

Impediments to global surveillance of infectious diseases: consequences of open reporting in a global economy

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Globalization has led to an increase in the spread of emerging and re-emerging infectious diseases. International efforts are being launched to control their dissemination through global surveillance, a major hindrance to which is the failure of some countries to report outbreaks. Current guidelines and regulations on emerging and re-emerging infectious diseases do not sufficiently take into account the fact that when developing countries report outbreaks they often derive few benefits and suffer disproportionately heavy social and economic consequences.

In order to facilitate full participation in global surveillance by developing countries there should be: better and more affordable diagnostic capabilities to allow for timely and accurate information to be delivered in an open and transparent fashion; accurate, less sensationalist news reporting of outbreaks of diseases; adherence by countries to international regulations, including those of the World Trade Organization and the International Health Regulations; financial support for countries that are economically damaged by the diseases in question.

The article presents two cases — plague in India and cholera in Peru — that illuminate some of the limitations of current practices. Recommendations are made on measures that could be taken by WHO and the world community to make global surveillance acceptable.

Keywords: epidemiological surveillance; disease outbreaks, economics; communicable disease control, legislation; emerging diseases; plague; cholera; Peru; India.

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Introduction

Globalization has heightened the attention being paid to the international movement of people, goods, and information. In addition to expanding trade and travel, such movement accelerates the scale and speed of the transmission of infectious diseases. Most of these diseases are those once considered to be under control, ones that have emerged recently, or drug-resistant strains of existing pathogens. However, over the past two decades at least 30 new diseases have emerged, many with a potential for rapid spread across borders (1). The HIV/AIDS pandemic exemplifies the ease with which pathogens can spread in today's globalized society.

It is widely agreed that a global surveillance system for infectious diseases would help significantly to control their spread. Interest in disease surveillance dwindled between the late 1950s and the early 1990s because developed countries no longer perceived infectious diseases to be a serious threat.

Such optimism resulted from advances made in vaccines and treatment, the eradication of smallpox, a preoccupation with chronic diseases, and a confidence among health leaders that infectious diseases were a problem of the past (2, 3). There were a few exceptions; for example, global influenza surveillance began in 1948 and led to the annual design of effective vaccines. Other comparable endeavours, however, were not sustained. In the absence of interest in global surveillance, the corresponding funds and infrastructure declined, together with the capacity to detect outbreaks. Inaccurate disease surveillance reports continue to be made by developing countries because of a fear of unduly harsh treatment from the world community (2, 3).

Global surveillance finds its beginnings in 1896 when it was agreed at the International Sanitary Conference that there was a need for international health surveillance (4). Before this date, individual countries had monitored and often contained cases through quarantine. The *Organisation internationale d'Hygiène publique* was established in Paris in 1907 to gather information on disease outbreaks for eventual distribution to participating countries. The reporting of cholera and plague was required initially, while yellow fever, typhus and relapsing fever were added later. European countries feared that these diseases would cross their borders from the poorer countries

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where they principally occurred (2). Some countries signed additional health treaties before the Second World War. Despite these efforts, international health legislation proved ineffective because the treaties did not keep pace with scientific advances, were not recognized by all countries, and failed to secure the compliance of the poorer countries, which did not report diseases for fear of possible repercussions (2).

After the Second World War the *Organisation internationale d'Hygiène publique* was replaced by the World Health Organization. In 1951, WHO issued the International Sanitary Regulations, which were renamed the International Health Regulations in 1969 and later revised in 1981. These regulations required Member States to notify WHO within 24 hours of outbreaks of cholera, yellow fever and plague. The aim was to achieve the greatest possible security against the spread of disease and minimal disruption of international traffic (3). WHO possessed no enforcement powers, and it was hoped that persuasion and recommendation would induce countries to comply. Unfortunately, they did not always do so, often fearing unwarranted reactions that would affect travel and trade (5). Non-reporting countries justified their fears in terms of the costly repercussions that reporting countries faced in the past. The present International Health Regulations cover only three diseases (cholera, plague, and yellow fever), failing to address all other re-emerging and emerging infectious diseases that may have a potential for international spread. It is widely agreed that the goals of maximum security and minimal disruption have not been met because of the issues outlined above (3).

Global surveillance today

The spread of cholera, human immunodeficiency virus (HIV) and tuberculosis, as well as concerns over Ebola fever and other diseases, led to various initiatives aimed at cooperative global surveillance of emerging and re-emerging infectious diseases (6). In 1995 the World Health Assembly urged all Member States to strengthen surveillance of infectious diseases in order to detect re-emerging diseases and identify new infectious diseases promptly. (6). The Health Assembly noted that success in this area depended on accurate information on disease outbreaks and a willingness to share it. The European Union and the Group of Eight countries, among others, supported the formation of the surveillance network. WHO and the Centers for Disease Control and Prevention (CDC) in the USA have outlined plans to control emerging and re-emerging infectious diseases (7, 8). In 1999, however, WHO found it necessary to admonish Member States for failing to confront infectious diseases adequately and warned of possible international outbreaks (9).

The current global surveillance initiative, directed in many respects by WHO, consists of a network

of information sources and is based on the International Health Regulations, currently under revision, which oblige countries to report data. WHO plans to utilize a variety of sources, classified as formal or informal, to compile information on potentially dangerous outbreaks (6). Among the formal sources are government and university research centres, WHO regional and country offices, other United Nations agencies, and military networks (6); included also in this category are government clinics, individual scientists and public health practitioners. Informal sources include Internet sites and email list-servers. In addition, WHO maintains a web page of confirmed outbreaks (<http://www.who.int/disease-outbreak-news/index.html>) extracted from hundreds of postings that occur around the world each day — the primary aim being to verify rumours, not to repeat them. News organizations are a valuable source of information on outbreaks, and search engines are being tested by WHO that rapidly scan the World Wide Web to seek outbreak reports. The United States Committee on International Science, Engineering and Technology Working Group on Emerging Infectious Disease and other groups also plan to collaborate with WHO on the specifics of building surveillance capacity and communication networks (10).

Because of the ineffectiveness of the International Health Regulations, the World Health Assembly commissioned an informal working group in 1995 to re-examine them. The process of revision, intended to strengthen the role of the regulations in global disease control, takes into account the reluctance to report for fear of excessive reactionary measures, the lack of capacity for adequate detection, and the restricted scope of the regulations in the past. There are two major components: a framework document outlining appropriate public health measures at the time of an outbreak and legal provisions relating to the operation of the International Health Regulations; annexes describing specific requirements and recommendations (11).

The revised International Health Regulations will widen the scope of diseases that require reporting to include any disease of urgent international public health importance (12). According to proposed WHO operational guidelines the diseases to be included will be associated with: a high potential for spread outside the community; an unexpectedly high case fatality rate; an unusual or unexpected event; a newly recognized syndrome; a high political or media profile; a possibility of trade or travel restrictions (12).

It is to be hoped that countries will report diseases because of the assistance WHO can offer in response to immediate disclosure and because of the credibility that the Organization can provide. WHO recently completed a pilot study in 21 countries to assess the effectiveness of the revised International Health Regulations.

In order to respond to concerns about excessive restrictions on trade and travel, both the revised regulations and World Trade Organization (WTO) Agreement on the Application of Sanitary and

Phytosanitary Measures specify appropriate actions. The original International Health Regulations outlined in broad terms the reasonable measures that countries could employ, with specific guidelines for outbreaks of cholera, plague and yellow fever. The regulations also provided general rules concerning arrivals and departures of ships and aircraft and the treatment of imported goods; they were not, however, specific for particular situations. The International Health Regulations revision group intends to study this matter and to include annexes with specific limits on appropriate actions, but no definitive recommendations have yet been made (13). It is also intended that arbitration committees settle disputes on trade practices after an outbreak has occurred.

WTO currently uses the Sanitary and Phytosanitary Measures to provide basic rules on when and to what extent countries can apply measures that would normally be considered unfair trade practices to restrict the entry of unsafe goods. The rules stipulate that countries have the right to protect their citizens but that they should refrain from extreme measures unless justified by scientific evidence (14). There is an increased likelihood that countries will apply protectionist measures because of the relaxation of trade restrictions following the General Agreement on Tariffs and Trade (15). To ensure that this does not occur, the Sanitary and Phytosanitary Measures permit countries to raise disputed policies before a panel of experts for review and consultation. They also provide for a committee to facilitate ad hoc consultations or negotiations among members on specific sanitary and phytosanitary issues (14). In order to harmonize the numerous country guidelines, WTO recognizes certain groups, such as the Codex Alimentarius Commission and the International Office of Epizootics, as providing international standards for appropriate action.

Because of their common goal of maximum health protection and minimum international traffic disruption, WHO and WTO intend to collaborate in order to prevent conflict between the two sets of regulations. No specific agreements exist between the two organizations but recent discussions raise the potential for WHO to assist WTO in monitoring whether countries take appropriate public health measures during outbreaks. It will be WTO's role to assess trade practices.

Strengths and weaknesses of the latest global surveillance initiative

The plans for collecting information and revising the International Health Regulations make significant changes favouring the creation of an effective global surveillance system. They do not, however, fully address provision of an adequate surveillance infrastructure and the reluctance to report for fear of sanctions. While the first problem can probably be addressed through training and investment, that of reporting requires more than the outlining of

maximum allowable measures in the International Health Regulations and the Sanitary and Phytosanitary Measures.

Even in the presence of international help, the main burden of collecting information falls on government infrastructures. Although most developed countries possess some disease-monitoring capabilities, developing countries largely lack trained personnel, diagnostic laboratories and funds that can support surveillance activities. Where countries do not have an adequate surveillance capability, inaccurate reports and rumours can rapidly lead to social disruption nationally and unwarranted panic internationally.

While WHO and CDC, along with other groups, aim to encourage countries to build their surveillance capacities, there are no clear plans on the funding and maintenance of such efforts. It is necessary to focus on training of epidemiologists, improvement of specimen collection, and updating of laboratory facilities. Although building such an infrastructure requires considerable amounts of time and money, there seems to be enough interest to ensure that this will eventually be achieved.

With regard to non-reporting the prospects seem less favourable. Plans to expand the number of reportable diseases will increase the frequency with which the International Health Regulations may be applied to outbreaks (16). This could lead to increased use of trade and travel restrictions in an attempt to prevent the entry of infectious agents. It is intended that international regulations be used to prevent overreaction, even though such measures failed in the past. The revision process may improve the situation but regulations in themselves cannot completely address this issue. As discussed below, the recent examples of plague in India and cholera in Peru clearly demonstrate how the international community reacts to outbreaks, how the responses affect developing countries, and how global surveillance could be changed to prevent such reactions in the future.

Plague in India

Setting

On 20 September 1994, Surat Civil Hospital, Gujarat, admitted seven patients with pneumonia-like symptoms. Despite penicillin treatment, two of the patients died within a day. Other hospitals in the area admitted many other individuals with similar symptoms, all from the poor sections of Surat. Examination of patient sputum samples revealed the presence of rod-shaped bacilli resembling the plague bacillus but no bacteriological confirmation was obtained. Government officials had to decide whether to declare an outbreak of plague immediately or wait for laboratory confirmation a week later (17). They chose the former course of action and a sequence of events was set in motion that led to widespread panic, worldwide apprehension, and severe economic losses for India.

By 23 September 1994 there were media reports of a plague outbreak in Surat and these reports quickly spread throughout the world. As many as 500 000 people fled Surat and the surrounding area, and this led to fears that plague might be carried to other large Indian cities and beyond (18). A low-threshold case definition was adopted in order to include all possible cases, and in consequence the number of suspected cases rose throughout western India (19). Drastic nationwide measures were taken during the next week in the hope of stopping the spread of the suspected disease. Schools were closed and persons showing any respiratory symptoms, such as bloody sputum and persistent cough, were placed in quarantine. The Indian Ministry of Health, in accordance with the International Health Regulations, formally notified WHO, examined all persons leaving the country with any plague-like symptoms, and fumigated cargo from all ports of departure against rodents (19). On 3 October 1994, India declared that the epidemic was under control and by the end of the month WHO declared the outbreak to be over (20).

On 7 October 1994, because of international concern, WHO announced that it was sending an independent team of investigators to evaluate the situation. The team reported that there was evidence of a limited outbreak of plague in Surat but not of person-to-person transmission in major Indian cities; indeed, no cases were found in these cities (19). The team concluded that the lack of adequate diagnostic equipment in the affected area led to overreporting and subsequent panic among the residents of Surat, and that excessive measures were adopted, i.e. flea control as a means of preventing the spread of plague through commerce and antibiotic prophylaxis for unaffected individuals. At the time, official reports indicated 52 deaths in the country from plague and 876 clinically confirmed cases (21). A subsequent report from the All India Institute of Hygiene and Public Health indicated that not a single case of plague was confirmed on the basis of WHO bacteriological standards (22).

Established policy on response to plague

The International Health Regulations provide some guidance on how countries should respond to an outbreak of plague. They do not, however, state what specific actions can be taken, except that cargoes and goods may be regulated if they come from infected areas and if the health authority has reason to believe that they may have become contaminated by the agent of the disease. The regulations also stipulate that each country shall employ all means in its power to diminish the danger from the spread of plague by rodents and their ectoparasites. During the 1994 outbreak, India claimed to have fumigated all ships and relevant cargoes before they left port to ensure that all rodents were killed. However, there was no evidence of plague in the country's port cities.

Perhaps more significantly, the regulations stipulate that a ship or aircraft is considered to be

infected with plague only if there has been a human case on board, or if there is evidence of abnormal rat mortality that might be attributable to plague, or if someone on board has come from an infected area without being quarantined. A ship ceases to be regarded as infected or suspect if the affected country follows quarantine protocol, which India did. If a ship or aircraft comes directly from an infected area but does not meet the above-mentioned three criteria for suspicion, it should be regarded on arrival as healthy according to the International Health Regulations.

WHO regulations indicate that the response to India's epidemic should have ensured: adequate monitoring of departing aircraft and ships by Indian public health officials; adequate de-ratting of cargoes and ships before they left port; monitoring of arriving ships and aircraft by other countries for infections on board and preparedness to respond but not to deny entry; availability of adequate supplies of appropriate antibiotics in countries so that any cases that occurred could be quickly treated.

International response

Before the scientific confirmation of the 1994 plague outbreak had been carried out, press releases were giving estimates of the level of disease and television broadcasts were showing people wearing cloth masks fleeing from the affected area. Within a week of the initial reports, countries throughout Asia and the Eastern Mediterranean stopped flights to and from India (23). Before a single case was confirmed in western India, Bangladesh stopped the movement of goods and people at border crossings with India. Bangladesh, Oman, Qatar, and the United Arab Emirates stopped importing all foodstuffs from India, and many other countries followed suit. Canada, France, Germany, Italy, the United Kingdom, and the USA issued warnings to their citizens on travel to India. Italy placed an immediate embargo on all goods from India at all Italian ports, while Sweden, a major trading partner of India, cancelled all textile shipments (24). These measures were taken even though WHO requested that no travel or trade restrictions be imposed on India.

Although the reported cases were confined to the poor in defined areas, many people changed their plans for travelling to India at the height of the tourist season (25). The outbreak also affected Indians travelling abroad, as they were often held up at airports, placed in quarantine, or even sent back to India (24). Even some Indian citizens resident in other countries were subjected to unwarranted scrutiny. Such measures against citizens of countries suffering from an outbreak are prohibited by the International Health Regulations (5). Because of its historical importance, plague rapidly placed a stigma on India that took months to fade.

Only after the lifting of all sanctions and the normalization of travel and trade patterns did the full cost of the outbreak become clear. In 1994, India's trade deficit rose to more than twice that of the

previous year (26). In response to the loss of at least 2.2 million tourists during the season, the Ministry of Tourism reduced its hotel prices by 50% (25). Estimates of quantifiable losses vary, but most reports place total losses associated with the reported outbreak at over US\$ 2 billion (27). Long-term projections of losses will probably prove higher.

Was India treated in a manner consistent with the treatment of other countries where plague occurs? In the western USA, where plague is endemic, cases have been regularly reported in Arizona, California, and New Mexico for the past 20 years (28). During 1994 there were 14 confirmed cases of plague in the USA and two deaths occurred, whereas in India the disease has been reported in only one of the last 15 years, namely 1994, when there were 876 unconfirmed cases and 52 deaths. Most of the reports of unconfirmed cases in India were based on non-specific, clinically broad criteria, and most occurred among the impoverished inhabitants of an inland city. More confirmed cases were reported in Peru and Viet Nam in 1993 and 1994 than in India, yet no travel or trade restrictions were imposed on either of these countries on these occasions (21).

The response to the Indian outbreak appears to be both inequitable and motivated by media presentations. Both CDC and WHO concluded that it was excessive and unnecessary (22). Other countries, observing the price that India paid, will probably be more reluctant to report similar outbreaks in the future.

Cholera in Peru

Setting

In January 1991 an epidemic of cholera began in Peru and eventually spread throughout South America. On 29 January the Peruvian Ministry of Health received reports of an increase in gastroenteritis in Chancay, a coastal region north of Lima. A field research team went to the site and identified *Vibrio cholerae* O1, biotype El Tor. Between 24 January and 9 February 1991 a total of 1859 people in Peru with clinically diagnosed cholera required hospitalization and 66 deaths were reported (29).

Subsequently, cholera appeared along the Pacific coast in Chile, Colombia, and Ecuador and spread inland towards the Amazon and Brazil. From January 1991 to September 1994, CDC reported a total of 1 041 422 cases and 9642 deaths with a case fatality rate of 0.9% (29). WHO declared the epidemic to be over in 1995.

Established policy in response to cholera

The International Health Regulations provide limited guidance to countries on how to respond to outbreaks of cholera. They stipulate that cargoes and goods should only be subject to control measures when proceeding from infected areas and when officials suspect the presence of an infectious agent. No documented outbreaks of cholera have resulted

from commercially imported food (30). Most exported food products are safe because, in general, the cholera bacteria do not survive cooking and drying. Countries often ban fish imports when cholera outbreaks occur, even though the evidence suggests that the risk of transmission from contaminated imported fish is negligible (30).

In relation to the outbreak in Peru, CDC noted on 15 February 1991 that there was only a low risk that citizens of the USA would acquire cholera in the areas of endemicity. During the first 20 years of the current global pandemic only ten cases of cholera in travellers from the USA were reported to CDC, a frequency of less than 1 per 500 000 returning people (29). On 5 April 1991, WHO and CDC published reports on food safety and cholera that pointed out that there is no documented evidence of a cholera outbreak attributable to the importation of food across an international border (31). The report stated that on no account should travel be restricted because of cholera. CDC also noted that since 1961 some people had acquired cholera while travelling but that there were no records of secondary transmission in the USA (29). CDC attributed the prevention of secondary transmission to the quality of sanitation systems.

International response

Because cholera spread through Peru initially, the international response began with actions focused on that country. Bolivia, Chile, and Ecuador banned imports of Peruvian perishable foods, and soon afterwards Argentina banned all fish products from Peru (and even suspended an international soccer match). Within two weeks of the beginning of the outbreak the European Community had imposed a complete boycott of all Peruvian fish, thereby crippling one of the country's primary industries (32). The European Community proceeded to ban all imports from Peru and other countries followed suit. On 26 February the Prime Minister of Peru accused many countries of taking restrictive measures that unfairly blocked the country's export trade (33). The embargoes continued and were expanded, and other countries introduced specifications on the number of days required between cargoes leaving Peru and arriving in foreign ports, usually well in excess of advice given by WHO. By mid-March 1991 many Peruvian exports were subjected to international embargoes. Certain countries, among them the USA, required all food products from Peru to be tested for cholera, again going beyond WHO recommendations.

The President of the Peruvian Chamber of Tourism claimed that news releases led to the cancellation of half the reservations made by foreign travellers to the country. It was estimated that Peru's tourist industry lost US\$ 150 million. Even in the tourist centre of Cusco, where few cholera cases had been reported, half the hotels had closed and most of the others were empty (34). Many European countries placed restrictions on Peruvian travellers,

some of whom were sent back to Peru on arrival in Europe.

Meanwhile, cholera continued to spread in South America. In April some European countries widened the ban on fish exports to include Colombia and Ecuador (35). Chile predicted economic losses of over US\$ 300 million, and losses for other countries in the region were expected to be similar (36). These estimates did not include unmeasured effects on future tourism, trade and overall reputation. For Peru the economic losses on trade alone in 1991 were estimated at more than US\$ 770 million (37).

Cholera had spread among the poor in Peru because of unhygienic water supplies and sanitation. The international reaction only added to the poverty that had led to these conditions.

Lessons and recommendations

Global surveillance should confront the following matters in order that the devastating experiences of India and Peru may not be repeated:

- inability to acquire timely and accurate information early in an outbreak because of low diagnostic capabilities in poorer areas and the use of extremely vague case definitions in diagnosis;
- rapid spread of press reports that are often inaccurate, sensationalist and lacking in sound advice;
- failure of countries to adhere to international standards, including the International Health Regulations and WTO regulations relating to appropriate conduct in response to disease outbreaks;
- lack of substantive support for developing countries economically damaged by disease outbreaks.

Because of the vast reach of technology and the media it is increasingly unlikely that countries will be able to conceal disease outbreaks. WHO can, however, provide assistance to countries that report outbreaks and facilitate their rapid containment. Countries retain the power, however, to prevent foreign health organizations from operating within their borders. Many countries need the assistance of WHO to control the spread of diseases within their borders and to provide scientific credibility. In the interest of controlling diseases internationally, it is necessary that countries give WHO access to correct information and allow the world body to conduct investigations on their territory if there is an evident need for this. Only by preventing international overreaction can WHO and the world community begin to foster a cooperative relationship with the countries concerned.

Obtaining timely and accurate information

Reliable information is needed for documenting and controlling outbreaks and also for informing the

international community so that it can take appropriate measures. India and Peru were unable to collect reliable information sufficiently rapidly to inform others of the nature of outbreaks in a timely fashion, and both these countries created unnecessary alarm when their use of broad case definitions led to high numbers of cases. In India a lack of functioning diagnostic laboratories led health officials to use excessively sensitive clinical diagnoses rather than to confirm diagnoses through culture. Indeed, deficiencies in the collection of specimens would have prevented culturing in most cases. Similarly, Peru treated every person who reported having acute watery diarrhoea as a cholera patient, without using culture or dark-field microscopy to confirm the diagnosis. Such shortcomings can lead to inflated case numbers and overreaction by the international community.

Both WHO and CDC are assisting countries to improve their disease surveillance infrastructure through the training of field epidemiologists and laboratory personnel. However, accurate reporting from rural or poor urban areas remains problematic. Outbreaks of diseases often occur among the poor or in areas distant from major health centres and trained personnel. Moreover, personnel in such areas often lack the supplies and equipment required for characterizing pathogens, preserving specimens, and making diagnoses. A possible approach would be to support more research on inexpensive, easily used detection methods and inexpensive equipment. For example, a research group substantially reduced the cost of the polymerase chain reaction by simplifying the protocol, reagents, and equipment and then optimizing it for disease detection in the developing world (38). For many years, the Program for Appropriate Technology in Health (PATH), a nongovernmental organization, has been engaged in the development of inexpensive diagnostic tests. Low-cost approaches could conceivably allow field personnel to begin characterizing outbreaks at a relatively early stage.

Plans to expand the number of reportable diseases require that countries have specific criteria for identifying cases so that disease burdens are neither overestimated nor underestimated. Health officials should be aware of appropriate case definitions and should be encouraged to use them throughout outbreaks. WHO, CDC and other organizations should also consider what sorts of case definitions are used when public statements are made about the level of an outbreak.

Dissemination of valid information via the press

News organizations, the Internet and other forms of communication allow groups and individuals to gather information about events occurring anywhere in the world and disseminate it almost instantaneously. Unfortunately, information on disease out-

breaks is often inaccurate. Furthermore, the increasingly competitive environment in which they operate forces news organizations to describe outbreaks in a manner that captures the reader's attention but does not necessarily reflect their true nature. All of these factors lead to outbreaks being described in exaggerated and sensationalist terms, with the consequence that the international community overreacts. People read about plague in India and saw images of persons fleeing from Surat, but were not told that the risk was low and that the spread of the disease was limited. As a result, many individuals were disinclined to travel to India, while importers stopped the receipt of Indian products before any official policies were announced.

WHO, CDC and national health organizations should issue reliable and credible press releases about outbreaks at an early stage and should continue to update the information. This could be accomplished by both releasing specific statements to the press and maintaining easily accessible web sites providing accurate information on the diseases, reasonable trade and travel policies, and other relevant information. If such measures were taken while outbreaks were being characterized, the interval between press releases and official reports could be minimized.

Global surveillance should be proactive in order to tackle the problem of the inaccurate spread of information. News organizations should understand the consequences of sensationalized reports for developing countries. Educational initiatives could be developed to inform the international and national media about the principles of surveillance, the true threat of outbreaks, and the importance of transmitting accurate information. Such initiatives could take the form of courses or conferences for journalists in both the print and television media.

International reactions to disease outbreaks

The international community tends to overreact to reports about disease outbreaks. Improving the quality of information and its dissemination may reduce inappropriate global reaction. Paradoxically, when a country reports an outbreak, the international community may benefit relatively little, whereas the reporting country itself may suffer great losses. Many countries do respond appropriately, observing WTO and WHO guidelines, but many others do not and take extreme action with little bearing on scientific information, disease risk, or established preventive measures. As in India and Peru the potential for the spread of disease through trade was very small, as was the danger to tourists.

When guidelines fail to protect reporting countries, international organizations should alter their regulations and create new, more effective policies. In order to improve the situation, it is necessary to strengthen and enforce international

guidelines and to educate national ministries and regional trade organizations proactively.

WHO has limited powers to enforce the International Health Regulations, including those parts concerned with international responses to epidemics. Heavy reliance on the International Health Regulations may not be the most effective international legal strategy for the control of emerging diseases. Whatever legal approach is eventually taken will have to confront a fundamental paradox: globalization jeopardizes disease control nationally by eroding sovereignty, while the need for international solutions allows sovereignty to frustrate disease control internationally (39). The legal documents should deal directly with the issue of interference with trade and tourism in a specific manner. WHO's informal consultation on the revision of the International Health Regulations took a step in this direction by recommending that the Organization should be able to prohibit Member States from applying extreme health measures until approval had been obtained from a panel of experts (3). It remains to be seen whether Member States will accept that this power be given to WHO and whether they will accept WHO's authority. Finally, the arbitration committees proposed in the International Health Regulations should have the strength to resolve disputes among Member States effectively. It is important for developing countries to know that they have a means of appeal if they are unfairly treated by other Member States.

WTO can enforce its Agreement on the Application of Sanitary and Phytosanitary Measures in order to settle disputes among its Member States. Thus, Peru appealed to the General Agreement on Tariffs and Trade, WTO's predecessor, for compensation because of unfair trade practices during the 1991 cholera outbreak (40). Since 1995, when WTO adopted a formal mechanism of recourse, nearly 50 requests for consultations have been made in respect of unfair trading practices under the Agreement. The potential exists for WTO and WHO to collaborate so as to ensure that countries reporting disease outbreaks are not unfairly punished (41). Such collaboration is vital for the avoidance of excessive measures.

Since few specific regulations exist, national ministries and trade organizations have the freedom to set their own standards. Organizations such as the European Union and the North American Free Trade Agreement need to be educated on the appropriateness of various measures so that their member countries have a basis for deciding which ones to adopt. These bodies often set the tone that determines how the international community responds to an outbreak. Once they issue reasonable standards, reporting countries that are treated unfairly will be able to cite specific grounds for claiming compensation. WHO could also produce reports, similar to those already produced for the press, containing specific trade and travel guidelines,

and could supply them to all countries and trade organizations.

WHO and other organizations should be willing to make clear directives at an early stage of an outbreak for the benefit of the affected countries, with regular updates to deal with any changes that occur. If the mode of spread is uncertain, as with the recent bovine spongiform encephalopathy outbreak in the United Kingdom, international bodies should rapidly arrange for experts in the disease to design appropriate measures on the basis of the available data. No international organization has been willing to take responsibility for defining regulations early in an outbreak. Such inaction stems in part from fear that recommended measures may not prove to be appropriate once an outbreak is fully defined.

Long-term effects

It is unlikely that all excessive international reaction to outbreaks of disease will be prevented. Furthermore, there is no support, economic or otherwise, to assist reporting countries confront the long-term effects of embargoes and loss of tourism. In order to encourage reporting on the one hand and treat reporting countries equitably on the other, measures could be taken to provide a safety net for rebuilding tourism and trade ties and possibly recovering losses after an outbreak.

The following steps could both mitigate economic losses and encourage reporting:

- international organizations could advocate that economic aid be given to countries affected by outbreaks;
- organizations could consider creating funds, administered by WTO on the basis of recommendations from WHO, which would be available to help countries suffering economic losses;

- reporting countries could be actively supported, when appropriate, in their efforts to obtain compensation through appeals to groups such as the appeals committee of the Agreement on the Application of Sanitary and Phytosanitary Measures.

Conclusions

Efforts to improve global surveillance for emerging and re-emerging infectious diseases are making progress. In order to achieve complete and accurate reporting, more attention should be given to preventing harsh international responses against countries that report disease outbreaks. Poorer countries are vulnerable because they are more susceptible to disease outbreaks, have fewer means for accurately reporting outbreaks, and experience harsher economic consequences when outbreaks are reported. The outbreaks of cholera in Peru and plague in India demonstrate the limitations of international regulations to prevent economic losses and social disruption. WHO and other international organizations should educate international leaders, the press, and the international community before outbreaks occur and also at an early stage during outbreaks in order to prevent such losses. This requires increased openness by countries so that WHO and other organizations can support them. Low-cost diagnostic technologies, clearer case definitions, and improved dissemination of information may also help to limit losses. WHO and WTO should enforce their existing policies and consider new ways of protecting the interests of reporting countries. Otherwise, countries are likely to continue trying to conceal epidemics, and the goals of global surveillance are unlikely to be fully achieved. ■

Résumé

Obstacles à la surveillance mondiale des maladies infectieuses : conséquences de la notification publique dans une économie mondiale

La mondialisation a entraîné une propagation croissante des maladies émergentes et réémergentes. Au plan international, on s'efforce actuellement d'enrayer leur dissémination grâce à une surveillance mondiale, qui exige la collecte d'une information exacte sur les maladies infectieuses au niveau national ou régional et sa diffusion publique au niveau international. La non-notification par les pays craignant les effets néfastes qu'aurait sur leur économie une réaction internationale excessive est un obstacle de taille à la surveillance mondiale. Les conséquences économiques de la notification de flambées de maladies sont particulièrement graves pour les pays en développement, qui souffrent déjà de manière disproportionnée des maladies infectieuses et qui manquent de ressources pour localiser les flambées et les notifier.

Deux exemples récents de flambées de maladies sont examinés dans le présent article. Le premier, une

flambée de peste survenue en Inde en 1994, aurait fait perdre au pays jusqu'à US \$2 milliards dans le domaine du commerce et du tourisme, tandis que la plupart des sanctions extérieures étaient excessives et médicalement injustifiées. Dans le second exemple, au Pérou en 1991, les pertes subies par le commerce et le tourisme se sont élevées à plus de US \$700 millions au cours d'une flambée de choléra, et ici aussi les sanctions imposées étaient injustifiées. Dans les deux cas, l'OMS s'est opposée à toute sanction frappant le commerce ou le tourisme.

Pour que les pays en développement puissent participer pleinement à la surveillance mondiale, les conditions suivantes doivent être réunies :

- capacité de recueillir au début des flambées une information exacte au moyen de techniques diagnostiques peu coûteuses, facilement utilisables et aisément accessibles ;

- difusión rápida de l'información par des médias disposant de sources sûres, sans tomber dans le sensationnalisme ;
- respect des normes internationales, y compris le Règlement sanitaire international et les règles de l'Organisation mondiale du Commerce (OMC) applicables aux mesures qui s'imposent en matière de commerce et de tourisme ;
- appui substantiel aux nations pauvres dont l'économie est fragilisée par les flambées de maladies.

Actuellement, le Règlement sanitaire international demande aux Etats Membres de notifier à l'OMS, dans les 24 heures, les flambées de choléra, de fièvre jaune et de peste seulement. Comme de nombreux pays ne se conforment pas à ces instructions, l'OMS a proposé une révision du Règlement sanitaire international afin de garantir la divulgation publique de l'information et de réduire le préjudice causé aux pays qui s'acquittent de leurs obligations. Il est prévu que les pays notifient les flambées de :

- maladies qui risquent fortement de se propager, en particulier lorsqu'elles ont un taux de létalité élevé ;
- maladies nouvellement diagnostiquées ;

- maladies qui risquent d'avoir des répercussions sur le commerce, les voyages ou les médias.

Il faut espérer que les pays respecteront les nouvelles recommandations et qu'ils agiront plus ouvertement de sorte que l'OMS puisse les aider en matière de surveillance, garantir la crédibilité de l'information et limiter les dommages résultant de rumeurs infondées. Une collaboration est également prévue entre l'OMS et l'OMC afin d'examiner les moyens d'éviter des pratiques commerciales injustes.

L'OMS et d'autres organisations internationales devraient aussi mener une action d'éducation auprès des responsables internationaux, de la presse et du public avant que les flambées ne surviennent ou au début de celles-ci afin d'éviter des pertes. L'utilisation de techniques diagnostiques peu coûteuses, une définition plus claire des cas et une meilleure diffusion de l'information peuvent aussi être utiles à cet égard. L'OMS et l'OMC doivent appliquer leurs politiques et envisager de nouveaux moyens de minimiser les retombées économiques défavorables, en particulier dans les pays pauvres. Faute de quoi, les pays continueront vraisemblablement à essayer de cacher les épidémies, et les objectifs de la surveillance mondiale risquent de ne pas être pleinement atteints.

Resumen

Obstáculos a la vigilancia mundial de las enfermedades infecciosas: consecuencias de la notificación transparente en una economía mundial

La globalización ha conllevado un aumento de la propagación de enfermedades infecciosas emergentes y reemergentes. Se están desplegando esfuerzos internacionales para controlar su difusión mediante actividades de vigilancia mundial, que requieren la recopilación de información exacta sobre las enfermedades infecciosas a nivel nacional o regional y su distribución abierta a nivel internacional. La no notificación por parte de los países, que temen que una respuesta internacional excesiva pueda tener efectos perjudiciales en sus economías, es un enorme obstáculo para la vigilancia mundial. Las consecuencias económicas de la notificación de los brotes de enfermedades son particularmente graves en los países en desarrollo, que por añadidura se ven castigados desproporcionadamente por las enfermedades infecciosas y por la falta de recursos para identificar los brotes y notificarlos.

Se analizan aquí dos ejemplos recientes de brotes de enfermedades. El primero, un brote de peste registrado en la India en 1994, puede haber representado para el país, según las estimaciones, unas pérdidas de hasta US\$ 2000 millones en concepto de ingresos comerciales y por turismo, como resultado de unas sanciones externas que fueron excesivas e improcedentes desde el punto de vista médico. El segundo ejemplo es el brote de cólera registrado en el Perú en 1991, a consecuencia del cual se produjeron pérdidas de más de US\$ 700 millones en el comercio y el turismo, y en este caso las sanciones impuestas también fueron inapropiadas. En ambos casos la OMS se opuso a cualquier sanción comercial o turística.

Para asegurar la plena participación de los países en desarrollo en la vigilancia mundial se deben dar las siguientes condiciones:

- capacidad para adquirir información oportuna y exacta al comienzo de los brotes mediante técnicas diagnósticas de bajo costo y fácilmente utilizables y disponibles;
- difusión rápida de la información por medios de comunicación bien documentados, sin caer en el sensacionalismo;
- observancia de las normas internacionales, en particular del Reglamento Sanitario Internacional y de los reglamentos de la Organización Mundial del Comercio respecto a las medidas apropiadas en el comercio y el turismo;
- apoyo sustantivo a las naciones pobres económicamente perjudicadas por los brotes de enfermedades.

Actualmente el Reglamento Sanitario Internacional limita la obligación de los Estados Miembros de notificar a la OMS en un plazo de 24 horas a los brotes de cólera, fiebre amarilla y peste. Muchos países no cumplen con esa directriz. En consecuencia, la OMS ha propuesto revisar el Reglamento Sanitario Internacional para asegurar una mayor transparencia y reducir la estigmatización de los países informantes. Se pretende que los países informen de los brotes de:

- enfermedades con alto potencial de propagación, especialmente cuando concurre una tasa de letalidad alta;
- enfermedades recién identificadas;
- enfermedades con eventual repercusión en el comercio, los viajes o los medios de información.

Se espera que los países se adhieran a las nuevas directrices y actúen de forma más transparente para que la OMS pueda ayudarles en las tareas de vigilancia, aportar credibilidad y limitar los daños derivados de rumores sin fundamento. Hay también planes de colaboración entre la OMS y la Organización Mundial del Comercio al objeto de estudiar alternativas válidas para prevenir las prácticas comerciales desleales.

La OMS y otras organizaciones internacionales deben también educar a los líderes internacionales, a la prensa y al público antes de que se produzcan los brotes y en una etapa temprana de los mismos a fin de

prevenir las pérdidas. Las tecnologías diagnósticas de bajo costo, una definición más clara de los casos y una mejor difusión de la información también pueden ser útiles en este sentido. La OMS y la Organización Mundial del Comercio deben hacer cumplir sus políticas y considerar nuevas opciones para reducir al mínimo los daños económicos, especialmente en los países más pobres. De lo contrario, lo más probable es que los países sigan intentando ocultar las epidemias, con lo que difícilmente podrán alcanzarse las metas de la vigilancia mundial.

References

1. *The world health report 1996 — Fighting disease, fostering development*. Geneva, World Health Organization, 1996.
2. **Fidler D**. Return of the fourth horseman: emerging infectious disease and international law. *Minnesota Law Review*, 1997, **81**: 771.
3. *International health regulations*, third annotated edition. Geneva, World Health Organization, 1983.
4. **Zacher M**. Global epidemiological surveillance: international cooperation to monitor infectious disease. *Global public goods*. New York, Oxford University Press, 1999.
5. **Heymann D, Rodier G**. Global surveillance of communicable diseases. *Emerging Infectious Diseases*, 1998, **4**: 362–365.
6. *Fact Sheet Number 200*. Geneva, World Health Organization, 1996.
7. *Preventing emerging infectious diseases: a strategy for the 21st century*. Atlanta, GA, Centers for Disease Control and Prevention, 1998.
8. *Removing obstacles to healthy development. World Health Organization Report on Infectious Diseases*. Geneva, World Health Organization, 1996.
9. *Executive Summary: Ciset Working Group on EID, 1998*. unpublished, available at (www.whitehouse.gov/WH/EOP/OSTP/Ciset/HTML/exsum.html).
10. *The revision of the IHR*. Geneva, World Trade Organization, 1998 (unpublished document G/SPS/GEN/59).
11. *Operational guidelines*. Geneva, World Health Organization, (Communicable Diseases, unpublished document).
12. Revision of the International Health Regulations: progress report July 1999. *Weekly Epidemiological Record*, 1999, **74** (30): 252–253.
13. *Agreement on the Application of Sanitary and Phytosanitary Measures*. Geneva, World Trade Organization, 1995.
14. *Understanding the WTO Agreement on Sanitary and Phytosanitary Measures*. Geneva, World Trade Organization, 1998.
15. *Information paper 1: a comparison of the functions and requirements in public health and trade*. Geneva, World Health Organization, 1999 (unpublished document WHO/CDS/CSR/99.2).
16. **John JT**. Final thoughts on India's 1994 plague outbreaks. *Lancet*, 1995, **346**: 765.
17. **Burns JF**. Thousands flee Indian city in deadly plague outbreak. *New York Times*, 24 September 1994.
18. *Plague surveillance*, vol. 1. Atlanta, GA, Centers for Disease Control and Prevention, 1995.
19. India says spread of plague is halted. *New York Times*, 4 October 1994.
20. Human plague in 1996. *Weekly Epidemiological Record*, 1998, **73**(47): 366–369.
21. **Deodhar NS, Yemul VL, Banerjee K**. Plague that never was: a review of the alleged plague outbreaks in India in 1994. *Journal of Public Health Policy*, 1998, **19**: 184–199.
22. India: plague ending says health group, but world still wary. *International Press Service*, 13 October 1994.
23. **Dahlburg J**. Plague scars image, economy of modern India. Asia: epidemic reminds trade giant that social change hasn't kept up with business strides. *Los Angeles Times*, 5 October 1994.
24. **Burns J**. Plague in India giving visitors second thoughts. *New York Times*, 9 October 1994.
25. **Jain N**. India's trade deficit rises. *United Press International*, 6 December 1994.
26. **Fidler D et al**. Emerging and re-emerging infectious diseases: challenges for international, national, and state law. *International Lawyer*, 1997, **31**: 778–799.
27. **Levy C, Gage K**. Plague in the United States, 1995–1997. *Infections in Medicine*, January 1999, 54–63.
28. International notes cholera — Peru 1991. *Morbidity and Mortality Weekly Report*, 1991, **40** (6): 108–110.
29. *Import ban on fish products from Africa not the most appropriate answer*. Rome, Food and Agriculture Organization, 1998 (FAO Press Release 98/21).
30. Cholera outbreak — Peru, Ecuador, and Colombia. (Reprint of World Health Organization report *Small Risk of Cholera Transmission by Food Imports*.) *MMWR of CDC*, 1991, **40**: 225.
31. Peru to go on with fish exports despite alleged contamination. *Xinhua General Overseas News Service*, 16 February 1991.
32. **Atwood R**. Peru scorns "unfair" trade practices over cholera epidemic. *Reuters North American Wire*, 26 February 1991.
33. **Long W**. Market focus: cholera compounds Peru's economic misery: along with the human losses, the epidemic has taken a toll on tourism and exports — two key sectors of the struggling country. *Los Angeles Times*, 23 April 1991.
34. Peru: Europe's ban on imports may affect the whole Andean area. *International Press Service*, 22 March 1991.
35. Chile: losses from cholera could reach \$500 million. *International Press Service*, 2 May 1991.
36. **Heymann D, Rodier G**. Global surveillance of communicable diseases. *Emerging Infectious Diseases*, 1998, **4**: 362–365.
37. **Harris E, Kadir N**. *A low cost approach PCR: appropriate transfer of biomolecular techniques*. New York, Oxford University Press, 1998.
38. **Fidler D**. Globalization, international law, and emerging infectious diseases. *Emerging Infectious Diseases*, 1996, **2**: 77–84.
39. U.S. lifts import warning on Peruvian fruits, vegetables. *Xinhua General Overseas News Service*, 1 May 1991.
40. **Plotkin B, Kimball A**. Designing an international policy and legal framework for the control of emerging infectious diseases: first steps. *Emerging Infectious Diseases*, 1997, **3**: 1–9.
41. **Plotkin B, Kimball A**. Designing an international policy and legal framework for the control of emerging infectious diseases: first steps. *Emerging Infectious Diseases*, 1997, **3**: 1–9.