

OVERVIEW

THE WORLD HEALTH REPORT 2007

A SAFER FUTURE

GLOBAL PUBLIC HEALTH SECURITY IN THE 21ST CENTURY



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Organization**

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The world has changed dramatically since 1951, when WHO issued its first set of legally binding regulations aimed at preventing the international spread of disease. At that time, the disease situation was relatively stable. Concern focused on only six “quarantinable” diseases: cholera, plague, relapsing fever, smallpox, typhus and yellow fever. New diseases were rare, and miracle drugs had revolutionized the care of many well-known infections. People travelled internationally by ship, and news travelled by telegram.



MESSAGE FROM THE DIRECTOR-GENERAL

Since then, profound changes have occurred in the way humanity inhabits the planet. The disease situation is anything but stable. Population growth, incursion into previously uninhabited areas, rapid urbanization, intensive farming practices, environmental degradation, and the misuse of antimicrobials have disrupted the equilibrium of the microbial world. New diseases are emerging at the historically unprecedented rate of one per year. Airlines now carry more than 2 billion passengers annually, vastly increasing opportunities for the rapid international spread of infectious agents and their vectors.

Dependence on chemicals has increased, as has awareness of the potential hazards for health and the environment. Industrialization of food production and processing, and globalization of marketing and distribution mean that a single tainted ingredient can lead to the recall of tons of food items from scores of countries. In a particularly ominous trend, mainstay antimicrobials are failing at a rate that outpaces the development of replacement drugs.

These threats have become a much larger menace in a world characterized by high mobility, economic interdependence and electronic interconnectedness. Traditional defences at national borders cannot protect against the invasion of a disease or vector. Real time news allows panic to spread with equal ease. Shocks to health reverberate as shocks to economies and business continuity in areas well beyond the affected site. Vulnerability is universal.

The *World Health Report 2007* is dedicated to promoting global public health security – the reduced vulnerability of populations to acute threats to health. This year’s World Health Day, celebrated in April, launched WHO’s discussion on global public health security. Around the world, academics, students, health professionals, politicians and the business community are engaged in dialogue on how to protect the world from threats like pandemic influenza, the health consequences of conflict and natural disasters, and bioterrorism.

The *World Health Report 2007* addresses these issues, among others, in the context of new tools for collective defence, including, most notably, the revised International Health Regulations (2005). These Regulations are an international legal instrument designed to achieve maximum security against the international spread of diseases. They also aim to reduce the international impact of public health emergencies.

The IHR (2005) expand the focus of collective defence from just a few “quarantinable” diseases to include any emergency with international repercussions for health, including outbreaks of emerging and epidemic-prone diseases, outbreaks of foodborne disease, natural disasters, and chemical or radionuclear events, whether accidental or caused deliberately.

In a significant departure from the past, IHR (2005) move away from a focus on passive barriers at borders, airports and seaports to a strategy of proactive risk management. This strategy aims to detect an event early and stop it at its source – before it has a chance to become an international threat.

Given today’s universal vulnerability to these threats, better security calls for global solidarity. International public health security is both a collective aspiration and a mutual responsibility. As the determinants and consequences of health emergencies have become broader, so has the range of players with a stake in the security agenda. The new watchwords are diplomacy, cooperation, transparency and preparedness. Successful implementation of IHR (2005) serves the interests of politicians and business leaders as well as the health, trade and tourism sectors.

I am pleased to present the *World Health Report 2007* to our partners and look forward to the discussions, directions and actions that it will inspire.



Dr Margaret Chan
Director-General
World Health Organization



OVERVIEW



At a time when the world faces many new and recurring threats, the ambitious aim of this year's *World Health Report* is to show how collective international public health action can build a safer future for humanity.

This is the overall goal of global public health security. For the purposes of this report, global public health security is defined as the activities required, both proactive and reactive, to minimize vulnerability to acute public health events that endanger the collective health of populations living across geographical regions and international boundaries.

As the events illustrated in this report show, global health security, or the lack of it, may also have an impact on economic or political stability, trade, tourism, access to goods and services and, if they occur repeatedly, on demographic stability. It embraces a wide range of complex and daunting issues, from the international stage to the individual household, including the health consequences of poverty, wars and conflicts, climate change, natural catastrophes and man-made disasters.

All of these are areas of continuing WHO work and will be the topics of forthcoming publications. The 2008 World Health Report, for example, will be concerned with individual health security, concentrating on the role of primary health care and humanitarian action in providing access to the essential prerequisites for health.

This report, however, focuses on specific issues that threaten the collective health of people internationally: infectious disease epidemics, pandemics and other acute health events as defined by the revised International Health Regulations, known as IHR (2005), which came into force in June of this year.

The purpose of these Regulations is to prevent the spread of disease across international borders. They are a vital legislative instrument of global public health security, providing the necessary global framework to prevent, detect, assess and, if necessary, provide a coordinated response to events that may constitute a public health emergency of international concern.

Meeting the requirements in the revised IHR (2005) is a challenge that requires time, commitment and the willingness to change. The Regulations are broader and more demanding than those they replace, with a much greater emphasis on the responsibility of all countries to have in place effective systems for detection and control of public health risks – and to accomplish this by 2012.

A strategic plan has been developed by WHO to guide countries in the implementation of the obligations in the Regulations and to help them overcome the inherent challenges.



GLOBAL PUBLIC HEALTH THREATS IN THE 21ST CENTURY

Today's highly mobile, interdependent and interconnected world provides myriad opportunities for the rapid spread of infectious diseases, and radionuclear and toxic threats, which is why updated and expanded Regulations are necessary. Infectious diseases are now spreading geographically much faster than at any time in history. It is estimated that 2.1 billion airline passengers travelled in 2006; an outbreak or epidemic in any one part of the world is only a few hours away from becoming an imminent threat somewhere else (see Figure 1).

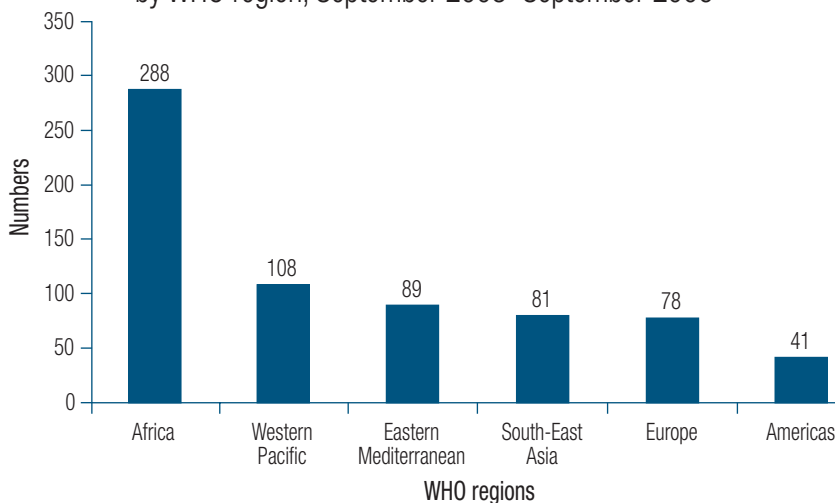
Infectious diseases are not only spreading faster, they appear to be emerging more quickly than ever before. Since the 1970s, newly emerging diseases have been identified at the unprecedented rate of one or more per year. There are now nearly 40 diseases that were unknown a generation ago. In addition, during the last five years, WHO has verified more than 1100 epidemic events worldwide.

The categories and examples given below illustrate the variety and breadth of public health threats confronting people today.

Epidemic-prone diseases

Cholera, yellow fever and epidemic meningococcal diseases made a comeback in the last quarter of the 20th century and call for renewed efforts in surveillance, prevention and control. Severe Acute Respiratory Syndrome (SARS) and avian influenza in humans have triggered major international concern, raised new scientific challenges, caused major human suffering and imposed enormous economic damage. Other emerging viral diseases such as Ebola, Marburg haemorrhagic fever and Nipah virus pose threats to global public health security and also require containment at their source due to their acute nature and resulting illness and mortality. During outbreaks of these diseases, rapid assessment and response, often needing international assistance, has been required to limit local spread. Strengthening of capacity is imperative in the future to assess such new threats.

Figure 1 Verified events of potential international public health concern, by WHO region, September 2003–September 2006



Total number of cases = 685

Gains in many areas of infectious disease control are seriously jeopardized by the spread of antimicrobial resistance, with extensively drug-resistant tuberculosis (XDR-TB) now a cause of great concern. Drug resistance is also evident in diarrhoeal diseases, hospital-acquired infections, malaria, meningitis, respiratory tract infections, and sexually transmitted infections, and is emerging in HIV.

Foodborne diseases

The food chain has undergone considerable and rapid changes over the last 50 years, becoming highly sophisticated and international. Although the safety of food has dramatically improved overall, progress is uneven and foodborne outbreaks from microbial contamination, chemicals and toxins are common in many countries. The trading of contaminated food between countries increases the potential that outbreaks will spread. In addition, the emergence of new foodborne diseases creates considerable concern, such as the recognition of the new variant of Creutzfeldt-Jakob disease (vCJD) associated with bovine spongiform encephalopathy (BSE).

Accidental and deliberate outbreaks

As activities related to infectious disease surveillance and laboratory research have increased in recent years, so too has the potential for outbreaks associated with the accidental release of infectious agents. Breaches in biosafety measures are often responsible for these accidents. At the same time, opportunities for malicious releases of dangerous pathogens, once unthinkable, have become a reality, as shown by the anthrax letters in the United States of America in 2001.

In addition, the recent past has been marked by disturbing new health events that resulted from chemical or nuclear accidents and sudden environmental changes, causing major concerns in many parts of the world.

Toxic chemical accidents

- West Africa, 2006: the dumping of approximately 500 tons of petrochemical waste in at least 15 sites around the city of Abidjan, Côte d'Ivoire, led to the deaths of eight people being attributed to exposure to the waste and to nearly 90 000 more people seeking medical help. Other countries were concerned that they could also have been put at risk as a result of dumping elsewhere or as a result of chemical contamination of transboundary rivers.
- Southern Europe, 1981: 203 people died after consuming poisoned cooking oil that was adulterated with industrial rapeseed oil. A total of 15 000 people were affected by the tainted oil and no cure to reverse the adverse effects of toxic oil syndrome was ever found.

Radionuclear accidents

- Eastern Europe, 1986: the Chernobyl disaster is regarded as the worst accident in the history of nuclear power. The explosion at the plant resulted in the radioactive contamination of the surrounding geographical area, and a cloud of radioactive fallout drifted over western parts of the former Soviet Union, eastern and western Europe, some Nordic countries and eastern North America. Large areas of Ukraine, the Republic of Belarus and the Russian Federation were badly contaminated, resulting in the evacuation and resettlement of over 336 000 people.

Environmental disasters

- Europe, 2003: the heatwave in Europe that claimed the lives of 35 000 persons was linked to unprecedented extremes in weather in other parts of the world during the same period.
- Central Africa, 1986: more than 1700 people died of carbon dioxide poisoning following a massive release of gas from Lake Nyos, a volcanic crater lake. Such an event requires rapid assessment to determine if it is an international threat.

This Overview summarizes some of the above examples, which, together with the lessons drawn from them, are more widely discussed in the report. The report emphasizes that the international response required today is not only to the known, but also to the unknown – the diseases that may arise from acute environmental or climatic changes and from industrial pollution and accidents that may put millions of people at risk in several countries.

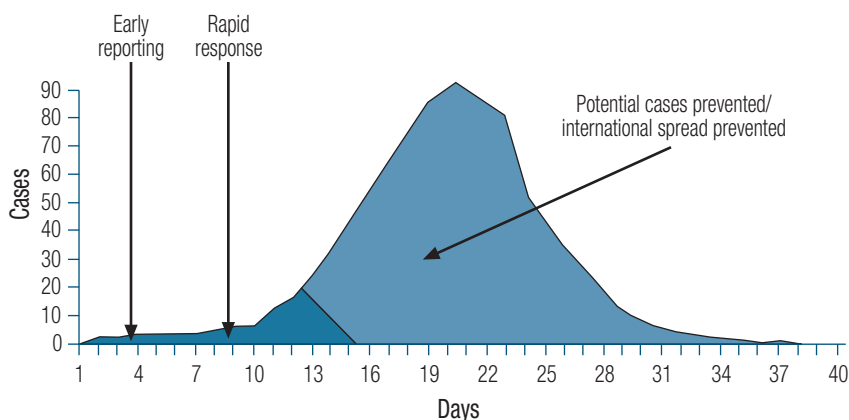
GLOBAL COLLABORATION TO MEET THREATS TO PUBLIC HEALTH SECURITY

These threats require urgent action, and WHO and its partners have much to offer immediately as well as in the longer term. This is an area where real progress to protect whole populations can be made, starting now. It is also where recent history shows that some of the most serious threats to human existence are likely to emerge without warning. It would be extremely naïve and complacent to assume that there will not be another disease like AIDS, another Ebola, or another SARS, sooner or later.

A more secure world that is ready and prepared to respond collectively in the face of threats to global health security requires global partnerships that bring together all countries and stakeholders in all relevant sectors, gather the best technical support and mobilize the necessary resources for effective and timely implementation of IHR (2005). This calls for national core capacity in disease detection and international collaboration for public health emergencies of international concern.

While many of these partnerships are already in place, there are serious gaps, particularly in the health systems of many countries, which weaken the consistency of global health collaboration. In order to compensate for these gaps, an effective global

Figure 2 Global outbreaks, the challenge: late reporting and response



system of epidemic alert and response was initiated by WHO in 1996. It was built essentially on a concept of international partnership with many other agencies and technical institutions. Systematic mechanisms for gathering epidemic intelligence and verifying the existence of outbreaks were established and prompted risk assessments, information dissemination and rapid field response. Regional and global mechanisms for stockpiling and rapid distribution of vaccines, drugs and specialized investigation and protection equipment were also established for public health events caused by haemorrhagic fevers, influenza, meningitis, smallpox and yellow fever.

Today, the public health security of all countries depends on the capacity of each to act effectively and contribute to the security of all. The world is rapidly changing and nothing today moves faster than information. This makes the sharing of essential health information one of the most feasible routes to global public health security.

Instant electronic communication means that disease outbreaks can no longer be kept secret, as was often the case during the implementation of the previous International Health Regulations (1969), known as IHR (1969). Governments were unwilling to report outbreaks because of the potential damage to their economies through disruptions in trade, travel and tourism. In reality, rumours are more damaging than facts. Trust is built through transparency, and trust is necessary for international cooperation in health and development (see Figure 2).

The first steps that must be taken towards global public health security, therefore, are to develop core detection and response capacities in all countries, and to maintain new levels of cooperation between countries to reduce the risks to public health security outlined above. This entails countries strengthening their health systems and ensuring they have the capacity to prevent and control epidemics that can quickly spread across borders and even across continents. Where countries are unable to achieve prevention and control by themselves, it means providing rapid, expert international disease surveillance and response networks to assist them – and making sure these mesh together into an efficient safety net. Above all, it means all countries conforming to and benefiting from IHR (2005).

CHAPTER SUMMARIES



Evolution of public health security

Chapter 1 begins by tracing some of the first steps, historically, that led to the introduction of IHR (1969) – landmarks in public health starting with quarantine, a term coined in the 14th century and employed as a protection against “foreign” diseases such as plague; improvements in sanitation that were effective in controlling cholera outbreaks in the 19th century; and the advent of vaccination which led to the eradication of smallpox and the control of many other infectious diseases in the 20th century. Understanding the history of international health cooperation – its successes and its failures – is essential in appreciating its new relevance and potential.

Numerous international conferences on disease control in the late 19th and early 20th centuries led to the foundation of WHO in 1948. In 1951, WHO Member States adopted the International Sanitary Regulations, which were replaced and renamed the International Health Regulations in 1969. Starting in 1995, the Regulations were revised through an intergovernmental process which took into account new epidemiological understanding and accumulated experience, and which responded to the changing world and the related increased threats to global public health security. It was agreed that a code of conduct was required that could not only prevent and control such threats, but could also provide a public health response to them while avoiding unnecessary interference with international trade and traffic. The revision process was completed in 2005 and the Regulations are now referred to as IHR (2005).

Chapter 1 describes how the basis of an effective global system of epidemic alert and response was initiated by WHO in 1996 and how it has been widely expanded since then. It was built essentially on a concept of international partnership with many other agencies and technical institutions. Called the Global Outbreak Alert and Response Network (GOARN), this partnership provides an operational and coordination framework to access expertise and skill, and to keep the international community constantly alert to the threat of outbreaks and ready to respond. Coordinated by WHO, the network is made up of over 140 technical partners from more than 60 countries.

In addition, the unique, large-scale active surveillance network developed by the Global Polio Eradication Initiative is being used to support surveillance of many other vaccine-preventable diseases, such as measles, meningitis, neonatal tetanus and yellow fever. This network is also regularly supporting outbreak surveillance and response activities for other health emergencies and outbreaks described in the report. In 2002, WHO established the Chemical Incident Alert and Response System to operate along similar lines to GOARN. This was extended in 2006 to cover other environmental health emergencies, including those related to the disruption of environmental health services, such as water supply and sanitation, as well as radiological events and emergencies.

The revised Regulations define an emergency as an “extraordinary event” that could spread internationally or might require a coordinated international response. Events that may constitute a public health emergency of international concern are assessed by State Parties using a decision instrument and, if particular criteria are met, WHO must be notified. Mandatory



From the 14th century, European doctors visiting plague victims wore protective clothing, a mask and a beak containing strong-smelling herbs.



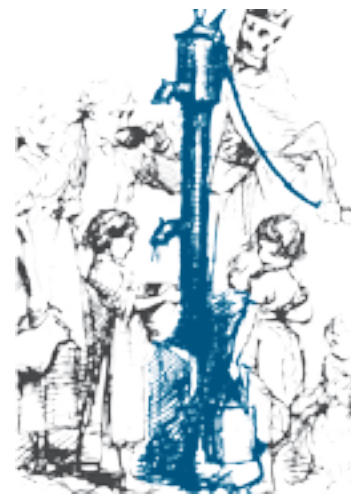
An English doctor, Edward Jenner, carries out the first vaccination against smallpox in 1796 by inoculating a boy with cowpox virus.

notification is called for in a single case of a disease that could threaten global public health security: human influenza caused by a new virus subtype, poliomyelitis caused by a wild-type poliovirus, SARS and smallpox.

The broad definitions of “public health emergency of international concern” and “disease” allow for the inclusion in IHR (2005) of threats beyond infectious diseases, including those caused by the accidental or intentional release of pathogens, or chemical or radionuclear materials. This extends the scope of the Regulations to protect global public health security in a comprehensive way.

The IHR (2005) redirect the focus from an almost exclusive concentration on measures at airports and seaports aimed at blocking the importation of cases, as required in IHR (1969), towards a rapid response at the source of an outbreak. They introduce a set of “core capacity requirements” that all countries must meet in order to detect, assess, notify and report the events covered by IHR (2005) and aim to strengthen collaboration on a global scale by seeking to improve capacity and demonstrate to countries that compliance is in their best interests. Thus, compliance has three compelling incentives: to reduce the disruptive consequences of an outbreak, to speed its containment, and to maintain good standing in the eyes of the international community.

A revolutionary departure from previous international conventions and regulations is the fact that IHR (2005) explicitly acknowledges that non-state sources of information about outbreaks will often pre-empt official notifications. This includes situations where countries may be reluctant to reveal an event in their territories. WHO is now authorized through IHR (2005) to take into account information sources other than official notifications. WHO will always seek official verification of such information from the country involved before taking any action based on the information received. This reflects a new reality in a world of instant communications: the concealment of disease outbreaks is no longer a viable option for governments.



This sketch, called “Death’s Dispensary”, was drawn by George Pinwell in 1866, around the time John Snow was studying the connection between London’s contaminated water supply and outbreaks of cholera.



Threats to public health security

Chapter 2 explores a range of threats to global public health security, as defined by IHR (2005), which result from human actions or causes, from human interaction with the environment, and from sudden chemical and radioactive events, including industrial accidents and natural phenomena. It begins by illustrating how inadequate investment in public health, resulting from a false sense of security in the absence of infectious disease outbreaks, has led to reduced vigilance and a relaxing of adherence to effective prevention programmes.

For example, following the widespread use of insecticides in large-scale, systematic control programmes, by the late 1960s most of the important vector-borne diseases were no longer considered major public health problems outside of sub-Saharan Africa. Control programmes then lapsed as resources dwindled. The result was that within the next 20 years, many important vector-borne diseases including African trypanosomiasis, dengue and dengue haemorrhagic fever, and malaria emerged in new areas or re-emerged in areas previously affected. Urbanization and increasing international trade and travel have contributed to rapid spread of dengue viruses and their vectors. Dengue caused an unprecedented pandemic in 1998, with 1.2 million cases reported to WHO from 56 countries. Since then, dengue epidemics have continued, affecting millions of people from Latin America to South-East Asia. Globally, the average annual number of cases reported to WHO has nearly doubled in each of the last four decades.

Inadequate surveillance results from a lack of commitment to build effective health systems capable of monitoring a country's health status. The rapid global emergence and spread of HIV/AIDS in the 1970s illustrates this. The presence of this new health threat was not detected by what were invariably weak health systems in many developing countries. It only belatedly became a matter of international concern with the first cases in the United States. In addition to limited disease surveillance capacity and data, early efforts to control the AIDS epidemic were also hampered by a lack of solid data on sexual behaviour in African countries, the United States and other industrialized countries. Behavioural data were practically non-existent in the developing world. The understanding of HIV/AIDS in the context of sexuality, gender relations and migration in the developing world took years to develop and is still poorly understood.

Even with reliable operations in place, other influences on public health programmes can have lethal and costly repercussions. Such was the case in August 2003, when unsubstantiated claims originating in northern Nigeria that the oral poliomyelitis vaccine (OPV) was unsafe and could sterilize young children led to the suspension of polio immunization in two northern states and substantial reductions in polio immunization coverage in a number of others. The result was a large outbreak of polio across northern Nigeria and the reinfection of previously polio-free areas in the south of the country. This outbreak eventually paralysed thousands of children in Nigeria and spread from northern Nigeria to 19 polio-free countries.

Chapter 2 also considers the public health consequences of conflicts, such as the outbreak of Marburg haemorrhagic fever against the background of the 1975-2002 civil war in Angola, and the cholera epidemic in the Democratic Republic of the Congo in the aftermath of the crisis in Rwanda in 1994. In July of that year, between 500 000 and 800 000 people crossed the border to seek refuge in the outskirts of the Congolese city of Goma. During the first month after their arrival, close to 50 000 refugees died in a widespread outbreak of combined cholera and shigella dysentery. The speed of transmission and the high rate of infection were related to the contamination with *Vibrio cholerae* of the only available source of water and the absence of proper housing and sanitation.



Against a background of armed conflict, families have less access to health care and are more vulnerable to disease.

Overcrowding exposes displaced populations to infectious disease outbreaks.



The problem of microbial adaptation, the use and misuse of antibiotics and zoonotic diseases, such as human bovine spongiform encephalopathy (BSE) and Nipah virus, is discussed. The history of Nipah virus emergence provides another example of a new human pathogen that originated from an animal source, initially caused zoonotic disease, and subsequently evolved to become a more efficient human pathogen. This trend calls for closer collaboration among sectors responsible for human health, veterinary health and wildlife.

Infectious diseases following extreme weather-related events and the acute public health impact of sudden chemical and radioactive events are also discussed. These now fall within the scope of IHR (2005) if they have the potential to cause harm on an international scale, including the deliberate use of biological and chemical agents, and industrial accidents. Among the examples of accidents given here is the Chernobyl nuclear accident in Ukraine in 1986, which dispersed radioactive materials into the atmosphere over a huge area of Europe. Put together, the examples in this chapter reveal the alarming variety of threats to global health security towards the end of the 20th century.



Viruses, such as dengue, flourish in slums that result from uncontrolled urbanization.



Contaminated lakes and rivers are often people's only sources of drinking-water.



Above-normal rainfall increases the risk of vector-borne diseases.



The Chernobyl nuclear reactor stands empty after the 1986 explosions.



A child of Chernobyl is examined by medical staff after the accident.



New health threats in the 21st century

Chapter 3 examines three new health threats that have emerged in the 21st century – bioterrorism in the form of the anthrax letters in the United States in 2001, the emergence of SARS in 2003, and the large-scale dumping of toxic chemical waste in Côte d'Ivoire in 2006.

Coming only days after the terrorist events of 11 September 2001, the deliberate dissemination of potentially lethal anthrax spores in letters sent through the United States Postal Service added bioterrorism to the realities of life in modern society. In addition to the human toll – five died out of a total of 22 people affected – the anthrax attack had huge economic, public health and security consequences. It prompted renewed international concerns about bioterrorism, provoking countermeasures in many countries and requests for a greater advisory role by WHO led to the updating of the publication *Public health response to biological and chemical weapons: WHO guidance*.

The anthrax letters showed the potential of bioterrorism to cause not just death and disability, but enormous social and economic disruption. A simultaneous worry was that smallpox – eradicated as a human disease in 1979 – could be used over 20 years later to deadly effect in deliberate acts of violence. Mass smallpox vaccination had been discontinued after eradication, thus leaving unimmunized populations susceptible and a new generation of public health practitioners without clinical experience of the disease.

Since then, WHO has taken part in international discussions and bioterrorism desk-top exercises arguing that the surest way to detect a deliberately caused outbreak is by strengthening the systems used for detecting and responding to natural outbreaks, as the epidemiological and laboratory principles are fundamentally the same. Expert discussions on the appropriate response to a biological attack, especially with the smallpox virus, served to test – on a global scale – the outbreak alert and response mechanisms already introduced by WHO.

In 2003, SARS – the first severe new disease of this century – confirmed fears, generated by the bioterrorism threat, that a new or unfamiliar pathogen might have profound national and international implications for public health and economic security. SARS defined the features that would give a disease international significance as a global public health security threat: it spread from person to person, required no vector, displayed no particular geographical affinity, incubated silently for more than a week, mimicked the symptoms of many other diseases, took its heaviest toll on hospital staff, and killed around 10% of those infected. These features meant that it spread easily along the routes of international air travel, placing every city with an international airport at risk of imported cases.

New, deadly and – initially – poorly understood, SARS incited a degree of public anxiety that virtually halted travel to affected areas and drained billions of dollars from economies across entire regions. It challenged public and political perceptions of the risks associated with emerging and epidemic-prone diseases and raised the profile of public health to new heights. Not every country felt threatened by the prospect of bioterrorism, but every country was concerned by the arrival of a disease like SARS.



Toxicological dumping in Côte d'Ivoire – the clean up begins.

It showed that the danger arising from emerging diseases is universal. No country, rich or poor, is adequately protected from either the arrival of a new disease on its territory or the subsequent disruption this can cause. The spread of SARS was halted less than four months after it was first recognized as an international threat – an unprecedented achievement for public health on a global scale. If SARS had become permanently established as yet another indigenous epidemic threat, it is not difficult to imagine the consequences for global public health security in a world still struggling to cope with HIV/AIDS.

As well as the international mobility of people, the global movement of products can have serious health consequences. The potentially deadly risks of the international movement and disposal of hazardous wastes as an element of global trade were vividly illustrated in Côte d'Ivoire in August 2006. Over 500 tons of chemical waste were unloaded from a cargo ship and illegally dumped by trucks at different sites in and around Abidjan. As a result, almost 90 000 people sought medical treatment in the following days and weeks. Although less than 100 people were hospitalized and far fewer deaths could be attributed to the event, it was a public health crisis of both national and international dimensions. One of the main international concerns was that the cargo ship had sailed from northern Europe and had called at a number of ports, including some others in western Africa, on its way to Côte d'Ivoire. It was unclear in the aftermath of the incident whether it had taken on, or discharged, chemical waste at any of those ports of call.



Learning lessons, thinking ahead

Chapter 4 is devoted to potential public health emergencies of international concern, the most feared of which remains pandemic influenza. The response to this threat has already been proactive – facilitated by early implementation of IHR (2005). This has been a rare opportunity to prepare for a pandemic, and possibly to prevent the threat becoming a reality by taking full advantage of advance warning and by testing a model for pandemic planning and preparedness. This advantage must be fully exploited to enhance global preparedness within the framework of IHR (2005).

Coming on the heels of the SARS outbreak, the prospect of an influenza pandemic sparked immediate alarm around the world. Far more contagious, spread by coughing and sneezing and transmissible within an incubation period too short to allow for contact tracing and isolation, pandemic influenza would have devastating consequences. If a fully transmissible pandemic virus emerged, the spread of the disease could not be prevented.

Based on experiences with past pandemics, illness affecting around 25% of the world's population – more than 1.5 billion people – could be anticipated. Even if the influenza pandemic virus caused relatively mild disease, the economic and social disruption arising from sudden surges of illness in so many people would be enormous.

As the next influenza pandemic is likely to be of avian variety, many interventions have been taken to control the initial outbreaks in poultry, including the destruction of tens of millions of birds. Chapter 4 describes the key actions taken and the remarkable degree of international collaboration that has been achieved to reduce the pandemic risk. Among its many front-line activities, WHO has tracked and verified dozens of daily rumours of human cases. Field investigation kits have been dispatched to countries and training on field investigations and response intensified. The GOARN mechanism was mobilized to support the deployment of WHO response teams to 10 countries with H5N1 infection in humans and/or poultry, while over 30 assessment teams investigated the potential H5N1 situation in other countries.

With the aim of promoting global preparedness, WHO developed a strategic action plan for pandemic influenza that set out five key action areas.

- Reducing human exposure to the H5N1 virus.
- Strengthening the early warning system.
- Intensifying rapid containment operations.
- Building capacity to cope with a pandemic.
- Coordinating global scientific research and development.

By May 2007, when 12 countries had reported 308 human cases including 186 deaths, nearly all countries had established avian and human pandemic preparedness plans. Working together, WHO and some Member States created international stockpiles of oseltamivir, an antiviral drug that potentially could stop transmission in an early focus of human-to-human transmission. The pharmaceutical industry continues to search for a pandemic influenza vaccine. In 2007, outbreaks in poultry continued, as did sporadic cases in humans, but a pandemic virus failed to emerge. Nevertheless, scientists agree that the threat of a pandemic from H5N1 continues and that the question of a pandemic of influenza from this virus or another avian influenza virus is still a matter of when, not if.

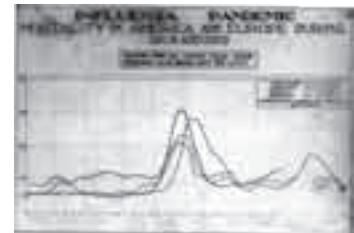


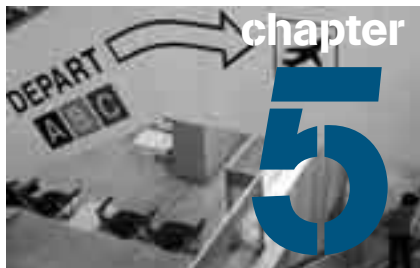
An emergency hospital in the United States during the 1918–1919 influenza pandemic.

Chapter 4 also highlights the problem of XDR-TB in southern Africa, exacerbated by inadequate health systems and the resulting failures in programme management, especially poor supervision of health staff and patients' treatment regimens, disruptions in drug supplies, and poor clinical management, all of which can prevent patients completing courses of treatment. The current situation is a wake-up call to all countries, and especially those in Africa, to ensure that basic tuberculosis control reaches international standards and to initiate and strengthen management of drug-resistant forms of the disease.

The 2003-2005 global spread of poliovirus caused by inadequate control in Nigeria (described in Chapter 2) was another wake-up call. It underscored the risk that polio might re-emerge post-eradication and the importance of the designation of polio as a notifiable disease in IHR (2005). The alert and reporting mechanisms mandated by IHR (2005) are an essential complement to activities undertaken by the extensive surveillance network already in place around the world that provides for the immediate notification of confirmed polio cases and for standardized clinical and virologic investigation of potential cases. This capacity to remain alert and to respond is fundamental to the ability to eradicate polio because, once the virus is eradicated in nature, the world will need be vigilant in case of accidental or deliberate release of the virus.

Finally, Chapter 4 considers natural disasters which, in 2006 alone, affected 134.6 million people and killed 21 342 others. Just as these situations endanger individuals, they can also threaten already stressed health systems that people rely on to maintain their personal health security. The indirect effects of natural disasters include the threat of infectious disease epidemics, acute malnutrition, population displacement, acute mental illness and the exacerbation of chronic disease, all of which require strong health systems to deal with them.





Towards a safer future

Chapter 5 emphasizes the importance of strengthening health systems in building global public health security. It argues that many of the public health emergencies described in this report could have been prevented or better controlled if the health systems concerned had been stronger and better prepared. Some countries find it more difficult than others to confront threats to public health security effectively because they lack the necessary resources, because their health infrastructure has collapsed as a consequence of under-investment and shortages of trained health workers, or because the infrastructure has been damaged or destroyed by armed conflict or a previous natural disaster.

No single country – however capable, wealthy or technologically advanced – can alone prevent, detect and respond to all public health threats. Emerging threats may be unseen from a national perspective, may require a global analysis for proper risk assessment, or may necessitate effective coordination at the international level.

This is the basis for IHR (2005), but as not all countries will be able to take up the challenge immediately, WHO will have to draw upon its long experience as the leader in global public health, its convening power, and its partnerships with governments, United Nations agencies, civil society, academia, the private sector and the media to maintain its surveillance and global alert and response systems.

As described in Chapter 1, WHO surveillance networks and GOARN are effective international partnerships that provide both a service and a safety net. GOARN is able to deploy response teams to any part of the world within 24 hours to provide direct support to national authorities. WHO's various surveillance and laboratory networks are able to capture the global picture of public health risks and assist in efficient case analysis.

Together, these systems fill acute gaps caused by the lack of national capacity and protect the world when there may be a desire to delay reporting for political or other reasons.

The effective maintenance of these systems, however, must be adequately resourced with staff, technology and financial support. The building of national capacity will not diminish the need for WHO's global networks. Rather, increased partnerships, knowledge transfer, advancing technologies, event management and strategic communications will grow as IHR (2005) reaches full implementation.

Conclusions and recommendations

The report concludes with recommendations intended to provide guidance and inspiration towards cooperation and transparency in the effort to secure the highest level of global public health security.

- Full implementation of IHR (2005) by all countries. The protection of national and global public health must be transparent in government affairs, be seen as a cross-cutting issue and as a crucial element integrated into economic and social policies and systems.
- Global cooperation in surveillance and outbreak alert and response between governments, United Nations agencies, private sector industries and organizations, professional associations, academia, media agencies and civil society, building particularly on the eradication of polio to create an effective and comprehensive surveillance and response infrastructure.



WHO emergency response teams deploy to even the most remote regions within 24 hours

- Open sharing of knowledge, technologies and materials, including viruses and other laboratory samples, necessary to optimize secure global public health. The struggle for global public health security will be lost if vaccines, treatment regimens, and facilities and diagnostics are available only to the wealthy.
- Global responsibility for capacity building within the public health infrastructure of all countries. National systems must be strengthened to anticipate and predict hazards effectively both at the international and national levels and to allow for effective preparedness strategies.
- Cross-sector collaboration within governments. The protection of global public health security is dependent on trust and collaboration between sectors such as health, agriculture, trade and tourism. It is for this reason that the capacity to understand and act in the best interests of the intricate relationship between public health security and these sectors must be fostered.
- Increased global and national resources for the training of public health personnel, the advancement of surveillance, the building and enhancing of laboratory capacity, the support of response networks, and the continuation and progression of prevention campaigns.

Although the subject of this report has taken a global approach to public health security, WHO does not neglect the fact that all individuals – women, men and children – are affected by the common threats to health. It is vital not to lose sight of the personal consequences of global health challenges. This was the inspiration that led to the “health for all” commitment to primary health care in 1978. That commitment and the principles supporting it remain untarnished and as essential as ever. On that basis, primary health care and humanitarian action in times of crisis – two means to ensure health security at individual and community levels – will be discussed at length in *The World Health Report 2008*.



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The *World Health Report 2007* marks a turning point in the history of public health, and signals what could be one of the biggest advances in health security in half a century.

In 1951, when WHO issued its first set of legally binding regulations aimed at preventing the international spread of disease,

people travelled internationally by ship, and news was transmitted by telegram.

The world has changed dramatically since then. Now, every day, up to three million people travel by air to another city, another country, or another continent. Every day, millions of tons of cargo are shipped around the world by air, land and sea. Every day, the constant movement of people and products carries with it the potential to spread highly infectious diseases and other hazards more rapidly than at any time in history.

A sudden health crisis in one region of the world is now only a few hours away from becoming a public health emergency in another.

In the last five years, WHO has verified more than 1100 epidemic events. Among them was a deadly new disease, SARS – Severe Acute Respiratory Syndrome – which sparked an international alert in 2003. Today, there is a real and continuing threat of a human influenza pandemic that could have much more serious human and economic consequences.

The *World Health Report 2007* discusses these and other current challenges to global health security and asks: How can a safer future be achieved? It looks at the potential of new tools for collective defence, particularly the revised International Health Regulations (2005) which came into force this year. They are designed to achieve maximum security against the international spread of diseases, and have been expanded to include any emergency with international repercussions for health, including natural disasters and chemical or radionuclear events, whether accidental or deliberate.

Significantly, the revised Regulations move away from a focus on passive barriers at airports, seaports and borders to a strategy of proactive risk management – detecting an event early and stopping it at its source – before it has a chance to become an international threat.

For while acute health risks can and do spread quickly, nothing travels faster today than information. Increasingly armed with the latest communications, and supported by international networks, technology, expertise and legal obligation, countries can act promptly and collectively to health emergencies at their source and prevent their spread.

The prospect of a safer future is within reach. It is both a collective aspiration and a mutual responsibility. As the causes and consequences of health emergencies expand, so does the range of players with a stake in the security agenda. *The World Health Report 2007* is directed towards all of them, and all who value public health.

