

Establishing goals, techniques and priorities for national communicable disease surveillance

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WHICH COMMUNICABLE DISEASES SHOULD BE routinely monitored? How should they be monitored? Why are we monitoring them at all? The national Advisory Committee on Epidemiology set up a subcommittee to ponder these questions in 1987. The conclusions this committee reached led to recommendations on communicable disease surveillance which were subsequently endorsed by the Advisory Committee on Epidemiology. These recommendations, summarized in this article, will have a significant impact on microbiologists and clinicians in this country both from the standpoint of their workload and data they may have available for the study of communicable diseases.

GOALS

The first requirement was to answer, Why are we doing this? Without goals, one cannot make decisions on priorities or methods. The committee established the following goals:

- To facilitate the prevention and control of the disease under surveillance by identifying:
 - prevailing incidence levels, impacts and trends for the development of feasible objectives for prevention and control of the disease and the evaluation of control programs;
 - epidemiologic patterns and risk factors associated with the disease to assist in the

development of intervention strategies; and outbreaks for timely investigation and control.

- To satisfy the needs of government (especially regulatory programs), health care professionals, voluntary agencies and the public for information on risk patterns and trends in the occurrence of communicable diseases.

It was necessary to define the quality requirements of the surveillance system if these goals were to be met. The committee determined these requirements to be as follows:

- The use of a uniform case definition across Canada and definition of a preventable case, if applicable.
- The collection of sufficient, appropriate epidemiologic data on a case to fulfill the goals and identify preventable cases.
- The timely transmission of these data from local to provincial and national agencies for analysis and timely reporting of analysis to clinicians and public health officials.
- The use of data to enhance disease control programs and to assist in the development of realistic objectives for reducing the number of preventable cases.
- Evaluation of the surveillance system every five years for effectiveness, cost and progress towards control of the disease.

*Members of the subcommittee in 1988, when the bulk of work was done, were: Dr M Fast of Manitoba Health, Winnipeg, Manitoba; Dr J Waters of Alberta Health, Edmonton, Alberta; Dr N April of the Département de Santé Communautaire, Hôpital de l'Enfant-Jésus, Québec, Québec and Drs A Carter, E Ellis and P Varughese of the Laboratory Centre for Disease Control, Ottawa, Ontario Bureau of Communicable Disease Epidemiology, Laboratory Centre for Disease Control, Ottawa, Ontario

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TECHNIQUES

A 'generic' methodology was developed that met these goals and quality standards. This consisted of notification of cases to local public health authorities, collection of data on the case, and transmission of these data on a case-by-case basis to provincial and national surveillance agencies. As each disease was examined individually, the 'generic' method was altered to suit the particular characteristics of the disease. Not all diseases can be effectively and efficiently kept under surveillance by a case-by-case notification system. Other methods are available for keeping track of a disease. One can also use laboratory-based information, hospital reports, sentinel physicians, epidemiologic investigation, mortality data, special surveys, or a combination of these.

PRIORITIES

After the committee had decided on the goals and methods of communicable disease surveillance, the question of what diseases warranted surveillance was addressed. This was done by developing 12 criteria that contribute to the importance of a disease from a national disease surveillance perspective (using the goals previously defined). Each disease was given from zero to five points for each criterion depending on how important that criterion was for that disease. The sum of the points gave the estimate of the importance of that disease for national surveillance purposes.

Some may wonder why all infectious diseases of general interest are not nationally notifiable. First, there isn't enough money, time or energy for health care providers, local health units, provinces, territories or Health and Welfare Canada to report and collect data on every communicable disease. Second, to make a disease nationally notifiable means every province and territory needs to go through the legislative or regulatory process of making it reportable in their jurisdictions. That takes time and effort! The disease must be important enough to be worth this effort. Having priorities helps us decide where to put our greatest effort.

The following are the criteria used to determine the importance of a disease:

WHO interest: The World Health Organization (WHO) is interested in all communicable diseases to some degree; however, cholera, plague and yellow fever are subject to the 1983 International Health Regulations. Canada must collect and report information about cases of these diseases as an international duty. Five points were awarded to each of these diseases. Three points were

TABLE 1
Disease surveillance in Canada: Points obtained for each criterion during rating for surveillance

	Measles	Tuberculosis	AIDS
WHO interest	***	—	***
Agriculture Canada interest	—	**	—
Incidence	*****	****	**
Morbidity	*****	*****	*****
Deaths	**	*****	*****
Deaths-to-case ratio	*	****	*****
Communicability	*****	**	**
Potential for outbreaks	*****	****	****
Public perception of risk	**	**	*****
Socioeconomic impact	*****	****	*****
Vaccine-preventable	*****	**	—
Immediate public health response necessary	****	****	**
Total number of points	42	40	38

*1 point

awarded to other diseases under WHO surveillance or that are part of the Expanded Program on Immunization.

Agriculture Canada interest: Agriculture Canada and federal food regulatory agencies spend substantial amounts of money on inspecting animals, food production facilities and products. Human surveillance helps to monitor the effect of such work. The committee gave five points to diseases directly prevented by this work and two for diseases which have been or could be prevented.

Incidence: The committee classified the disease incidence rates into quintiles and gave one through five points to each disease depending on the quintile of the rate into which its incidence fell. Zero points were given if no cases were being reported. Quintiles were used since the incidence rates of infectious diseases cover a wide range, from zero for yellow fever to 174 per 100,000 population for gonorrhoea, and the rates are not normally distributed.

Morbidity: For morbidity, the committee assigned points as above, by quintile, based on hospital days and short term disability. If data were not available, the disease was subjectively compared to those with data.

Mortality: The committee used the actual number of deaths recorded by Statistics Canada and divided the diseases into quintiles assigning points as above. The number of deaths varied from less than one annually to 443 reported for the acquired immunodeficiency syndrome (AIDS) in 1988.

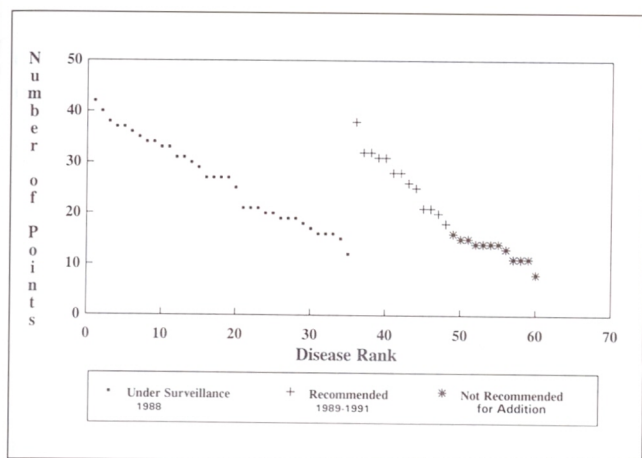


Figure 1) Disease surveillance in Canada: Rating for surveillance. See Table 2 for definition of 'Disease Rank'

Case fatality rate: Because some organisms may cause few deaths but have a high case fatality rate for the cases that do occur, the committee rated the death/case ratio by quintiles, with the highest being 100% for rabies.

Communicability and potential for outbreaks: These were rated more subjectively based on the literature and experience of subcommittee members. AIDS illustrates the difference between the two criteria, as it rated two out of five points for communicability, but four out of five points in potential for an outbreak.

Socioeconomic impact: For this criterion, the committee considered factors such as the cost of immunization and food inspection programs, non-hospital health care and long term disability. Economic impact analyses have not been prepared for many communicable diseases, so subjective comparison was often necessary.

Public perception of risk: This was even more subjectively based on subcommittee members' experience and media interest. It included the following factors:

- immediate versus delayed effects of the infection;
- dreaded versus familiar disease;
- mechanism of disease not known or understood;
- uncontrollable;
- involuntary;
- children at risk;
- identifiable victims;
- lack of belief in authority of the information source; and
- media attention.

Vaccine preventability: This criterion included both vaccine availability and efficacy.

TABLE 2
Disease surveillance in Canada: Rating for surveillance

Rank	Disease	Points
Under surveillance 1988		
1	Measles	42
2	Tuberculosis	40
3	AIDS	38
4	Hepatitis B	37
5	Pertussis	37
6	Salmonellosis	36
7	Rubella and CRS	35
8	<i>Haemophilus influenzae</i> invasive disease	34
9	Diphtheria	34
10	Chickenpox*	33
11	Meningococcal infection	33
12	Gonococcal infection	31
13	Rabies	31
14	Paralytic poliomyelitis	30
15	Syphilis	29
16	Botulism	27
17	Hepatitis A	27
18	Shigellosis	27
19	Mumps	25
20	Giardiasis	21
21	Typhoid	21
22	Tetanus	21
23	Plague	20
24	Yellow fever	20
25	Cholera	19
26	Pneumococcal and other meningitis	19
27	Trichinosis	19
28	Campylobacteriosis	18
29	Legionellosis	17
30	Amoebiasis	16
31	Brucellosis	16
32	Malaria	16
33	Paratyphoid	15
34	Leprosy	12
Recommended for addition 1989-91		
35	Influenza*	38
36	Non-AIDS HIV infection*	32
37	Rotavirus infection*	32
38	Chlamydial infection - genital	31
39	RSV infection*	31
40	Verotoxigenic <i>E coli</i> infection	28
41	Hepatitis C*	28
42	Listeriosis	26
43	Herpes infection - genital*	25
44	Herpes infection - congenital	21
45	Parvovirus infection*	21
46	nonA-nonB hepatitis	20
47	Chancroid	18
Not recommended for addition		
48	Reye syndrome	16
49	Yersiniosis	15
50	Lyme disease	15
51	Psittacosis	14
52	Q fever	14
53	Toxoplasmosis - congenital	14
54	CMV infection - neonatal	14
55	Cryptosporidiosis	13
56	Kawasaki disease	11
57	Toxic shock syndrome	11
58	Tularemia	11
59	HTLV-I infection	8
60	<i>Borrelia hermsii</i> infection	8

*Recommended surveillance method differs from 'general' method described in text. AIDS Acquired immunodeficiency syndrome; CMV Cytomegalovirus; CRS Congenital rubella syndrome; HIV Human immunodeficiency virus; HTLV-I Human T-lymphotropic virus type I; RSV Respiratory syncytial virus

Necessity for an immediate public health response: This criterion evaluated the need for health officials to act immediately upon learning of a case of the disease in order to prevent further transmission. It measured the effectiveness of immediate case and contact management measures and was based on the members' knowledge and subjective comparison between diseases.

The committee did not give weights to the various criteria – in other words, give more importance to one criterion compared to another. Perhaps weighting will be done in the future as experience is gained with this approach. A second set of criteria would have to be developed for assigning weights to the first. Table 1 illustrates the points scored in the 12 categories for measles, AIDS and tuberculosis, which were ranked as the top three diseases by the present system.

Looking at all 60 diseases which have been evaluated (Figure 1, Table 2), the diseases notifiable in 1988 are distinguished on the basis of points scored from those added in 1989 to 1991 and from those considered but not recommended for addition.

What is important in this exercise is not the exact number of points given to a disease, but rather the relative position of the disease to others, and the cutoff point chosen. The committee decided to use a cutoff of 18 points to recom-

mend a disease for national surveillance (Table 2). This requires diseases to rank somewhat higher to initiate than to continue surveillance. The system has worked well for diseases proposed in 1989-91 and provides a methodology to judge additional disease suggestions in the future.

Disease surveillance is much more than collecting numbers. It also means compilation, consolidation and analysis of data, and the development of conclusions. Then and only then will it lead to better prevention and control of the diseases being counted in the first place. The provincial epidemiologists and the LCDC are attempting to meet this challenge by developing standardized case definitions for the notifiable diseases (in final draft, to be published this year) and instituting case-by-case disease reporting to the federal level. With everyone's cooperation, valuable information should be readily available to help in the prevention and control of communicable disease in Canada.

If anyone would like a copy of the detailed ratings given to each disease or the case definition booklet, please write to the author at the Laboratory Centre for Disease Control, Health and Welfare Canada, Tunney's Pasture, Ottawa, Ontario K1A 0L2.