and being scratched or bitten by cats. These data indicated that fleas may have a role in cat-to-cat transmission. The statewide incidence was 3.7 cases per 100,000 persons, with encephalopathy occurring in 1% to 2% of cases. The highest case rates occurred in children.

TOPIC: SURVEILLANCE AT THE INTERNATIONAL LEVEL

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The significance of new and re-emerging infectious diseases has been recognized by the World Health Organization (WHO). During the 48th World Health Assembly, two key resolutions were endorsed that form the critical foundation of future activities designed to prevent and mitigate problems associated with infectious disease.

The first resolution, "Communicable Disease Control: New, Emerging and Re-emerging Infectious Diseases" (Resolution 48.13), urges the approximately 180 member states to strengthen active surveillance efforts. These efforts should include improvements both to diagnostic capabilities and to internal and international communications. The resolution calls on all countries to encourage routine antimicrobial sensitivity testing and to foster rational antimicrobial prescription practices. Resolution 48.13 urges member states to increase the number of staff skilled in epidemiology and laboratory investigations of infectious disease, as well as to foster more applied research in areas such as development of sensitive, specific, and inexpensive diagnostics. Countries should set standards for basic public health procedures and establish fundamental disease-prevention strategies, including prompt and accurate reporting of cases at both the national and international level.

Resolution 48.13 requests the director general, WHO headquarters in Geneva, and the six regional offices that implement WHO policy to develop strategies for rapid national and international response in investigating infectious disease outbreaks and epidemics. The resolution also acknowledges the necessity of coordinating WHO's activities with other specialized UN agencies and governmental organizations.

The second resolution, "Revision and Updating of the International Health Regulations" (Resolution 48.7), calls for the revision of the health regulations

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initially adopted in 1969. These codes were amended first in 1973, when cholera was included in the list of internationally reportable conditions and, following the eradication of smallpox, modified again in 1981. Today, plague, cholera, and yellow fever are the only diseases subject to regulations. The objectives of the regulations are to ensure maximum protection against infection with minimum interference in international commerce and traffic. Resolution 48.7 urges member states to participate and cooperate in the revision of these regulations and mandates that the director general assist in this process.

These two resolutions formalize current efforts within WHO, provide credibility within the headquarters and regional offices of the issue of emerging infectious diseases, and allow programs addressing emerging infectious diseases to compete for core budget funds. By virtue of its endorsement by all member states, individual countries can assist in implementing new infectious disease strategies that support the objectives of the resolution.

Concurrent with the implementation of these goals, WHO defined two goals. The first involved evaluating the current capacity of WHO collaborating centers to recognize, report, and respond to infectious diseases. The second objective was to strengthen the national infrastructure necessary to recognize and respond to these threats. Toward achieving this second goal, WHO intends to build laboratory capabilities, increase training opportunities, and improve communications at national, regional, and international levels. Ancillary goals to the above objectives included the need to (1) utilize advances in biotechnology to develop accurate and inexpensive tests suitable for use in developing countries, (2) improve the understanding of the epidemiology of several significant diseases so that improved disease-prevention strategies can be implemented, (3) foster regional collaborations and ensure the self-sufficiency of reagent production and quality control, and (4) evaluate and establish standards for public health practices.

A collaboration exists between WHO and several networks of laboratories to isolate occurrences of influenza, polio, antimicrobial resistance, and hemorrhagic fevers. The arbovirus/hemorrhagic fever network is composed of over 35 key laboratories in disparate geographic locations, including the Centers for Disease Control and Prevention (CDC), the Yale Arbovirus Research Unit, the CDC Laboratory for Vector-borne Diseases, the Instituto Evandro Chagas in Brazil, five laboratories across Africa, several laboratories in Asia and Europe, and other facilities in Russia, Cuba, and Australia. A survey was sent to each laboratory to determine the technical capacity of these facilities, with specific questions examining the laboratory's ability to isolate specific pathogens. The results of

this survey indicated that, overall, these laboratories are well prepared to diagnose locally endemic viral diseases, but that many lacked the reagents needed to identify infections caused by viruses not endemic to their immediate area, including even some common diseases that may affect international travelers, such as dengue (see the Table).¹

WHO is responding to this survey by attempting to assist laboratories to obtain critical diagnostic reagents, such as antigens and positive control sera, and by helping laboratories in developing countries to get and maintain the necessary equipment, personnel training, and consumable supplies needed to isolate and characterize pathogenic viruses. This is especially important in the case of both yellow fever and dengue viruses, for which the risk of significant

TABLE World Health Organization Laboratory Survey (35 Laboratories)

Question Asked	Affirmative, %
Affiliation and access to technology	
Laboratory associated with ministry of health?	74
Laboratory associated with hospital?	59
Laboratory has a serum bank?	88
Cell culture available for virus isolation?	100
Mice available for isolation?	75
Serological tests available?	
Immunofluorescent assay (IFA)	100
Hemagglutination inhibition (HAI)	91
Complement fixation (CF)	81
Radioimmunoassay (RIA)	44
Plaque reduction neutralization (PRN)	94
Agar gel immunodiffusion (AG)	56
Mouse neutralization test (MNT)	74
Molecular techniques: does the laboratory have	
Capacity to radiolabel proteins?	59
Ability to sequence?	71
Ability to clone?	65
Expression capability?	47
Ability to perform polymerase chain reaction (PCR)?	91
Reagents available to test for specific disease?	
Yellow fever	56
Japanese encephalitis	47
Tick-borne encephalitis	74
St. Louis encephalitis	35
Ability to isolate specific hemorrhagic fevers?	
Lassa fever	26
Argentine/Bolivian fever	24
Ebola virus	26
Marburg	29
Reston (RST)	12

urban transmission with high rates of morbidity and mortality is great. WHO is also working closely with the Expanded Programme on Immunization (EPI) and with the global polio eradication campaign to link needed laboratory development with these important vaccination efforts.

In general, WHO is responding to the urgency of emerging infectious diseases by assessing and assisting the existing networks of laboratories working with such diseases; by organizing meetings, symposia, and steering committees specifically dedicated to emerging disease initiatives; and by undertaking programs that complement national plans developed by existing initiatives.

Strong leadership and coordination now is required from WHO and its regional offices; key national programs such as those developed by the US and Canada are needed to enter the global implementation phase of the effort to address the challenges posed by emerging infectious diseases. Significant challenges lie ahead, but much has been accomplished, and sufficient goodwill and dedication exist. While we never will eliminate the risk of emerging infectious diseases, we can influence the spread of antimicrobial resistance, we can improve diagnostic capabilities, we can respond to and interrupt outbreaks more efficiently, and we can implement more-effective disease control and prevention programs.

REFERENCE

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