

The Role of International Agencies in Emerging Infections

A Ronald,*^{MD, FRCP, FACP}

Abstract

Emergent and resurgent infections have no respect for national borders. Surveillance programmes, policies and practices, educational activities and control initiatives all require international leadership, multinational funding, and the ability to transcend national barriers if we are to prevent and control these infections. Society seems to expect us to organise ourselves to do this job well without building "impossible to maintain" barriers to the flow of people or goods. As a result, we must determine how international organisations, including United Nations agencies, international societies, and academic groups in universities, can work together with national organisations to achieve effective surveillance, ongoing education, important research and control initiatives to prevent infections from becoming an ever-increasing global threat to our security.

Ann Acad Med Singapore 1997; 26:616-9

Key words: Interventions, Public Health, Research, Surveillance, World Health Organization

Introduction

Emergent and resurgent infections are a primary focus of current global health concerns. Out of these concerns have arisen the recognition that infections have become a major threat to human security. International and national agencies have reviewed the threat of emerging infections and have addressed the challenge to international organisations posed by this threat.¹⁻⁵ Residence on this small, densely populated and heavily travelled planet ensures that all of us are at risk of illness and death from the emergence and spread of new and poorly understood pathogens. We must direct our energies to support well considered initiatives to understand, interdict, and ultimately control the emergence and spread of both new pathogens and old pathogens with new guises. Otherwise we may lose the war between rapidly evolving microbial pathogens and the human race. The role of international agencies to enable us to "stack the odds" in favour of Homo sapiens is the topic of this review.

Only a few organisations and international agencies have made the global threat of emerging pathogens their mandate. The World Health Organization (WHO), assisted by other UN agencies, has the primary responsibility for leading global health efforts. WHO has orchestrated some impressive successes in the control of infections. However, its effectiveness is often thwarted by centralisation, excessive bureaucracy and political ap-

pointments, and a regimented response to many of the issues confronting it. International organisations are dependent upon the vision, alacrity and administrative expertise of senior leaders and are always at risk of being unable to respond quickly to changing events, due to the nature of their administrative structures. However, WHO has responded to some of the challenges of emerging infections and is identifying structures and resources to meet them.

The International Society for Infectious Diseases (ISID) is a young membership-based organisation, with its executive offices in Boston, Massachusetts, USA. It has a small infrastructure. Its mandate includes membership mobilisation to address issues arising from emerging infections and partnership with other organisations to participate in surveillance, professional education and training, and consensus development in order to make a contribution to a global control strategy. It provides access to large numbers of infectious disease physicians and scientists through its congresses, regional symposia and journal. However, the organisation has limited financial resources and has not been involved in any leadership initiative to develop a significant response. Other international agencies are targeted towards specific pathogens or specific routes of infections. Several of these have given excellent leadership and among these would be the International Union Against Tuberculosis

* Associate Dean, Research

Faculty of Medicine, University of Manitoba, Canada

President

International Society for Infectious Diseases

Address for Reprints: Dr Allan Ronald, Faculty of Medicine, University of Manitoba, Room A108 Chown Building, 753 McDermot Avenue, Winnipeg, Manitoba R3E 0W3, Canada.

and the International Union Against Venereal Disease and Treponematoses.

National organisations, particularly the Centers for Disease Control and Prevention (CDC) in the United States and the national equivalents of CDC in other countries, have given most of the leadership that has occurred to date in the initial response to emerging infections. For the past five decades, CDC has been very effective in alerting US citizenry about microbial challenges to their health. It has consistently addressed concerns about food and water-borne infections, as well as infections spread by inadequate sanitation practices and through sexually-transmitted infections. It has established credibility within the political structures as well as within the media for its consistency and its ability to respond to issues with investigation of outbreaks and effective control measures. More recently, the CDC has been involved internationally in training epidemiologists and in disease investigation. Many of the effective programmes at WHO have been led by CDC-trained personnel. As a result, this organisation has had unique international as well as national roles in disease control and has been the major force to create the platform on which emerging infection issues have been brought to the forefront.

Universities and some international agencies, such as the International Centre for Diarrhoeal Disease Research in Bangladesh, have a substantial role to play in emerging infections. Schools of Tropical Medicine and Public Health at Universities in Antwerp, Liverpool, London, Boston, Baltimore, Alabama, Seattle and elsewhere have provided professional training for most of the world's leadership, with expertise in global surveillance, laboratory research, and control strategies for infectious diseases.

Specific responsibilities of international agencies can be categorised under seven topics. Each of these will be discussed.

Surveillance

Global surveillance can only be undertaken by agencies with an international mandate. Well-coordinated, adequately-spaced sentinel laboratories and sentinel physicians are the infrastructure required for appropriate surveillance. Networking, skills building, case reporting and outbreak investigations are all essential components of a global surveillance system. The issues are complex and incompletely understood. However, global success has occurred for poliomyelitis and small-pox surveillance and this has been a very worthwhile investment. Lessons learned from this and other targeted surveillance activities need to be built into a larger global structure in which individual laboratories and physicians are adequately rewarded for their vigilance to provide information that alerts both national and

international disease control agencies of the possibility of an emerging pathogen

Ongoing surveillance of antimicrobial susceptibility, syndrome aetiology, changing microbial population and emerging pathogens in immunocompromised patients are all targeted surveillance activities that should be resourced and coordinated. Ultimately, surveillance with early detection and early outbreak control for many infections is the most cost-effective measure to prevent global epidemics. However, the success of these will ultimately require a substantial investment in preparing expertise and ensuring its effectiveness.

Sounding the Alarm

International agencies have the contacts, the responsibility, and the overview to identify and respond to global issues before they become a crisis. The actual or potential disease burden, and the necessary interventions to limit its harm to society should be carefully and effectively articulated on the world stage. Politicians, bureaucrats, significant decision makers and the public need to be alerted, by direct communication, the media, and specific campaigns. International organisations need to continually identify how they can ensure that this communication and responsibility occurs within an appropriate framework that ensures a response, without losing their effectiveness through "false alarms". The resource implications of strategies to control emerging infections also need to be carefully developed and conveyed to the world with the expectation that appropriate responses will occur from an aroused public.

The need to maintain public health infrastructures and ensure that these are not eroded and ultimately destroyed "between epidemics" are particularly important. Tuberculosis and sexually-transmitted infections are recent examples. Excellent public health structures were developed for both these illnesses during the first half of the century in many western countries. They were reasonably effective in controlling massive epidemics of tuberculosis and syphilis. With the advent of effective treatment, control programmes and the laboratory and epidemiological structures that supported them, were gradually disbanded. With the advent of HIV and the resurgence of tuberculosis, the world has been caught flatfooted and all societies are suffering the consequences of inadequate preparation and expertise. We must learn from these experiences and ensure that future epidemics are anticipated and the necessary structures in place that can be rapidly brought out of "mothballs", if necessary, to control disease outbreaks.

International agencies also have the responsibility to prevent countries from being satisfied with solving only their own problems. The recognition that we live in a global village and that microbes are unaware of national boundaries, must therefore be continually identified by

these organisations with international responsibilities. Rapid spread can occur from anywhere. Until the last wild strain of poliomyelitis has been eradicated from the world, we have to maintain our vigilance with immunisation and surveillance for poliomyelitis. As with smallpox, only after several years following global eradication can we relax.

Orchestrating a Multisectoral Response

Louria⁶ has recently identified the complexity of societal issues which have to a very large extent, created the milieu in which infections are resurgent. Simplistic responses within the traditional biomedical health framework are not adequate. Interventions that address human rights, gender inequities, poverty, malnutrition, societal, cultural and religious practices, employment, changing agricultural practices, and many more are required if we are to appropriately understand, prevent, and when necessary intervene, to alter the course of emerging infections. International agencies, through their interface with other agencies and sectoral groups through their leadership activities can effect a multisectoral response. This will be a daunting task and has generally not been an area in which the medical community has provided adequate leadership. However, the AIDS epidemic has clearly shown the inadequacies of the traditional biomedical response.⁷

Research-An Essential Prerequisite

Any history of infectious diseases is full of widely-accepted fallacies that, with hindsight, appear ludicrous. Our management of duodenal ulcer disease is a modern classical illustration of the importance of science as the major determinant for identifying cost-effective interventions to control infectious diseases.

Continuing support for a wide ranging scientific pursuit of knowledge from molecular biology through to operational and health systems research are required if we have any hope of containing infections. International agencies are ideally placed to identify gaps in our knowledge and to encourage targeted research efforts to ensure that correct decisions are made in response to identified concerns about emerging infections.

The vast majority of research is carried out in industrialised societies, with less than one per cent of the world's research funding allocated to the world at greatest immediate risk of emerging infections, the developing world. Scientists are often widely dispersed so that the development of substantial health research capacity does not occur. Programmes that link universities between developed and developing countries and create genuine partnerships should be supported. Efforts such as the Council on Health Research for Development (COHRED) are important initiatives that require funding resources, administrative leadership from suc-

cessful scientists, and decentralised effective planning processes within member countries. Some of this is occurring, but a great deal more is required, particularly increased funding and structures within which accountability can occur. Ultimately our capability to deal with emerging infection will depend upon our success as a global society to ensure that our knowledge base is increased substantially over the next ten to fifteen years.

Professional Development, Training and Skills Enhancement

No international assessment of human resource required for infectious disease control has been undertaken and any such effort would be problematic. However, despite the growing surfeit of physicians in many parts of the world, including many developing countries, expertise in infectious diseases, public health, and clinical microbiology have generally lagged many other areas of expertise within professional disciplines. As a result, there is likely a growing gap between the need and the level of expertise available. The efforts of CDC through its field epidemiology programme to provide an international cadre of epidemiologic and public health expertise has been very successful, but too limited. Although the International Society of Infectious Diseases has about 20 000 individuals on its mailing list, many of these have not had substantial training within the disciplines of public health, epidemiology, and laboratory microbiology to make major contributions to disease control initiatives within the societies in which they reside. International organisations need to provide active sustained effective leadership to equip physicians, scientists, and other health professionals with the skills and expertise to ensure that the health needs of individuals can be adequately met, new syndromes recognised, epidemiological studies carried out, laboratory support provided, and control measures organised. At present, probably 150 of the approximately 200 countries in the world are dependent on imported expertise, whenever infectious outbreaks threaten society. This is inappropriate and should be addressed through international leadership.

Educational programmes must be developed that will encourage creativity and not be traditional replicas of western models of health care delivery. Managerial and leadership expertise in many societies are almost as essential as technical and specific competence. All these issues are complex and require a broad range of discussions at the international level in order to begin to address deficits in human resources needed for emerging infection control.

Consensus Development

International organisational societies have a responsibility to bridge national differences and identify the way

forward. Conferences, working groups, task forces, and other efforts to identify "best practices" and share them widely are needed. Electronic data gathering and networking should reduce the costs of these group activities, but support will still be required for face to face meetings in which issues are resolved and planning occurs. Internationally organised societies ultimately have to provide this forum.

Implementation

The skills and the expertise associated with programme implementation is one which is often not well developed within international organisations. In most instances, national and regional public health structures are best equipped to ensure that the control measures are initiated and maintained. International consultants, however, can play a role through partnerships with universities and with other national disease control agencies.

However, the world also needs individuals who have global infectious disease control expertise and are willing to share it widely through organisational leadership, field epidemiology training, and national and international disease control models. The CDC in the USA has been a model for this kind of leadership. Serious study should be undertaken to determine if a "global CDC" is a worthwhile initiative. Can it be efficient and respected from an international base such as WHO? Can we participate with member nations and enable solutions to occur to emerging infection problems? Can international agencies be true partners in the real world of programme implementation?

Conclusion

International agencies are assumed by much of the world's population to be the major bulwark against the threat of widespread emerging infections. Their effectiveness in this regard has only been tested on a few occasions and the results have been unpredictable. On the whole, we have largely failed to contain the HIV epidemic in most countries. However, the public concern about the resurgence of infectious diseases and the commitment that this presumably implies in the industrialised world should provide the opportunity for effective international leadership to respond credibly and responsibly to the challenge of emerging infections.

REFERENCES

1. Institute of Medicine. *Emerging Infections: Microbial Threats to Health in the United States*. Washington, DC: National Academy Press, 1992.
2. Morse SS. Emerging viruses: defining the rules for viral traffic. *Perspect Biol Med* 1991; 34:387-409.
3. Institute of Medicine. *The Future of Public Health*. Washington, DC: National Academy Press, 1988.
4. WHO. *Global Health Situations and Projections, Estimates 1992*. Geneva: WHO, 1992.
5. Lederberg J. Medical science, infectious disease, and the unity of humankind. *JAMA* 1988; 260:684-5.
6. Louria DB. Emerging and re-emerging infections: The societal variables. *Int J Infect Dis* 1996; 1:59-62.
7. Mann J, Tarantola D. *AIDS in the World II. Societal Vulnerability: Contextual Analysis*. New York: Oxford Univ Press, 1996; 40:444-62.