MEETING OF THE STATES PARTIES TO THE CONVENTION ON THE PROHIBITION OF THE DEVELOPMENT, PRODUCTION AND STOCKPILING OF BACTERIOLOGICAL (BIOLOGICAL) AND TOXIN WEAPONS AND ON THEIR DESTRUCTION

BWC/MSP/2004/MX/WP.73
29 July 2004

ENGLISH ONLY

Second Meeting
Geneva, 6-10 December 2004

Meeting of Experts
Geneva, 19-30 July 2004
Item 5 of the agenda

Surveillance and (Early) Detection of Infectious Diseases in Humans in the Netherlands

Submitted by the Netherlands

1. Infectious disease control in the Netherlands is undertaken by regional public health services, in collaboration with the regional laboratories. Surveillance and outbreak investigations at the national level are performed or supported by the National Institute of Public Health and the Environment (RIVM). Coordination between the 40 public health services and national institutions? is controlled by the National Coordination Structure for Infectious Disease Control (LCI). The office of the LCI draws up guidelines and protocols and coordinates outbreak management.

2. The LCI consists of a professional advisory team: Outbreak Management Team (OMT) consisting of five permanent members with clinical, microbiological, and public health backgrounds and sometimes other specialists (chairmanship national public health institute, RIVM). Local professional clinical, microbiological and public health staff inform and join in the discussions of the OMT. The OMT advises the Minister of Health through a board of administrators (BAO). The BAO checks the advice for practical feasibility and decide on the policy to be implemented under responsibility of the Minister.

Surveillance

3. Surveillance is the continuous process of collecting, analysing and interpreting of data and the timely dissemination of information to those who should know, so specific action can be taken. The World Health Organization summarises this as 'information for action'. 'Action' represents the aims of surveillance and covers all measures to:

(i) Monitor trends in endemic diseases;
(ii) Evaluate interventions;

(iii) Early detection of outbreaks;
(iv) Eliminate sources of infection;
(v) Assess and protect (new) risk groups;
(vi) Identify (new) transmission routes.

4. With surveillance it is important to have a representative picture of the incidence of infectious diseases in the population. For diseases with a low incidence, complete coverage of the population is of importance. For diseases with a high incidence, a representative sample of the population is sufficient to detect trends and outbreaks.

Analysis of surveillance data

5. Analysis of surveillance data is usually done by means of basic descriptive epidemiology (time, place and person). However, with the increase in electronic data collection and information, mathematical algorithms are used increasingly to assess whether the observed number of events is statistically significant higher than expected on the basis of historical data. Also, the internet and other electronic media are increasingly used for dissemination of information.

6. In this working paper we describe three surveillance and early detection systems for human infectious disease surveillance which are in place or being set up in the Netherlands, and which are trying to use the vast amount of data and possibilities of automation as efficiently as possible:

(i) Infectious diseases Surveillance Information System (ISIS);
(ii) Signaling of infectious disease events;
(iii) Syndromic Surveillance

Infectious diseases Surveillance Information System (ISIS)

7. ISIS is the national Infectious Diseases Information System designed to describe the day-to-day changes in frequency of all communicable diseases in The Netherlands that can be a threat to public health. ISIS is responsible for timely distribution of descriptive epidemiological reports and early warning signals to professionals in public health, in order to support relevant control measures.

8. ISIS consists of two parts: Notification of clinical cases and laboratory surveillance:

(i) Reports of clinical cases based on Infectious Disease Law (OSIRIS):

- From practitioners to public health services (PHS);
- National coverage through 40 PHS;
- Obligatory questions for control (Inspectorate of Health);
- Voluntary questions for surveillance (RIVM);

(ii) Laboratory reports of all pathogens (ISIS lab):

- Microbiological Laboratories;
- No national coverage, sentinel (currently 20% coverage, but increasing);
- Positive and negative results, in contrast to regular laboratory surveillance!

9. The PHS report the cases through a web-based application, OSIRIS. Reporting delay with this automated system, introduced in 2002, is much less compared to before, when notifications were sent on paper. Also, because not completely filled out reports can already be viewed in the database.

10. Of the laboratories connected tot ISIS all laboratory data are transferred every night to the central database. A practical problem is the fact that all laboratories have different software systems, which have to be connected to a central database.

11. Usually, more tests on different pathogens are requested simultaneously for one patient. The results of all of these tests are interpreted in relation to the others, and hereby only counting this patient once in the denominator. To be able to count cases in the laboratory surveillance system within ISIS, criteria for diagnoses have been established. Because different laboratories use different test methods for the same pathogen, all possible tests are included in the criteria for the diagnoses.Thus we have established case-definitions for so-called surveillance diagnosis for public health purposes.. Since there is no information on clinical signs in the laboratory surveillance system, the diagnoses based on the microbiological results may be less accurate than those made by a clinician who also has seen the patient. But the 'surveillance diagnoses' are sufficient for detecting trends and outbreaks.

12. Standard reports for the clinical and laboratory data are updated automatically every night and are available through the internet. Parts of the site are password-protected and can only be seen by experts. Besides descriptive reports (time, place, person), early warning signals are generated. The thresholds for a warning signal depend on the pathogen and, if relevant, take into account seasonal patterns.

Signaling of infectious disease events

13. Acute changes in the incidence of infectious diseases can occur unexpectedly, but can have serious consequences for public health, e.g. one SARS patient will turn a hospital or even a country upside down. So, in addition to a system that creates early warning signals, such as ISIS, it is necessary to have a permanent system in place that can signal possible threats for public health so the government can take action to prevent (further) spread. The RIVM has the task to list and evaluate all possible public health threats, verify and judge them and inform the government about significant items.

14. To this end, the RIVM has established a structure for the signaling of infectious disease events. According to protocol, all relevant data sources (ISIS, reference laboratories, Pro-med, WHO outbreak verification list, EU early warning and response system, etc.) are checked and

discussed during a weekly meeting of experts. A report is made and disseminated the same day. If necessary, the OMT will convene or other actions are decided upon.

15. In addition to acute events and actual threats, the medical literature contains relevant information that may be of importance, especially where this concerns gaps in the current policy. Therefore, relevant literature is discussed quarterly with a larger expert group.

Syndromic surveillance

16. Surveillance and signaling of infectious diseases relies on laboratory and clinical diagnosis. These systems do not include prediagnostic information for detection of outbreaks, meaning there is a delay in discovering an outbreak and atypical or 'new' diseases may be missed.

17. Syndromic surveillance also makes use of automated data, and also generates statistical signals, but does not depend on succesful diagnoses. By means of syndromic surveillance, one will not detect a single case but one can detect relative large numbers of non-specific relative mild disease. Therefore, it can not replace traditional public health surveillance but is an extra tool for outbreak detection of all acute diseases.

18. Currently, we are validating this new method in the Netherlands (RIVM) by retrospective analysis of existing, automated data. In other words, would with the syndromic approach known trends or incidents have been detected in these data sources?

19. A practical problem is that each data source uses different disease classification codes (ICD-9, ICD-10, ICPC) that have to be connected to be able to create universal syndrome classifications.

Developments and recommendations

20. It is clear that a surveillance system is not complete with the production of a continuous flow of data, and even not with the signaling of elevations of infectious disease events. The interpretation of the data themselves and signals based on these data by experts is essential, as is the coordination of actions following from the interpretation of signals.

21. Some developments elaborating on the issues in surveillance described in this working paper are to be expected in the coming years:

Further automation of data already collected

22. Further automation of data that is already collected will improve timeliness and accessibility of surveillance data for early detection. Further automation will facilitate integration of surveillance data from different public health and health care institutions. Naturally, access authoritisation (read and write rights) need to be established.

23. Establishing a web-based case register in the short term in case of a national is already feasible in the Netherlands with the OSIRIS system. As an increasing number of countries are working on automation of notification systems, one has a basis for the the establishment of an international web-based, real-time case register for monitoring international outbreaks.

Second generation surveillance

24. Second generation surveillance is the monitoring of risk factors instead of outcomes in order to be able to predict the outcome. An example of second generation surveillance is monitoring of sexual behaviour as a predictor of the incidence of sexually transmitted diseases (STD) soone can direct information/education before one sees a rise in STD.

Unification of Europe

25. With the unification of Europe, there is a growing need for European surveillance. There are already many surveillance networks and possibilities for sharing information, but European legislation is needed for transfer and sharing of data.

26. European case definitions have been established, but also standardization of codes and classifications is necessary for comparability of surveillance data from the different countries.

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