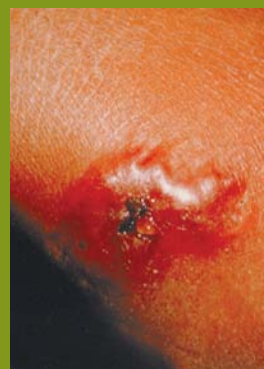
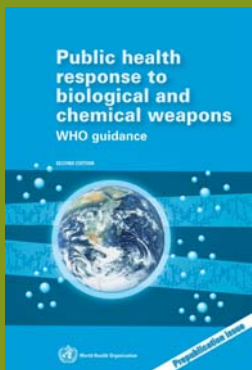


Preparedness for **the deliberate use** of biological agents

A rational approach to the unthinkable



World Health Organization
Geneva, May 2002

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Overview of public health functions

“In most cases, the public health system will be the first to detect cases and raise the alarm. It will be at the front line throughout the response.”

A public health perspective

Routine surveillance systems for epidemic-prone and emerging infectious diseases enhance the capacity to detect and investigate deliberately caused outbreaks, as the initial epidemiological and laboratory techniques are similar to those used for natural outbreaks. Adequate background data on the natural behaviour of infectious diseases facilitate recognition of an unusual event and help determine whether suspicions of a deliberate cause should be investigated.

Preparedness for the deliberate use of a biological agent requires collaboration of the intelligence community, law enforcement agencies, public health professionals, and the biomedical sciences. As these disciplines do not routinely work together, the meaning of some terms, notably surveillance and verification, has different interpretations. Surveillance, as used in public health, pertains to routine systems for monitoring diseases with a high burden, tracking outbreaks of epidemic-prone diseases, and detecting new diseases. Verification pertains to the procedures followed when investigating an outbreak and identifying the causative agent.

Priorities

The first priority of WHO remains the prompt detection and containment of naturally occurring outbreaks. Strict preservation of political neutrality is essential to this goal, as it encourages frank reporting and earns the trust of affected countries.

For deliberately caused outbreaks, WHO is solely concerned with the public health aspects of preparedness and response. Threat analysis, which considers the likelihood of a deliberate attack, aims to identify the agent that may be used and assess the level of risk. Such analysis is the responsibility of intelligence and law enforcement agencies, and is not a public health function.

Public health plays a leading role in all other areas of preparedness planning for a deliberately caused outbreak. In most situations, the public health system will be the first to detect cases and raise the alarm. It will be at the front line throughout the response.

Pre-emption of terrorist use of biological agents presupposes, first and foremost, accurate and up-to-date intelligence about terrorist groups and their activities. As the agents may be manufactured using dual-use equipment, and as the equipment for manufacture need not be large or particularly distinctive, technical means of acquiring intelligence, such as reconnaissance satellites, are of little use. The difficulties of predicting or pre-empting a bioterrorist attack underscore the need for careful preparedness planning. They also lead some analysts to regard strong public health infrastructures as the only reasonable defence.

“The difficulties of predicting or pre-empting a bioterrorist attack underscore the need for careful preparedness planning.”

As countries contemplate their response to the threat of a deliberately caused outbreak, vigorous positioning of public health functions is essential to guard against the diversion of resources and expertise badly needed for established public health programmes. A balanced preparedness plan includes public health in the national security framework.

Infectious diseases: a security threat in their own right

The emergence of new infectious diseases, and the re-emergence of others, combined with the increased speed and volume of international travel, have alerted countries to the ease with which infectious diseases can cross national borders. The emergence of AIDS, and its rapid progression to endemicity in particular, convinced the world that a previously unknown pathogen can cause social and economic upheaval on a scale that threatens to destabilize whole regions.

In developing countries, the destabilizing effect of endemic diseases, including AIDS, TB and malaria, is amplified by emerging and epidemic-prone diseases. Outbreaks and epidemics disrupt routine control programmes and health services, often for extended periods, due to the extraordinary resources and logistics required for their containment. The interruption of trade, travel and tourism that can follow news of an outbreak places a further burden on already fragile economies.

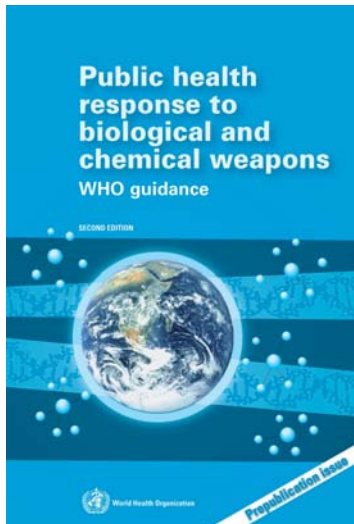
In industrialized countries, infectious diseases can represent a security issue for several reasons: if domestic populations need protection from diseases originating abroad, if deteriorating health trends abroad lead to instability and violence, or if biological agents are deliberately used to cause harm.

Growing recognition of the power of emerging and epidemic-prone infectious diseases to disrupt and destabilize has led to inclusion of their control in foreign policy agendas that seek to build a more secure world.

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Biological agents of concern



Formal WHO advice prepared in consultation with over 90 experts.

Pre-publication edition available at:
http://www.who.int/emc/deliberate_epi.html

"All of the biological agents of concern can cause natural disease in humans, though with markedly different frequency."

Formal WHO advice

In 1997, WHO responded to the need for considerable updating of its 1970 guide, *Health Aspects of Chemical and Biological Weapons*, and initiated an expert consultation, eventually involving over 90 experts. The updated guide was made available, in draft form, in September 2001 under a new title, *Public Health Response to Biological and Chemical Weapons*. Formal publication is scheduled for late 2002. The publication is WHO's official guidance based on the views of these experts.

For biological agents, the publication covers 11 bacteria, fungi and viruses listed by states parties to the Biological Weapons Convention in declarations of past offensive research and development programmes, or considered of special concern for possible use in terrorism. All of these agents can cause natural disease in humans, though with markedly different frequency.

Two diseases of concern, glanders and tularaemia, are only rarely transmitted from animals to human. No case of smallpox has been confirmed since a laboratory-associated outbreak in 1978. Some of the 11 agents cause isolated cases and sporadic outbreaks in the developing world: anthrax (Africa, the Middle East and central and southern Asia), melioidosis (South-East Asia), plague (Africa, Asia, and South America), typhus fever (endemic foci in parts of Mexico, central and South America, central and east Africa, and Asia), and Venezuelan equine encephalomyelitis (endemic in central and northern South America). The others, namely brucellosis, Q fever, and coccidioidomycosis, can occur worldwide.

The role of routine surveillance

The human occurrence of any of these diseases, whether naturally or deliberately caused, will in most cases first be detected by the public health system. Suspicions that the event is unusual will be roused by background data on the natural behaviour of the disease, including its geographical and seasonal occurrence and the characteristic epidemiological, demographic, and clinical features of the outbreak. Routine surveillance provides this background "intelligence".

Given the geographical distribution of the diseases of concern, adequate surveillance requires a global system. Strengthening of surveillance capacity in the developing world is particularly important. Many new diseases emerge in developing countries. The experience acquired in their detection and investigation has direct relevance to the prompt recognition and management of deliberately caused disease. While any component of the surveillance system could possibly detect a suspicious outbreak, the local or national component is more likely to recognize an unusual event.

The performance of routine systems in detecting and containing naturally occurring outbreaks provides an indication of how well they would perform when coping with a deliberately caused outbreak. Mechanisms for the routine exchange of information between the public health and veterinary sectors are important as many diseases of concern are zoonoses.

“Experiences acquired with emerging diseases have direct relevance to the prompt recognition and management of deliberately caused outbreaks.”

Diseases of concern and their natural occurrence	
Bacterial	
Anthrax	The human form is most frequent in Africa, the Middle East and in central and southern Asia
Brucellosis	Worldwide
Glanders	Rare or absent in most parts of the world
Melioidosis	Prevalent in South-East Asia
Tularaemia	Only rarely transmitted from animals to humans
Plague	Recent outbreaks in Africa, Asia and South America and sporadic cases in several countries
Q fever	Worldwide
Typhus fever	Endemic foci in parts of Mexico, central and South America, central and east Africa and various parts of Asia
Fungal	
Coccidioidomycosis	Worldwide in arid and semi-arid regions
Viral	
Venezuelan equine encephalomyelitis	Endemic in central and northern South America
Smallpox	No case confirmed since laboratory-associated outbreak in 1978

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Preparedness plans



Low probability, high consequences

The risk that biological agents will be used deliberately to cause harm has historically been low. While the probability may be low, the consequences are potentially so great as to make it prudent for governments at least to consider how to address this danger as an integral part of the national response to other challenges to public health and well-being.

Given the emotive force of even an alleged threat of a biological release, preparedness plans can reassure the public and reduce panic should genuine threats or hoaxes occur. Historical precedent further suggests that the risk of a deliberate release is considerably reduced by the existence of an effective ability to respond to and manage an incident.

Principles of planning

Preparedness plans should follow the established principles of risk assessment and management and should draw on existing plans for dealing with disasters or emergencies, including natural outbreaks of disease, natural disasters, and terrorist incidents. Planning principles will also overlap with plans for responding to large-scale industrial or transportation accidents in which health care facilities will be required to deal with a surge of casualties and emergency admissions.

“Every outbreak should be treated as a natural outbreak until demonstrated otherwise. This frees the health system to concentrate on its first priority: saving lives and containing spread.”

Every outbreak should be treated as a natural outbreak until demonstrated otherwise. Such an approach frees the health system to concentrate on the first priority: the reduction of morbidity and mortality and prevention of further spread. For all outbreaks, whatever the cause, the window of opportunity for effective intervention closes quickly.

Public health: on the front line

The covert release of a biological agent will, in most cases, take several days or even weeks to become apparent. Suspicions that an attack has occurred will emerge only when patients begin appearing in health care facilities or emergency rooms with unusual symptoms or an inexplicable disease.

For this reason, public health workers, including nurses, physicians, and hospital accident and emergency personnel, will be the first to respond to a deliberately caused outbreak.

Prompt detection depends on their vigilance: their alertness to clusters of unusual symptoms and immediate reporting to the appropriate authorities. Public health workers are also at the front line throughout the response and should have first call on protective equipment, vaccines, and drugs.

Most health personnel will have little or no experience of several of the illnesses that could be deliberately caused. Training is therefore needed in the recognition and initial management of biological casualties, and for a rapid communication that allows real-time sharing of information as an unusual event unfolds.

First responders also need training in barrier nursing techniques, safe handling of samples, and decontamination procedures. Of great concern is the generally acknowledged fact that few countries will ever have the surge capacity, in staff and facilities, to manage either a very large and lethal outbreak or simultaneous attacks with different agents.

“Few countries will ever have the surge capacity to manage a very large and lethal outbreak or simultaneous attacks with different agents.”

Watersheds in the perception of public health risks

1958: thalidomide (drug safety)

A wave of previously rare birth defects occurred in thousands of infants born to women who took thalidomide during pregnancy. The tragedy called into question the reliability of teratogenicity tests and the safety of drug prescribing to pregnant women. It also led to improved post-marketing surveillance of adverse drug effects.

1980s: HIV-tainted blood (blood safety)

Blood transfusion became a risk factor for HIV after thousands of haemophiliacs and others, not considered at risk, contracted HIV infection from untreated blood products. Apart from defining a new risk group, the tragedy placed the spotlight on the blood supply as a vehicle for transmission of infectious diseases. Rigorous safety standards ensued.

1986: Chernobyl (industrial safety)

The accident at the Chernobyl nuclear power plant was the world's worst nuclear disaster and one of the greatest

industrial accidents of all times. The accident underscored the need for strict safety standards and dramatically demonstrated how a threat can spread far beyond national borders, with long-term consequences for health and the environment.

1996: vCJD (food safety)

Recognition of variant Creutzfeldt-Jakob disease as a new disease in humans opened the possibility that food could transmit a chronic and invariably fatal disease. It raised questions about the consequences of intensive farming practices and pointed to the need for improved surveillance.

2001: anthrax (biological safety)

The deliberate distribution of anthrax through the US postal system caused 22 infections and five deaths. The resulting panic occupied emergency and law enforcement services around the world. The threat of bioterrorism, long considered hypothetical, became real. Many regard strengthened disease surveillance and response capacity as the best protective measure.

Preparedness for the deliberate use of biological agents

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Balancing known and unknown risks



Smallpox.

A disease from the past, vanquished in 1979, is now an unknown risk.

“A key question is whether preparedness should include the stockpiling of drugs, vaccines, and equipment, as the costs can be prohibitive for many countries.”

Health infrastructures: stretched to the limit

Throughout most of the world, the public health infrastructure is stretched to its limits coping with natural health hazards. Governments considering preparedness for a biological attack face a range of new issues within an already complex mix of competing priorities and uncertainties.

In most cases, countries should not establish a specialized unit for responding to a biological attack. Three concerns support this advice. First, the relative infrequency of call-out could lead to a deterioration of skills. Second, the expense is difficult to justify in the many countries where other immediate and prevalent health needs are not being met. Third and most importantly, excessive centralization can increase the time taken to respond. Mobilization of a specialized unit can never match the availability and experience of existing emergency response and public health services at the local level. Across-the-board strengthening of the existing infrastructure, reaching to the local level, is the better option.

At the same time, however, certain activities, such as sampling and analysis for the definitive identification of the agent, will need to be carried out by specialists and may require the security of biosafety level IV laboratories. In this regard, the WHO global network of over 270 collaborating institutes and laboratories with expertise in infectious diseases provides a vital resource. The sharing of such resources is a more economical option than attempting to build highly specialized capacity in an enlarged number of countries.

Another key question is whether preparedness should include the stockpiling of drugs, vaccines, and equipment, as the costs can be prohibitive for many countries. There is also a risk that items will expire or be rendered obsolete. Spending large sums exclusively on preparing for a possible attack can be justified only when there is consensus within a country that the threat is possible, probable, and specific.

Moreover, the world’s vaccine production capacity is limited. Both the polio eradication initiative and emergency responses to outbreaks of epidemic meningitis and yellow

fever have been hindered, on occasion, by vaccine shortages. A further transfer of limited production capacity to preparedness for a possible bioterrorist attack could make an already fragile situation worse. Industry's capacity to comply with a large and unexpected demand is limited, even when the economic incentive to do so is strong.

Preparedness for an unknown risk should not jeopardize the international community's capacity to respond to well-known, immediate, and measurable risks. Over 14 million people continue to die each year from often preventable infectious diseases. Many millions of preventable deaths occur because of lack of access to essential drugs and vaccines. These realities point again to strong public health infrastructures and services as the most reasonable – and ethical – defence against the threat of a deliberately caused outbreak.

“Over 14 million people die each year from infectious diseases. Preparedness for bioterrorism should not compromise the world's capacity to respond to existing threats.”



Malaria.

Annual toll: 1.1 million deaths.



African sleeping sickness.

Annual toll: US\$ 4.5 billion in lost agriculture alone.

Tuberculosis. Annual toll: 2 million deaths, including deaths from co-infection with HIV.

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Global surveillance and response

The foundation of health security

No country can ever guarantee the total security of its population against a biological attack, especially when a contagious agent is used. As with naturally caused outbreaks, the harm is delivered by invisible, highly mobile, microscopic agents that easily cross borders, placing all countries at risk. The consequences – whether in the form of cases of disease or waves of panic – can quickly spread in a highly mobile, interconnected, and electronically linked world.

UK warns against anthrax panic

17 October 2001
Health secretary Alan Milburn has warned the public not to panic about anthrax after a series of scares across the UK.

Incidents in the US, possibly linked to the 11 Sep have killed one man and three other people, but there has been no confirmed anthrax disease outside An

La psychose de l'anthrax en Occident

«Vous avez plus de chances de mourir en traversant la rue qu'en attrapant la maladie du charbon», a le courage d'affirmer

El Antrax dejó de ser una amenaza para comenzar su guerra de pánico

Hace sólo 3 meses, un grupo de civiles reunidos en la Base Andrews de la Fuerza Aérea de los Estados Unidos participaron de un ejercicio denom-

Kenya issues anthrax alert

19/10/2001

The Kenyan government has issued a national alert after a letter was found containing anthrax. Government officials say they are testing two other suspicious letters.

cases are still under investigation. One suspicious item was a tattered and oily parcel sent to the United Nations Environment Program headquarters in Nairobi.

Anthrax scare in New Delhi

NEW DELHI, Oct. 18

THE anthrax scare hit the Capital on Thursday with Indraprastha Apollo Hospital turning over a "suspicious looking" letter, addressed to one of its doctors, to the National Communicable Diseases (NICD).

Hospital sources told Business Line that the letter was received a couple of days ago. "While on a normal

Panic following the deliberate release of anthrax in the US in 2001 rapidly spread around the world.

deliberate distribution of anthrax in the US resulted in the prescribing of antibiotics to over 32 000 persons, while rumours and hoaxes occupied emergency and law enforcement services throughout the world. In the current climate of heightened alert, WHO has been asked to investigate rumoured outbreaks of smallpox in areas ranging from large cities in the industrialized world to remote mountain villages in developing countries.

"A global system of surveillance and response helps ensure that the world is not taken by surprise and knows how to collaborate in managing a shared threat."

In responding to the threat of deliberately caused outbreaks, a global system of surveillance and response helps ensure that the world is not taken by surprise and knows how to collaborate in managing a shared threat. A global system, operating in real time, facilitates rapid and rational responses. It ensures that the necessary laboratory and epidemiological skills are kept sharp, since the call-out for natural outbreaks at the global level is almost daily. It provides the mechanisms for sharing expertise, facilities, and staff.

A global system ensures that news of outbreaks of potential international concern is communicated to the international community as the event unfolds, enhancing vigilance for similar cases elsewhere. Investigating rumours, verifying genuine events, and providing assistance in a politically

neutral way reduces panic and encourages prompt and frank reporting. It also ensures that a global network of highly qualified “first responders” is available to assist in the investigation and containment of events in countries that lack the facilities and skills to do so on their own.

The Global Outbreak Alert and Response Network

These mechanisms are in place and operational, on a daily basis, in the Global Outbreak Alert and Response Network. Under development since 1997, this overarching network interlinks, in real time, over 100 existing networks. Together, these possess much of the data, expertise, and skills needed to keep the international community constantly alert and ready to respond.

The network, which was formalized in April 2000, is supported by several new mechanisms and a computer-driven tool for real-time gathering of disease intelligence. This tool, the Global Public Health Intelligence Network, heightens vigilance by continuously and systematically crawling web sites, news wires, local online newspapers, public health email services, and electronic discussion groups for rumours of outbreaks. In this way, WHO is able to scan the world for informal news that gives cause for suspecting an unusual event.

Formal sources of information, linked together in the network, include government and university centres, ministries of health, academic institutions, other UN agencies, networks of overseas military laboratories, and nongovernmental organizations having a strong presence in epidemic-prone countries. Information from all these sources is assessed and verified on a daily basis. Validated information is made public via the WHO web site.

“The network is supported by several new mechanisms and a computer-driven tool for real-time gathering of disease intelligence.”



Conditions during the Ebola outbreak in Uganda that began in October 2000.

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Alert and response operations

Sent: Wednesday, 11 October 2000 08:09
To: OUTBREAK@whoafr.org
Cc: OUTBREAK@who.ch
Subject: Viral haemorrhagic fever outbreak in Uganda

This is to inform you that there is a possible outbreak of viral haemorrhagic fever in Gulu district. There are several cases reported with 15 deaths including 2 health workers. A team has been sent to assist with outbreak investigations and some protective wear too has been sent.

We may need some assistance financially and in terms of logistical support especially after this is confirmed. We will be sending the specimen to the South African Lab for fast confirmation of diagnosis.

Real-time surveillance.

WHO was immediately notified by email following detection of the first suspected cases of Ebola in Uganda.

“Operational protocols bring order to the containment response. They protect against the very real risk that samples of a pathogen might be collected for malicious purposes.”

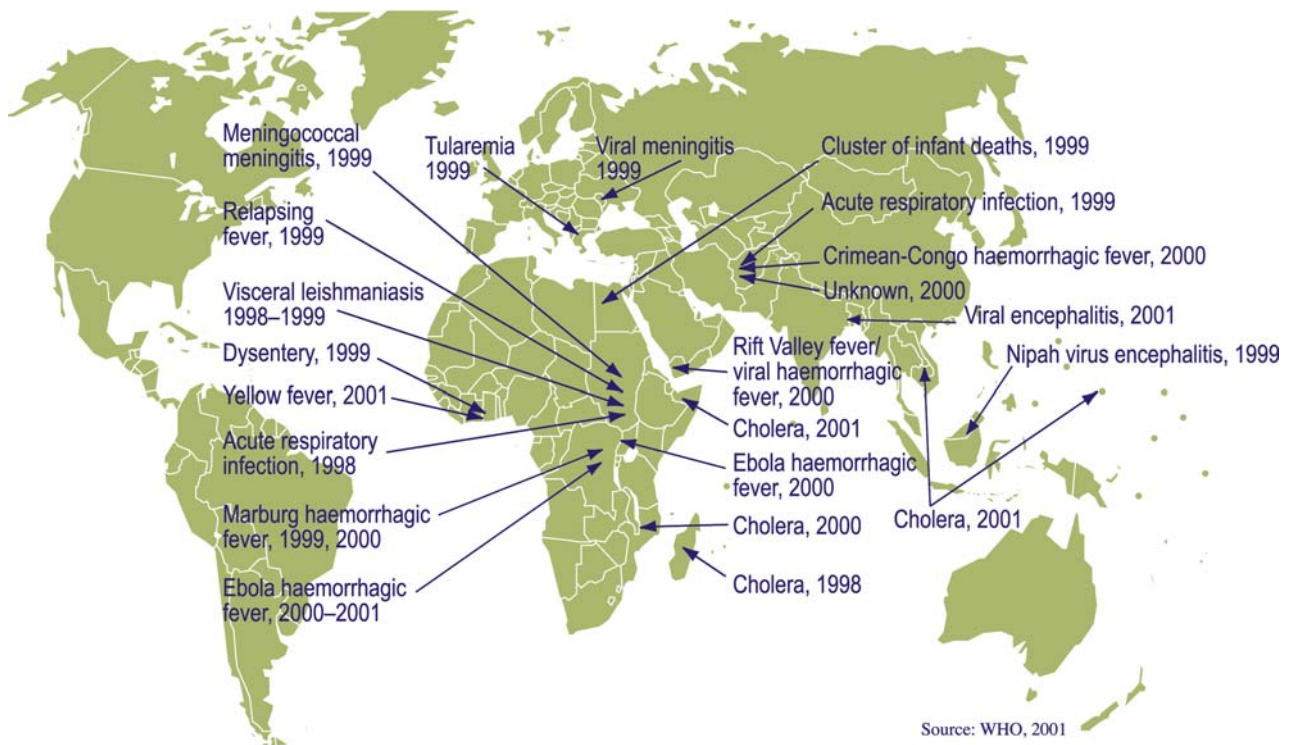
WHO uses six criteria to determine whether an outbreak is of international concern. “Suspected accidental or deliberate release” is one, and is routinely considered.

When international assistance is needed, as agreed upon in confidential consultation with the affected country and with experts in the network, WHO uses electronic communications to coordinate prompt assistance. To this end, WHO maintains global databases of professionals with expertise in specific diseases or epidemiological techniques, together with nongovernmental organizations present in countries and in a position to reach remote areas. Such mechanisms, which are further supported by the WHO network of collaborating laboratories and institutes, help the world make the maximum use of expertise and resources – assets that are traditionally scarce for public health.

During the past two years, the network launched effective international containment activities in Afghanistan, Bangladesh, Burkina Faso, Côte d’Ivoire, Egypt, Ethiopia, Kosovo, Sierra Leone, Sudan, Uganda, and Yemen.

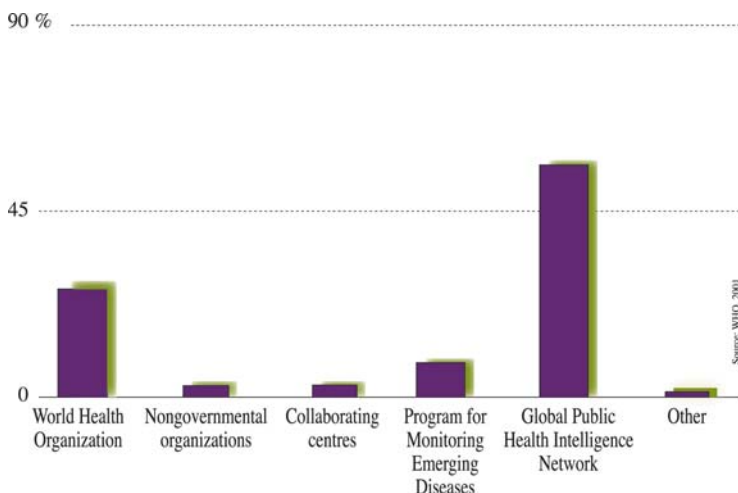
The work of coordinating large-scale international assistance, which can involve many agencies from many nations, is facilitated by operational protocols, developed by WHO, which set out standardized procedures for the alert and verification process, communications, coordination of the response, emergency evacuation, research, monitoring, ownership of data and samples, and relations with the media. By setting out a chain of command, and bringing order to the containment response, such protocols help protect against the very real risk that samples of a lethal pathogen might be collected for later provision to a terrorist group.

From July 1998 to August 2001, WHO verified 578 outbreaks in 132 countries, indicating the system’s broad geographical coverage. Twenty-two countries, many affected by continuing conflict, had ten or more verified outbreaks of potential international importance. The most frequently reported outbreaks were of cholera, meningitis, haemorrhagic fever, anthrax, and viral encephalitis.



Some WHO-facilitated epidemic response missions in the field, 1998–2001.

WHO has coordinated several large international responses to potentially explosive outbreaks. A WHO team is prepared to arrive at an outbreak site within 24 hours.



Initial sources of reports of outbreaks, 1998–2001.

The Global Public Health Intelligence Network computer application, developed for WHO by Health Canada, picked up the initial rumours of 56% of 578 outbreaks subsequently verified by WHO for the period July 1998 to August 2001.

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Strengthening the response to a shared threat

“Systems for global surveillance can never match the sensitivity, speed, and cost-effectiveness of strong local epidemiological and laboratory capacity.”

The importance of strong national systems

Global health security ultimately depends on strong national systems for surveillance and response. As noted previously, any component of the surveillance system could possibly detect a suspicious outbreak, but the local or national component is more likely to recognize an unusual event. Systems for global surveillance and response can never match the sensitivity, speed, and cost-effectiveness of strong local infrastructures and laboratory and epidemiological capacity.

Unfortunately, most national systems in developing countries suffer from poor sensitivity and incomplete reporting. Strengthening national capacity requires a long-term commitment of human and material resources, which should begin with a systematic assessment of national surveillance and response activities.

The revised International Health Regulations

New needs created by the resurgence of the infectious disease threat are the main driving force behind revisions of the *International Health Regulations*. As one of several new features, the revised regulations will identify the core surveillance capacities required at national level in order for a country to fully participate in the new requirement to report public health emergencies of international concern.

It is anticipated that this core capacity will become a benchmark for national surveillance systems and contribute to their strengthening by providing a clear, internationally recognized target.



Training in epidemiology at the WHO centre in Lyon, France. The 2-year programme includes a 6-month course followed by supervised field training.



Strengthening local capacity. WHO protocols for outbreak response include local training and participation in containment activities.

A rational response to the unthinkable

The world faces the prospect of unexpected events arising from the volatile microbial world on a daily basis. With the recent deliberate release of anthrax, the microbial threat, already considerable, has become at once more unpredictable and more ominous. The challenge is to manage this new threat in ways that do not compromise the response to natural outbreaks and epidemics. The infrastructure for doing so is firmly in place.

Aided by new tools and operational protocols, WHO and its partners in the Global Outbreak Alert and Response Network are permanently alert to the constantly changing infectious disease threat and permanently prepared to respond. As articulated in the November 2001 *Ottawa Plan for Improving Health Security*, the strengthening of global capacity for routine disease surveillance and outbreak response is an essential component of preparedness for the deliberate release of a biological agent. Many regard this approach as a wise “dual use” investment that prepares for a potential security threat while also providing a clear public health benefit.

The need for global unity

The need now is for global unity. In this regard, initiatives that swiftly followed the Ottawa Plan provide good evidence of both the willingness to collaborate internationally and the many advantages of doing so. Strengthened public health capacity for disease surveillance and response may not be able to predict or pre-empt another bioterrorist attack. But it can do much to mitigate the effects. It will also convey an important message for both concerned populations and potential aggressors: global health security can be defended in a rational and sustainable way.

“Strengthened capacity may not be able to predict or pre-empt another attack. But it can do much to mitigate the effects.”



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Web sites for further information

WHO home page

<http://www.who.int/home-page/>

Infectious diseases

http://www.who.int/m/topicgroups/infectious_diseases/en/index.html

Responding to the deliberate use of biological agents and chemicals as weapons

http://www.who.int/emc/deliberate_epi.html

Public health response to biological and chemical weapons (second edition, draft)

http://www.who.int/emc/deliberate_epi.html

Smallpox

<http://www.who.int/emc/diseases/smallpox/>

- fact sheet
<http://www.who.int/emc/diseases/smallpox/factsheet.html>
- advice on vaccination policy
<http://www.who.int/inf-pr-2001/en/state2001-16.html>
- WHO slide set on the diagnosis of smallpox
<http://www.who.int/emc/diseases/smallpox/slideset/index.htm>
- Smallpox and Its Eradication. F. Fenner, D.A. Henderson, I. Arita, Z. Jezek, I.D. Ladnyi. WHO, 1988 (ISBN: 92 4 156110 6)
<http://www.who.int/emc/diseases/smallpox/Smallpoxeradication.html>

Ottawa plan for improving health security

<http://www.g7.utoronto.ca/g7/health/ottawa2001.html>

Outbreak news

<http://www.who.int/disease-outbreak-news/>

Weekly epidemiological record

<http://www.who.int/wer>



World Health Organization

Communicable Disease Surveillance and Response
20, avenue Appia – CH-1211 Geneva 27, Switzerland