

SURVEILLANCE

Note by the secretariat

1. Introduction

An expert group meeting, Consultation on Waterborne Disease Surveillance, was held on 9-10 May 2006 in Budapest, Hungary, at the invitation of the National Institute of Environmental Health of Hungary and the World Health Organization (WHO) Regional Office for Europe in the framework of the Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes. The consultation was attended by participants from Croatia, Germany, Hungary, Italy, the Netherlands, Norway, Serbia, Slovak Republic, Sweden, United Kingdom and the USA and by representatives from WHO, the European Centre for Disease Prevention and Control and the European Commission Joint Research Centre.

The consultation aimed to contribute to the definition of the work plan of the Protocol by drafting decision for common action on waterborne disease surveillance, for review by the 6th Meeting of the Working Group on Water and Health (May-June 2006), and eventual adoption at the First Meeting of the Parties (January 2007).

2. Background

The Protocol on Water and Health sets its objective at protecting human health and well-being through improving water management and through preventing, controlling and reducing water-related diseases. Articles 6 and 7 oblige Parties to establish national and/or local targets, and to periodically review and assess progress made towards the targets including the reduction of the scale of outbreaks and incidents of water-related diseases. Article 8 obliges the Parties to ensure establishment, improvement, and maintenance of comprehensive national and/or local surveillance and early-warning systems

2.1 Meetings under the Protocol

Waterborne disease surveillance and reporting were discussed during two expert consultation meetings held in 2001:

- Assessment of the evidence-base and development of a reporting scheme (25-26 October 2001, Bonn, Germany)
- Waterborne disease surveillance: goals and strategies (29-20 November 2001, Budapest, Hungary)

The outcomes of the two consultation meetings were presented at the 2nd Meeting of the Working Group on Water and Health (28-29 October 2002, Budapest, Hungary) for consultation among a wider group of Member State representatives.

At the 2nd Meeting of the Signatories (2-4 July 2003, Geneva, Switzerland), the Signatories:

- (a) adopted a set of priority diseases¹ and symptoms for target setting and reporting.

Diseases of primary importance:

cholera, bacillary dysentery (Shigellosis), *enterohemorrhagic Escherichia coli* (EHEC), viral hepatitis A, and typhoid fever

Disease and infections of secondary importance:

campylobacteriosis, cryptosporidiosis, *giardia intestinalis*, and *calicivirus*

Symptoms of diseases of unknown aetiology:

acute gastrointestinal diseases, severe and acute diarrhea, vomiting, continuous fever, and bradycardia, and jaundice

- (b) took note of the current lack of coordination at the European level in surveillance of water-related diseases, and requested that actions leading to the integration/co-ordination of existing information mechanisms concerning surveillance and outbreak detection be included in the work plan.

2.2 *EU Directives*

These diseases identified are in line with EU directives, namely the following:

- Decision 2119/98/EC of the European Parliament and of the Council of 24 September 1998 setting up a network for the epidemiological surveillance and control of communicable diseases in the Community
- Commission Decision 2000/96/EC on the communicable diseases to be progressively covered by the Community network under Decision No 2119/98/EC of the European Parliament and of the Council (notified under document C(1999)4015)
- Decision of the Commission 2002/253/EC laying down definitions for reporting communicable diseases to the Community network under Decision 2119/98/EC of the European Parliament and of the Council

The proposed network of disease surveillance established under these Decisions covers the complete list of diseases proposed for priority attention under the Protocol.

2.3 *CISID*

The WHO Regional Office for Europe manages Centralized Information System for Infectious Diseases (CISID) with the following aims:

- Provide timely, standardized, and complete picture of the epidemiology of important infectious diseases.
- Indicate the disease burden
- Identify the geographical area for priority concern
- Share data at the sub-regional/sub-national level
- Develop early warning systems

The system now offers the possibility of capturing all but one of the diseases identified under the Protocol.

¹ The list of priority diseases was re-opened for review at the 5th Working Group on Water and Health (Palais des Nations, Geneva, Switzerland, December 2006). No dissenting views on the original selection were received by the Secretariat.

3. Basic Considerations

Waterborne diseases constitute a significant health burden in all countries of the European region. Surveillance of the endemic burden of water-related disease is important to set overall targets and monitor progress towards these targets. To ensure in addition effective control and prevention of waterborne disease outbreaks, both disease surveillance and outbreak investigation are essential. Monitoring of health outcomes therefore becomes the counterpart activity to the water supply assessment, which was the subject of a previous expert group meeting (9-10 May 2005, Copenhagen, Denmark). Both assessment of water supply and surveillance of water-related diseases, including timely detection of outbreaks, have their function in the overall health services system.

Waterborne disease surveillance systems require constant adjustments and upgrading to accommodate emerging issues and new findings. Information is one of the most essential elements of disease surveillance, and how indications and signs of an outbreak are captured is a key to successful systems of surveillance and early warning. The following are aspects of information for success surveillance and early warning systems:

- **Information source:** reporting from multidisciplinary sources; typically from physicians and clinical laboratories.
- **Data quality:** application of appropriate case definition and use of methods that allow accurate confirmation.
- **Data consistency:** information that is comparable nationally.
- **Data transmission speed:** possible use of electronic system to ensure timely reporting for effective detection of diseases and response.

To ensure the above in an environment that requires constant adjustments and upgrading, education and training of personnel are necessary in any country.

However, in countries where situation is less advanced, potentials to ensure the above are limited due to both human capacities and infrastructure availability. This is an important point for consideration for the Protocol.

Further, for the surveillance system to operate effectively, it should not be overwhelmed by excessive reporting requirements. Prioritization of diseases for reporting is a policy issue and should be determined taking into account the national situation and capacity.

4. Meeting Topics

4.1 *Disease selection for reporting*

Article 6 of the Protocol requires the Parties to each “establish and publish national and/or local targets for the standards and levels of performance that need to be achieved or maintained for a high level of protection against water-related disease.” The targets to be covered include “the reduction of the scale of outbreaks and incidents of water-related disease” (Article 6, paragraph 2(b)). Further, Article 7 obliges the Parties to collect and evaluate data on the progress towards achieving the targets set.

The expert group considered how the Parties might agree on setting targets and target dates for the reduction of the cases of the selected diseases, and how progress towards these targets might be monitored.

The expert group recommends unanimously to the Parties that the diseases of importance to the Protocol which are notifiable and monitored by national surveillance schemes should be taken up first for the Protocol reporting purpose (including setting of targets and target dates). Diseases of importance which are not notifiable but being monitored by national systems should be introduced for reporting at a later stage. Health burden caused by diseases of unidentified etiology is considered to be important, but no definitive guidance is given on how to address it in any common surveillance system.

It was recognized that some of the priority diseases of the Protocol may not be problems in many EU countries, but that it was unanimously felt to be still important to maintain monitoring capacity as imported cases may emerge.

EU directives provide that all the priority diseases of the Protocol except for Calicivirus are subject to reporting. Based on country experiences, the expert group also recommended that Parties consider taking up *norovirus* as a priority pathogen for its relevance to water and relative ease of detection than *calicivirus*.

4.2 Reporting System

Objectives of national reporting systems and of the reporting system needed for the Protocol are different. For national reporting systems, speed is especially important in outbreak detection as it is a key element in identifying the causative pathogen in controlling the spread of the outbreak. On the contrary, for the purpose of Article 7 of the Protocol, reporting is a periodic exercise where accurate monitoring of the endemic condition is important, but where the speed of the notification system is not of prime importance.

Nevertheless, Article 8 of the Protocol mandates the Parties to “ensure that comprehensive national and/or local surveillance and early-warning systems are established, improved or maintained” (Article 8, paragraph 1(a)), for which prompt and clear notification is necessary.

The expert group recommends to the Parties that at least diseases of primary importance should all be made legally notifiable by the time of the Second Meeting of the Parties, and that an appropriate reporting system should be identified to capture at least endemic levels of these diseases. For countries in which diseases of secondary importance are not yet covered by a legal system of notifiable disease control, they can be left to voluntarily notification at present.

The expert group furthermore recommends that, by the time of the Second Meeting, assessment of the voluntary and mandatory surveillance of diseases of secondary importance should have been conducted in order to upgrade their status so that they may be included in the nationally notifiable diseases.

The expert group noted that currently, there are only 5 Parties that are not legally bound by the EU decisions cited above. Nevertheless, in view of the importance of the priority diseases, the expert group surmised that the recommendation is not likely to be overly challenging to Parties not influenced by the EU *acquis communautaire*.

The expert group recognized the important reporting burden imposed on the Parties by national and supranational legislation, and was aware that duplication of effort often results from the same base-data being requested in different formats or in different aggregations. Streamlining the data parameters among different bodies obliging reporting from the countries is necessary to avoid duplication of efforts by the countries. The expert group therefore advised that reporting requirements under the Protocol following Article 7 should not require the Parties to conduct additional data analysis, and welcomes co-operation between specialized agencies and

organizations, particularly WHO and ECDC to come to a common and comprehensive data capture system. .

4.3 Surveillance Systems

Surveillance systems may vary from country to country. A first challenge common to all waterborne disease surveillance systems is capturing all incidents of infection as not all infections result in clinical diseases, and disease may be mild or severe not leading to the patient seeking medical assistance. Sweden, for example, has been successful in improving system efficiency by introducing additional source of notification. A second challenge might be in unequivocally identifying the sources of infections, as water is not the only exposure pathway for many of the pathogens of interest. Moreover, the case may be primary infection or secondary.

In most of the countries represented in the expert group, waterborne disease surveillance is governed by national law as part of the national health service. However, not only do organizational differences exist in national surveillance systems, there may be important differences between surveillance at the national and surveillance at the local level especially in federal states. In the US, notifiable diseases are selected at the state level with smaller number of them determined at the federal level; in Italy, different regions have different systems for data gathering, which hampers data comparison at the national level. Comparability of surveillance data within the countries and across the European region was acknowledged as important and necessary, and was determined by the expert group to require further follow-up.

Moreover, countries of the region are in various levels of implementation (trial) of different surveillance methodologies including reporting and information management. While, for instance, modernization of data management by introducing electronic information systems might help advance surveillance systems, human capacity to deal with such modernization should also be built to ensure improvement in the efficiency of disease identification and outbreak detection. Development of infrastructure alone is not enough; users' capacity also needs to be developed.

The expert group unanimously recommended that one core document and a set of topic specific guidelines, should be written to serve as common guidance to the Parties. The common guidance should include the following elements:

- Definition of standardized minimum quality requirements for waterborne disease surveillance including reporting, and outbreak detection and investigation.
- State-of-the-art documentation to take stock of current systems.
- A compendium of surveillance systems with tools well documented. However, these tools have to provide some flexibility so that countries with different capacities can use them by adjusting them to the local situations.

4.4 Outbreak Detection

There are a number of conditions to be met for improved waterborne disease outbreak detection. These include good surveillance system, conduct of thorough (more complete) investigations which engage multidisciplinary investigation team, improved laboratory capabilities and improved reporting system. Application of sero-epidemiology was presented as an example of means to enhance sensitivity of detection for certain infections by one of the experts.

Typical challenges met by countries with regard to waterborne disease outbreak detection are:

- Only few people normally see doctors for diarrhea, making outbreak detection difficult and leading to underestimation.

- The etiological agent is often unknown due to limitations in determination tools. . Sensitivity of detection methods determines the number of outbreaks reported by etiological agent. As the burden of disease with unidentified etiology is currently high, improvement in detection methods would allow to better specify and rank the diseases thus providing evidence for action.
- There are very few reports of intoxication by chemicals. In one country, intoxication was commonly caused by faulty unit operations, while in another country problems in investigation are suspected.
- Timely investigation is not always possible due to difficult detection of suspected outbreak and difficulty in obtaining relevant water samples.

Some countries, including Germany, may already have highly sensitive systems for outbreak detection. On the other hand, some other countries of the European Region suffer from problems such as:

- obsolete infrastructure that keep the system from responding to increasingly important complex infectious agents;
- outdated epidemiological methods that are based on laboratory investigation rather than epidemiological (case-control studies and modern surveillance);
- lack of skills and resources at the laboratories;
- dispensing of inappropriate interventions; and
- inconsistency of data.

4.5 Joint Actions for Waterborne Disease Surveillance

The Protocol, in its Articles 11 through 14, calls upon the Parties to cooperate among themselves in support of the objectives of the Protocol and in implementing national and local plans in pursuance of the Protocol.

At the same time, a number of important initiatives were brought to the meeting which address the concerns of the expert group mentioned above and which hold out the possibility of mutually beneficial cooperation between the Parties and other organizations/agencies with common interest in waterborne disease surveillance.

4.5.1 USEPA-WHO: Emerging Issues in Water and Infectious Diseases

USEPA and WHO have collaborated on a series workshops and documents dealing with emerging issues in water and infectious diseases. Waterborne disease surveillance has been considered as a potential topic for the 4th workshop in the series, for which catalytical amount of funding has been secured. The workshop has tentatively been scheduled for either December 2006 or January 2007. The objective of the workshop will be:

- To review current waterborne disease surveillance systems;
- To identify new/alternative systems based on disease agent characteristics, outbreaks, health status, etc; and
- To evaluate current control strategies to identify agents that might fall outside of the current control envelope.

The expected outcomes of the workshop are:

- Systems of future significance in water, recommended a hierarchy of management strategies identified; and
- A state-of-the-art review of surveillance systems

The development in this project should be followed, and the Parties may wish to consider it as a possible joint action element (if the workshop is to be held on later dates than currently scheduled).

4.5.2 ECDC-WHO: CISID

The missions of the European Centre for Disease Prevention and Control are defined in the regulation (EC) No 851/2004 of the European Parliament and of the Council (21 April 2004), establishing a European centre for disease prevention and control. The three core functions of ECDC are scientific advice, surveillance, and preparedness and response.

Through its surveillance function, ECDC aims to develop a European Surveillance System for public health action that introduces one notification system in Europe (25 EU Member States and beyond).

Preparedness and response function focuses on epidemic intelligence, preparedness and outbreak response, and development and adoption of training strategy.

The expert group agreed that a common data capture system should be used for the monitoring of progress in the lessening of the burden of waterborne diseases, and that the Parties should use CISID as the data capture tool for progress monitoring for the Protocol. WHO (CISID) and ECDC should be invited to ensure that no duplication of effort would be imposed on the reporting Parties.

The expert group noted with appreciation the comprehensive approach realized by WHO's CISID and invited it to include *norovirus* infection.

4.5.3 International Cooperation through the Protocol

The Oslo Roundtable on Water and Health was held in September 2004 to bring together the donor community and the countries of the European Region to assess the needs gap in the Region. Countries put forward their priority needs in the countries with regard to water and health. Within the framework of the Protocol, facilitation of international cooperation will be continued addressing various needs in the Region including those in the area of waterborne disease surveillance.

4.5.4 Possible Joint Action Elements

The Expert Group reached a consensus that:

- a work plan element is required on the development and implementation of an integrated strategy for surveillance of waterborne diseases, taking into account the work of the ECDC and WHO Regional Office for Europe, aimed at the progressive harmonization of national waterborne surveillance systems.
- a work plan element is required on mutual assistance for the assessment and strengthening of national waterborne disease surveillance systems. This element may include the following tasks:
 - Development of surveillance guidance document(s)
 - Periodic regional (or sub-regional) seminars to share information and experiences on best practices and lessons learned
 - Training and capacity building activities for information management, surveillance, and outbreak detection, particularly for countries in need of modern methodologies

5. Conclusion

The Expert Group came to a common set of guidance with regard to the five concerns raised by the Protocol Secretariat at the beginning of the meeting.

1. **Should the Protocol reporting system be based on national surveillance systems dealing with notifiable diseases, or should voluntary surveillance of non-notifiable diseases also be taken into account?**

- The diseases of importance to the Protocol which are notifiable and monitored by the national surveillance schemes should be taken up first for the Protocol reporting purpose (including setting of targets and target dates). Diseases of importance which are not notifiable but being monitored by national systems will be introduced for reporting at a later stage. What not to be neglected is the burden of symptoms of unidentified aetiology.
- The Parties should consider taking up norovirus as a priority disease for its relevance to water (relative to rotavirus which is child-relevant but seldom waterborne) and relative ease of detection than calicivirus.

2. **Should the Parties be encouraged to make the Protocol priority diseases notifiable?**

- The Parties should at least make diseases of primary importance identified by the Protocol notifiable by the time of the Second Meeting of the Parties (diseases of secondary importance can be notified voluntarily) and that, by the time of the Second Meeting, assessment of surveillance situation of the diseases of secondary importance will have been conducted to upgrade them to be included among the notifiable diseases nationally.
- The reporting requirements of the Protocol under Article 7 should not require the Parties to conduct yet another data analysis. Streamlining the data parameters among different bodies obliging reporting from the countries is necessary to avoid duplication of efforts by the countries.

3. **Should the inconsistency of current surveillance schemes be addressed by the drafting of a common guidance document on waterborne disease surveillance?**

- A document, or a set of documents, should be written that serves as common guidance (for the purpose of the Protocol and beyond). The common guidance should include the following elements:
 - Definition of standardized minimum quality requirements for both process and information output.
 - A state-of-the-art documentation to take stock of current systems that analyzes what works well and what doesn't.
 - A compendium of methods with surveillance tools documented. However, these tools have to provide some flexibility so that countries with different capacities can use them by adjusting them to the local situations.

4. Should there be an element in the work plan of the Protocol to promote joint action in assessment and strengthening of current national surveillance systems to address specifically waterborne diseases?

- A work plan element on the development and implementation of an integrated strategy for surveillance of waterborne diseases should be created, taking into account the work of the ECDC and WHO Regional Office for Europe, aimed at the progressive harmonization of national waterborne surveillance systems.
- A work plan element on mutual assistance for the assessment and strengthening of national waterborne disease surveillance systems should be created. This element may include the following sub-elements:
 - Development of surveillance guidance document(s)
 - Periodic regional (or sub-regional) seminars to share information and experiences on best practices and lessons learned
 - Training and capacity building activities for information management, surveillance, and outbreak detection, particularly for countries in need of modern methodologies

The expert group formalized its finding in a draft decision for adoption by the Meeting of the Parties after review by the 6th Working Group on Water and Health. The document is attached hereto as Annex 1.

Annex 1

Draft decision

for submission to the 6th Meeting of the Working Group on Water and Health (31 May–2 June 2006, Geneva, Switzerland)

The Meeting of the Parties to the Protocol on Water and Health

Recalling the work of the expert working group meeting on the assessment of a reporting scheme for water-related diseases (Bonn, 25 – 26 October 2001) and waterborne disease surveillance Budapest, 29 – 30 November 2001)

Bearing in mind the decision by the Signatories at their second meeting (Geneva, 2 July 2003) which took note of the current lack of coordination at the European level in surveillance of water-related diseases, and requested that actions leading to the integration/co-ordination of existing information mechanisms concerning surveillance and outbreak detection be included in the work plan

Commends the work done by the WHO Computerised Information System for Infectious Diseases has now created the possibility for the capture of surveillance data of priority and secondary water related diseases

Recognizes the mandate and work currently being undertaken by the European Centre for Disease Surveillance and Control (ECDC), particularly the current effort to develop an integrated approach for disease surveillance, including priority and secondary waterborne diseases as defined under the Protocol

Welcomes in particular the commitment of the WHO Regional Office for Europe and the ECDC to avoid duplication of reporting efforts by countries, taking into account EU legal obligations and the voluntary reporting systems used by the other member states of the European region

Noting the outcome of the consultation on water-borne disease surveillance held at the national institute for environmental health (Budapest, 9 – 10 May 2006), the Parties

- Call on countries that have ratified the Protocol on Water and Health to make priority diseases (cholera, bacillary dysentery, enterohaemorrhagic E. coli infection, viral hepatitis A, and typhoid) notifiable immediately, and to ensure that waterborne diseases of secondary importance (campylobacteriosis, giardiasis, and cryptosporidiosis) are made notifiable as soon as possible.
- Acknowledges that the current list of diseases of primary and secondary importance will be subject to review as further scientific information becomes available, for example on the occasion of the Meeting of the Parties.
- Invite the WHO CISID to include infections by Norovirus in the current database, and encourages Parties to include these infections amongst the notifiable diseases as soon as possible.

- Encourage the use of the CISID data capture system and the EU/ECDC data reporting system (for the relevant countries) for diseases identified as being of particular importance under the Protocol.
- Request WHO and ECDC to liaise in order to avoid duplication of reporting efforts by countries.
- Advocate the formulation of guidance document on basic requirements for the surveillance of waterborne diseases by experts from the Parties selected on the basis of technical expertise giving due regard to equitable geographical distribution. Such guidance document to be complemented with the outcome of expert group meetings on selected topics.
- Stress the need for accurate and efficient outbreak detection and reporting
- Decide the creation of a work plan element on the development and implementation of an integrated strategy for surveillance of waterborne diseases, taking into account the work of the ECDC and WHO Regional Office for Europe, aimed at the progressive harmonization of national waterborne surveillance systems.
- Decide the creation of a work plan element on mutual assistance for the assessment and strengthening of national disease surveillance programmes.