be made as necessary.

Postconflict Phase

Because of the adverse effects of armed conflict on health care and public health systems and services, famine, spread of communicable disease, and social dislocation may persist long after armed conflict has ended. In addition, even after communities have been rebuilt and health care systems are functioning, adverse health outcomes of a preceding conflict may remain, such as mental health problems.¹⁷ In postwar Afghanistan, the prevalence of depression, anxiety, and PTSD were extremely high; among people older than 15 years of age, the prevalence of depression was approximately 70 percent.²⁵ Another type of remnant of armed conflict consists of landmines/UXOs, some of which from World Wars I and II are still present in Europe and Asia.²⁶ Therefore, collecting data on injury-related morbidity and mortality due to landmines/UXOs should continue far beyond a ceasefire. Although some countries collect this information, it is not being collected in a comprehensive or systematic manner that would permit cross-national comparison. To address this problem, some people are attempting to develop an internationally accepted system for collecting and managing landmine casualty data on a global scale.²⁷ Armed conflict probably contributes to increased homicide and suicide rates after ceasefire.²⁸⁻³¹ Improving surveillance of injury-related morbidity and mortality during the postconflict phase could help in examining these potential consequences.

Public health can continue to contribute to understanding of the epidemiological patterns of illnesses and associated risk factors in postconflict settings. In fact, many of the illnesses that occur during armed conflict—and their underlying risk factors—often continue to occur in postconflict settings. For example, many risk factors for communicable diseases, such as economic and environmental degradation, impoverishment, poor sanitation and waste management, inadequate or no shelter, and poor access to health care, may continue to exist long after ceasefire.

Risk factors for other health outcomes have not been well studied. For example, risk factors for recurrence of armed conflict after ceasefires or periods of peace have not been adequately identified or studied. Countries that have experienced armed conflict are at high risk for relapsing into violent conflict. Approximately 40 percent of countries in the postconflict phase relapse into war within 5 years.³² Understanding why some countries are more likely to relapse into yet another violent conflict is therefore important, because further violence is likely to exacerbate existing health problems. Studies conducted in postwar Kosovo and Afghanistan have suggested that mental illness caused by psychological trauma may be associated with feelings of hatred and the desire to take revenge.^{25,33} Effective treatment for psychological trauma may therefore help prevent the recurrence of violent conflict. Public health research can be used to identify factors that contribute to recurrence of violence and thereby help develop appropriate policies and strategies to prevent such collective recidivism.

Many of the proven interventions implemented during ongoing conflict to prevent communicable diseases and malnutrition continue to be needed long after ceasefire. In addition, the lack of evidence-based interventions for mental health disorders and landmine injuries during conflict pose similar limitations in postconflict settings. However, some unique circumstances, such as the potential for relapse into armed conflict, are more specific to a postconflict setting and need to be further studied. Interventions to promote and maintain peace during this period are critical. Peacekeeping efforts of the United Nations during this crucial period have contributed significantly to the decrease in the number of conflicts since the end of the Cold War.³² These peacekeeping efforts have gone beyond monitoring ceasefires; they are often more akin to nation-building. Two-thirds of U.N. nation-building activities have been successful, with peace and democracy being the most important measures of success.³⁴ Public health professionals can help further evaluate the effect that U.N. peacekeeping efforts have had on reducing the health consequences of armed conflict.

One of the greatest challenges in postconflict settings is how to best reconstruct the infrastructure and health services that existed before the armed conflict.⁵ Adequate function and capacity of water and sanitation systems, clinics, hospitals, and referral systems are necessary to prevent communicable and chronic diseases. In the past, reconstruction of infrastructure and reconstitution of disease-control programs have been emphasized much more than coordination of donor responses or the establishment of effective policy frameworks.⁵ Public health research can help determine how best to reconstitute and implement health services programs and policies during this reconstruction phase. In addition to determining how best to reestablish infrastructure and health services, public health needs to continue to monitor new

and existing interventions that address specific health problems, such as psychological trauma, especially because logistical constraints during this phase may decrease the effectiveness of prevention strategies.

Conclusion

Public health has, for many years, contributed significantly to understanding of the impact, the underlying causes, and ways to prevent infectious disease and malnutrition associated with armed conflict during the conflict and postconflict phases. More recently, it has contributed to understanding the impact of, and risk factors for, mental health problems and landmine/UXO injuries in conflict and postconflict phases, although much work remains to be done on these issues. Despite these important contributions, however, the capabilities of public health can be expanded in other areas. In particular, public health can make significant contributions to understanding the underlying causes of armed conflict so that effective prevention strategies can be developed to prevent armed conflict and its health consequences. Public health can also contribute to understanding how to better implement prevention strategies in all three phases of conflict, especially in countries with limited resources.

These objectives can be achieved only by bringing together various perspectives, expertise, and resources. The input of multiple scientific disciplines and multiple sectors of society is necessary to fully implement a public health approach to these challenges. We need to better understand human behavior; our social, political, and physical environments; and weapons systems. Public health can provide integrative leadership by bringing together various scientific disciplines, organizations, and communities to address the complex health issues of armed conflict.

Given the enormous health consequences of armed conflict, public health professionals should play a greater role in preventing it. The concepts discussed in this chapter outline areas in which public health can make greater contributions, not only to preventing health consequences after violence occurs, but also to preventing these health consequences by understanding and addressing the roots of armed conflict. Given that public health is defined as what we, as a society, do collectively to ensure the conditions in which people can be healthy, then preventing armed conflict should be one of its highest priorities.³⁵

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