

**SURVEILLANCE FOR EMERGING PATHOGENS**  
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The greatest challenge we face in mobilizing to cope with emergent microbial infections is that of assuring their earliest possible recognition and characterization. It is, of course, the essential first step. How to do this is neither a simple nor a straightforward subject. What kinds of reports can one solicit when one doesn't know what to expect? This is a quandary. Indeed, in planning documents, I sense that planners tend to be overwhelmed by the complexity of trying to decide what to look for and how reports might be gathered. This reaction is understandable. Let me today offer some thoughts which might help to sharpen one's focus as we move ahead with surveillance plans.

A key problem, I believe, is that surveillance, as we are using the term, has two possible operational meanings and that they have tended to be confused. We need to be clear as to which we mean and when.

Surveillance refers broadly to "watchfulness". For newly emerging infections, the term should generally characterize those activities which are designed to raise a red flag indicating that there are illnesses which appear strange or different, or that there are many more cases of disease 'X' than expected. What is needed for this purpose are clinical centers with staff who are seeing large numbers of patients and who are sensitized to the need to report something strange and some epidemiological skills at national or international level to probe such reports.

Surveillance, used in this sense, translates as a different system operationally than that fostered by Alex Langmuir: i.e., routine, systematic collection of data, its analysis and, finally, its use for operational purposes. There is no question but that the Langmuirian construct is enormously powerful in implementing control programs for known diseases. However, where our alert system is intended to detect the unexpected, there is no way to anticipate what might usefully be reported and so the futility of seeking quantitative data until syndromes are defined. But even when syndromes are defined, we must be realistic about building on existing surveillance systems. Throughout the world most so-called Surveillance systems are still fragile to non-existent and even the

concept is not well understood. In illustration, I would note that seven years after the launch of global polio eradication, most countries in Asia and Africa have, at most, only a rudimentary surveillance system; and even today, the United States, for example, lacks pertussis and rubella surveillance systems. Our first priority then is specifically for qualitative rather than quantitative systems.

I would also plead the case that, for planning purposes, we give far greater priority to the early recognition and characterization of emergent microbial infections which potentially pose a serious threat. Epidemic Ebola and *Vibrio cholerae* 0 139 have vastly different implications than do outbreaks of diphtheria in Russia or the recurrence of measles outbreaks in the United States. At this time, I hear alarms sounded on all sides about all manner of infectious diseases and grave concerns expressed about our ability to handle them. Certainly, there is validity in these concerns. There is no question but that the infectious disease field over the past three decades has been greatly neglected; that it needs to be strengthened at every level; and that resources are needed for this purpose. I would suggest, however, that we need to weigh priorities and by now seeming to identify virtually every infectious disease as an emerging infection, we risk losing direction, support and understanding.

Further, I would urge that our primary focus be placed on strengthening mechanisms for the recognition and characterization of agents in the third world. This is not to suggest that disease surveillance in our country or any other industrialized countries is adequate. It is far from it. However, with the plethora of clinical care and diagnostic facilities and with the extent and rapidity of communication, the recognition and characterization of a microbial agent posing a serious threat should not be long delayed. The same cannot be said for the developing world which is now home to 75% of the world's population.

Many imaginative new initiatives in surveillance have been identified in planning documents--and most comprehensively by the National Science and Technology Council's working group on Emerging and Re-emerging Infectious Disease which was chaired by David Satcher. Among the many recommendations is a call for encouraging more active communications and collaborations among the various WHO networks of centers and the

diverse array of laboratories supported by the United States and other countries. Communication networks, such as PROMED, satellites and a new journal launched by CDC all represent positive steps to this end.

This effort to mobilize existing resources is to be commended. In aggregate, such efforts would greatly strengthen information gathering and investigation. The list of potential collaborating laboratories and centers is an impressive one. Unfortunately, however, far too few are in the developing world and most are small, poorly supported and generally highly specialized. Most are not now well-equipped to identify and deal with problems outside of their specific sphere of interest.

While mobilization of existing resources will heighten surveillance sensitivity, I believe we would be deluding ourselves to believe that the world will be adequately served by this alone. A more definitive and dedicated core structure will be required to provide an effective framework as well as the needed leadership and direction. This will not be inexpensive. I identify three essential components: 1) A network of clinically-based centers in developing countries which can detect unusual diseases or syndromes and are equipped to undertake basic laboratory and epidemiological studies as well as training; 2) A cadre of epidemiologists and research staff with specialty expertise who can be called upon by governments for emergency assistance; and, 3) A secretariat of sufficient size and skill to analyze and orchestrate the diverse and changing global array of initiatives which are required to meet the challenges.

Leadership for the Secretariat function must inevitably reside in an international body if full international cooperation is to be realized. Most logical would be a joint WHO-World Bank-UNDP managed and sponsored program housed at WHO. But additional staff and resources would be required to exploit the potentials of modern communication and for orchestrating activities in the numerous laboratories and centers across the world. Support for such efforts should be no less a national priority than for defense. One wonders whether the World Bank joined by foundations might not be persuaded to take a lead role in such developments, much as they once did in launching the highly successful international agricultural network.

In brief, we need to bear in mind that our ability to expand to emergent infections is contingent first on them being identified. We are not today well-equipped to do so, especially in the third world and quite clearly we will not be absent a substantial commitment and investment by national and international authorities. We delay at our own peril.