

GLOBAL SURVEILLANCE AND RESPONSE SYSTEM FOR INFECTIOUS DISEASES

As envisioned, a global surveillance and response system for infectious diseases (GS&RS) brings to bear resources worldwide that prevent and, when failing that, control diseases infecting plants, animals and human beings. As such, the GS&RS should be an interlinked and robust network of international, regional, national and local efforts designed to a) carry out surveillance of infectious diseases worldwide, b) prevent disease outbreaks whenever possible, c) increase our understanding of how to prevent and treat/cure these diseases, d) develop the tools necessary to prevent and treat/cure these diseases, and e) respond early and effectively when disease outbreaks occur anywhere in the world. GS&RS' effectiveness is to be measured by the absence of harmful infectious diseases and the related morbidity and mortality prevented.

Global Threat and Opportunity.

In this era, the world is increasingly threatened by infectious diseases which occur and change in nature or can be created or changed by human beings. This threat can impact on humans, animals and plants either by the hand of nature or the hand of human beings. As the pace of global commerce and transportation increases, geopolitical political conflicts continue and the diseases become more complex, changeable and virulent, the potential for this infectious disease threat to harm large numbers of people is rising.

At the same time, reducing the threat or reducing the risk of the threat is increasingly aided by a range of tools available to the public, health providers, and governments. Through research and development efforts, computer, biological and other technologies are becoming more robust and improving our ability to do surveillance, screen, analyze and diagnose diseases, organize response efforts, and produce countermeasures, treatments and cures. Communication systems are able to reach more people, more quickly and more effectively. International efforts, governmental and non-governmental, in health and other areas of international cooperation provide platforms upon which to build global and regional systems working cooperatively with nations and reaching effectively across national boundaries.

Process for Developing the GS&RS.

For GS&RS to be effective, the process for developing an international network needs to be an open process which involves key international leaders early and obtains their commitment. The U.S. at the highest levels, the President and Vice-President, has already stated its strong interest. Working through the Committee on International Science, Engineering and Technology (CISSET) process and participating agencies, the U.S. should initiate a dialogue with the 25 to 50 key international leaders with respect to infectious diseases and the development of an effective prevention, surveillance and response system. These leaders should include representatives from the full range of affected nations, international non-governmental agencies (including the World Health Organization), academics, public health and medicine, business and industry, and philanthropy. As a first step, these leaders should meet within 90 days to 1) develop the basic design for a global S&RS, 2) lay out a strategic plan for developing such a system and the supporting coordination/communication network, and 3) commit the necessary resources to launch the initial phase of the GS&RS.

Key to the success of this process will be to involve international leaders short and long-term who will 1) ensure the neutrality and acceptability of the system, 2) bring or obtain the necessary public and private sector organizational and financial resources to launch the system, 3) access the technological resources to develop the network infrastructure, and 4) provide the expertise in infectious diseases and the development of effective and global prevention, surveillance and response system.

Necessary Conditions for GS&RS.

For a global surveillance and response system (GS&RS) to succeed, the following conditions, at a minimum, need to be met.

- A GS&RS of agency networks, national networks, regional networks, and an international network needs to be established for the purposes of coordination and communication.
- Surveillance systems operating throughout the world need to be established and/or strengthened and need to share information and link directly and through national and international networks.
- Response systems operating and available throughout the world need to be established and/or strengthened and need to work cooperatively to deal with infectious diseases identified through the surveillance systems.
- Prevention systems need to be developed which can identify precursors to infectious diseases, can do early detection of infectious diseases, and can prevent the emergence or re-emergence of infectious diseases.
- Research and development efforts need to develop the tools for a) preventing, b) screening, analyzing and diagnosing, c) treating and curing infectious diseases.
- Human resources need to be developed through recruitment, education and training and agency support that can carry out the critical roles described above.

Concept and Coordination of GS&RS.

To support a fully functioning and effective global surveillance and response system (GS&RS) in internationally, there is the need for a system made up of “networks” which can coordinate prevention, surveillance and response and facilitate communications for this system. This system of networks functions at the following levels:

- **Agency Network.** Each participating agency in the GS&RS needs to improve the effectiveness of its prevention, surveillance and response efforts and establish a coordination and communications network within its own agency which brings together its resources, coordinates surveillance/response actions, and provides linkage with other agencies within that nation as well as with other agencies internationally.
- **National Network.** Each nation, including the U.S., participating in the GS&RS needs to improve the effectiveness of its prevention, surveillance and response efforts and establish a coordination and communications network within its boundaries which brings together its resources, coordinates surveillance/response actions, and provides linkage with international agencies and with other nations.
- **International and Regional Networks.** A neutral, collaborative effort of nations, international agencies, donors and other interested parties needs to establish a coordination and communications network which supports the GS&RS and brings together and provides linkage amongst international agencies and nations. At the multinational regional level, these networks should support efforts, such as is being developed for southern Africa.

International and Regional Networks. The international coordination network’s function is to link together and coordinate the international resources available to deal with infectious diseases. Working with non-governmental and governmental agencies, it should support the system as follows:

- inventory available resources,
- work with the agencies on roles and responsibilities in an international S&RS and regional S&RS,
- develop special regional efforts targeted at surveillance and response of specific diseases,
- help develop preventive and treatment measures and their deployment
- work with industry on supply and distribution of preventive and treatment measures,
- analyze surveillance information from the full range of sources and disseminate that analysis,
- help organize international responses to potential and actual outbreaks of infectious diseases,
- encourage needed research and training to support an international S&RS, and
- identify gaps in the S&RS and work with the appropriate non-governmental and governmental agencies on capacity building to fill those gaps.

For there to be effective prevention, surveillance and response, a stronger coordination system is needed internationally, amongst U.S. agencies and within U.S. agencies. A stronger coordination system will identify potential infectious disease risks earlier and produce a more effective response, either preventive or corrective. A stronger coordination system will make better use of existing resources, identify areas where additional resources might be needed, and incorporate additional resources as they become available.

At the multinational regional level, regional S&RS systems and special efforts targeted at specific diseases should also be established by the respective nations, involving key governmental and non-governmental resources within that region, and supported by governmental and non-governmental agencies outside the region.

U.S. Network. The U.S. coordination/communication network is to link together and coordinate the U.S. resources available to deal with infectious diseases both in- and outside the U.S. Similar to the international network, it should function as follows:

- inventory available U.S. resources,
- work with the agencies on roles and responsibilities in a U.S. and international S&RS,
- help develop preventive measures and their deployment,
- work with industry on supply and distribution of preventive and treatment measures,
- analyze surveillance information concerning U.S. interests from the full range of sources and disseminate that analysis,
- help organize U.S. responses to potential and actual outbreaks of infectious diseases,
- encourage needed research and training to support an international S&RS, and
- identify gaps in the S&RS and work with the appropriate non-governmental and governmental agencies on capacity building to fill those gaps.

Agency Networks. Each U.S. agency involved heavily with infectious diseases is encouraged to set up a single coordination/communication network which organizes internal agency surveillance and response activities and links the appropriate activities with both the U.S. and international surveillance and response activities. This will provide a single and high level point of contact for ensuring appropriate agency responsiveness and appropriate and timely participation in the overall surveillance and response efforts of the U.S.

To enhance the agency's own efforts, it should, to the extent appropriate, inventory available resources, work with other agencies on roles and responsibilities, develop preventive measures and their deployment, analyze and disseminate surveillance information, organize agency responses to potential and actual outbreaks of infectious diseases, encourage needed research and training, and identify and fill gaps in the agency's S&RS.

Communications for GS&RS.

With respect to communications, each international, regional, national and agency network should have open architecture*, be voluntarily accessible to public and private agencies who have an interest, and be robust enough to attract the full mix of participants (nations, agencies, individuals) because of the high quality, timeliness, and credibility of the available information. The networks cannot be seen as promoting a single ideology or philosophy. The networks should not be a propaganda medium. Because some nations and agencies have the need to provide or receive some information on a more confidential basis, mechanisms will be established to handle these communications as well. This two-tiered approach, if carefully executed, allows the full range of communications while encouraging agencies and nations to move toward the open architecture part of the network. The free flow of information must be protected and the overriding characteristics of the process are sharing information, supporting preventive programs, and coordinating surveillance and response.

International and Regional Networks. For the international and regional networks to succeed, they must be accepted as politically neutral, be robust, and as with all the networks, operate with an open architecture. At these networks, participants should be free to enter, read and extract information openly. In order to ensure that there is quality control on the information and high-grade analysis, the international and regional networks should have one or more organizations providing analysis of the information flowing through the open architecture part of the network. While again encouraging international participants to use the open architecture parts of the network, it is recognized that participants may desire to limit their communication to local or regional participants, particular agencies or nations, or according to locally defined criteria or according to bilateral agreements. The international and regional networks should develop communications systems to respond to that need as long as it does not compromise the networks' primary objective of open communications leading to better surveillance and response.

U.S. Network. For the U.S. coordination/communications network to succeed with its communications function, it must be accepted as politically neutral, be robust, and operate with an open architecture. Non-governmental and governmental participants should be free to enter, read and extract information openly. The network should link with the international network, with U.S. agency networks and with other governmental and non-governmental networks outside the U.S. In order to ensure that there is quality control on the information and high-grade analysis, one or more organizations, including CDC, should provide analysis of the information flowing through the open architecture part of the network. While again encouraging U.S. participants to use the open architecture parts of the network, it is recognized that agencies will also have other communications outside this system.

Agency Networks. Each of the non-governmental and governmental agencies which are extensively involved in infectious disease surveillance and response is encouraged to develop a communications component of its coordination/communications network within that agency which links together the agency's activities internally and links with both the U.S. and international networks and any other surveillance and response agencies. The design of the internal part of these communications systems will vary widely depending on the mission, organization, and communications capability of the respective agency. Each agency is encouraged to incorporate an external link, a link which can be accessed by particular partner agencies or by the general public and which needs to be designed to meet those communications requirements.

GS&RS Organizational Support and Funding.

Key to the success of the global S&RS is coordination by a neutral agency and oversight by a collection of nations and agencies which together ensure political neutrality and responsiveness to the diverse international community. The GS&RS should be overseen by a "board" of governmental and non-governmental organizations representing the full spectrum of international political and economic interests.

The coordination office for GS&RS should be in a freestanding organization(s) in an independent country or its equivalent. If not a freestanding organization(s), the "host" nation or organization should not control or be perceived as controlling operations and yet must be able to help ensure GS&RS effectiveness. The GS&RS coordination office should be located organizationally and physically so as to again ensure its neutrality.

While there should be close coordination and communication with the World Health Organization (WHO), the GS&RS coordination office may or may not be separate from WHO.

Funding for GS&RS coordination and communications functions should come from a collection of sources which together ensure neutrality and long-term viability. While the U.S. should be a strong supporter organizationally and financially, it should not control or be perceived as controlling the GS&RS philosophy and operations.

Evaluation of GS&RS.

In order to be sure the GS&RS is having a positive and substantial impact on the prevention and control of infectious diseases, an evaluation needs to be designed and executed to assess its effectiveness. Within that evaluation should be performance measures for assessing both process and outcomes with respect to the GS&RS. GS&RS' effectiveness is to be measured by the absence of harmful infectious diseases and the related morbidity and mortality prevented.

The evaluation should be carried out by an independent and neutral evaluator funded and selected by the participating agencies with the evaluation information, including performance measures, being available to all participating agencies and the public.

** **Open Architecture** -- A communications system where information is visible and accessible to the public. In the case of the Internet, this would be a web site or series of web sites where information could be posted, read and downloaded by public health personnel, scientists, nations, non-governmental agencies and the general public. Such an open system should be designed to encourage people worldwide, at all levels and in all types of governmental and non-governmental organizations to input information into this system. To address concerns about the "raw" nature of the information which might be posted, this system must be linked to a strong analytic capability provided by one or more organizations which analyzes the raw information, provides timely and neutral interpretation of the information, and links the information to the prevention, surveillance and response system.*