



ENHIS
EUROPEAN ENVIRONMENT AND
HEALTH INFORMATION SYSTEM

OUTBREAKS OF WATERBORNE DISEASES

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Number of outbreaks of waterborne diseases attributable to drinking-water and bathing water each year

This summary is based on data describing outbreaks of waterborne diseases related to drinking-water and bathing water. An outbreak of waterborne disease is generally defined as a situation in which at least two people experience a similar illness after exposure to water and the evidence suggests a probable water source. The document also contains information on the environment and health context and on the policy relevance and context, as well as an assessment of the situation in the WHO European Region and suggestions for further monitoring.

KEY MESSAGE

⊕ The indicator shows that, between 2000 and 2007 in 14 European countries, there were 354 outbreaks of waterborne diseases related to drinking-water, resulting in over 47 617 episodes of illness. The data must be interpreted cautiously, as differences between countries are likely to reflect the efficiency of surveillance systems rather than differences in outbreaks, and data were available for only 14 countries. This underlines the need for more widespread and effective surveillance systems. Also, as the provision of adequate water and sanitation is associated with outbreaks of disease, the successful efforts to improve coverage in recent years must be continued.

RATIONALE

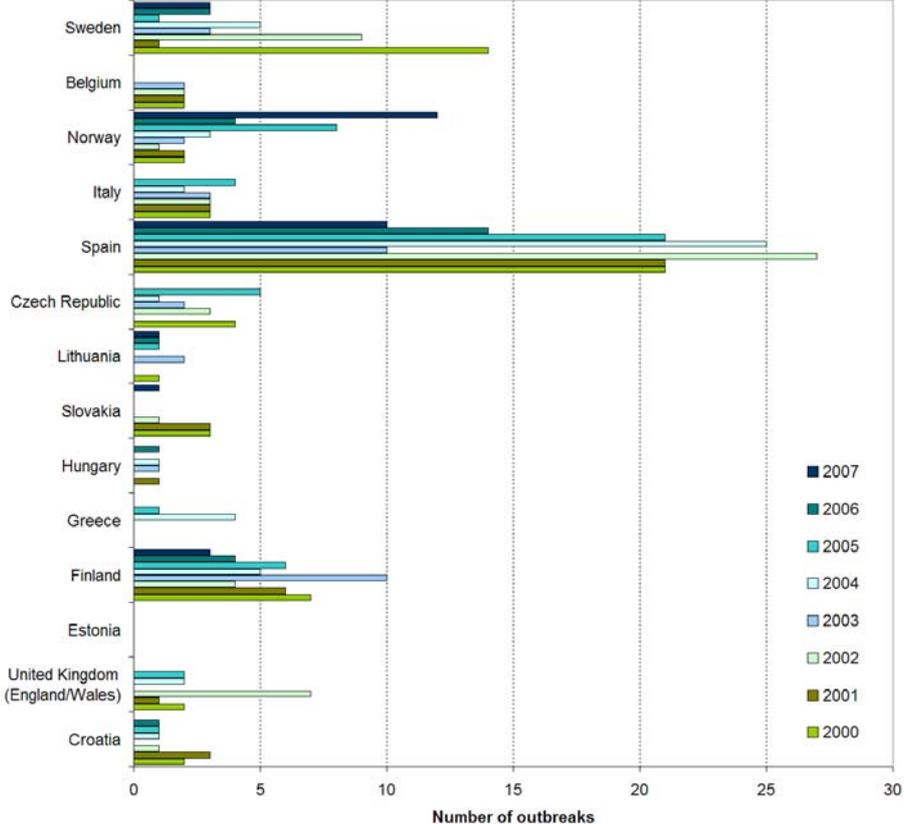
Safe drinking-water and bathing water are vital for the health of the population, particularly children. The number of outbreaks of waterborne diseases provides an indication of the quality of the drinking-water or bathing water.

PRESENTATION OF DATA

Fig. 1 shows the number of outbreaks of disease arising from drinking-water reported in Belgium, Croatia, the Czech Republic, Estonia, Finland, Greece, Hungary, Italy, Lithuania, Norway, Slovakia, Spain, Sweden and the United Kingdom (England and Wales) from 2000 to 2007. Outbreaks were seen in all reporting countries except Estonia.

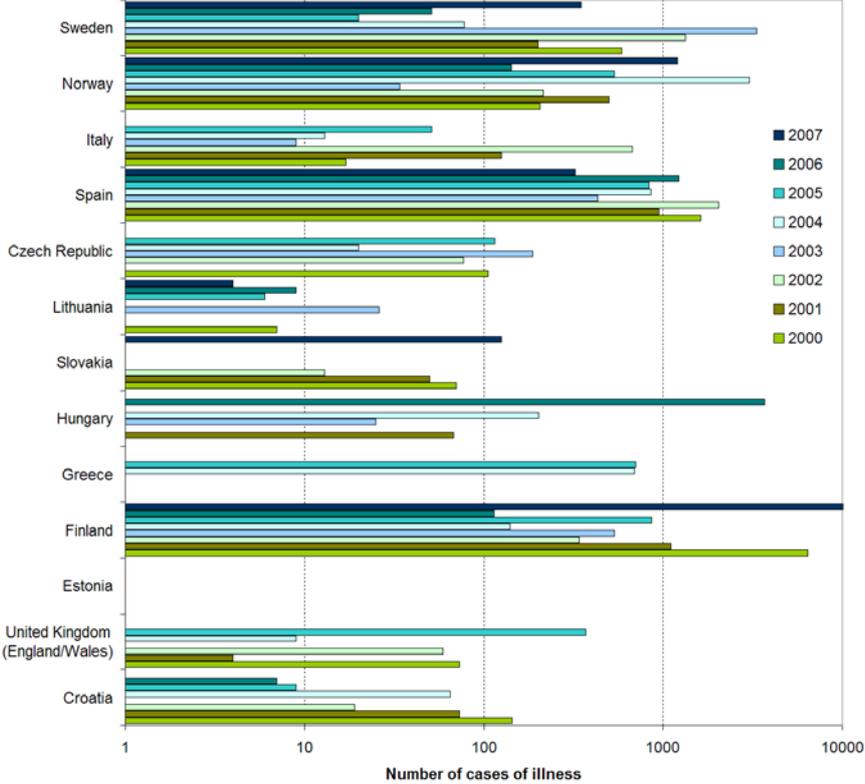
Fig. 2 shows the number of episodes of illness attributable to outbreaks of disease carried in drinking-water reported in the same countries over the same period. The data reflect cases in whole populations, as child-specific data are not available.

Fig. 1. Number of reported outbreaks of diseases arising from drinking-water in selected European countries, 2000–2007



Source: Surveys of various national agencies (see below under Data underlying the indicator).

Fig. 2. Number of reported episodes of illness attributable to diseases carried in drinking-water in selected countries, 2000–2007



Notes: Child-specific data are not available. The number of cases is shown on a log scale.
Source: Surveys of various national agencies (see below under Data underlying the indicator).

HEALTH AND ENVIRONMENT CONTEXT

Waterborne diseases arise from the contamination of water, either by pathogenic viruses, bacteria or protozoa or by chemical substances. These agents are directly transmitted to people when the water is used for drinking, preparing food, recreation or other domestic purposes. An outbreak of waterborne disease is usually defined as an event meeting two criteria: (a) at least two people have experienced similar illness after exposure to water; and (b) epidemiological evidence implicates water as the probable source of the illness. The occurrence of outbreaks of waterborne diseases is not limited to developing countries; affluent countries are also affected (1–5).

Drinking-water

The risk of outbreaks of waterborne diseases increases where standards of water, sanitation and personal hygiene are low. Worldwide, the proportion of people with access to safe drinking-water and basic sanitation rose from 78% in 1990 to 83% in 2004. Despite this progress, however, an estimated 425 million children under 18 years of age still have no access to an improved water supply. In 2004, it was estimated that diarrhoea due to unsafe water and a lack of basic sanitation contributes to the death of 1.5 million children aged less than five years each year (6). In the European Region, the annual burden of diarrhoeal disease attributable to poor water quality, sanitation and hygiene in children aged 0–14 years is estimated at 13 548 deaths (5.3% of all deaths) and 31.5 disability-adjusted life years (DALYs) per 10 000 children (7).

Contaminated drinking-water is a frequent cause of diseases such as cholera, typhoid, viral hepatitis A and dysentery. Water may be contaminated with naturally occurring inorganic elements such as arsenic, radon or fluoride. Human activity may also cause water to become contaminated with substances such as lead, nitrates and pesticides (8).

Bathing water

In addition to the potential risks posed by poor-quality drinking water, contaminated bathing water can cause serious and potentially fatal diseases. These include severe diseases such as typhoid and leptospirosis, as well as a number of minor infections. Health risks are highest among people with impaired immune systems or among specific risk groups, such as tourists who do not have immunity against locally endemic diseases (9). At present, the general quality of bathing water in Europe, as measured by the presence of faecal indicators and pathogens in bathing waters (10,11), poses limited health risks. The quality has improved since the 1990s: in 2007, 95% of the monitored coastal bathing waters and 89% of inland bathing waters complied with the mandatory standards. Nevertheless, a high level of compliance with mandatory standards (such as the occurrence of indicator bacteria) does not necessarily mean there are no factors that could potentially affect public health (12–14).

POLICY RELEVANCE AND CONTEXT

The Protocol on Water and Health drawn up by WHO and the United Nations Economic Commission for Europe (UNECE) (15) includes legally binding targets covering the prevention of waterborne diseases. In addition to general targets concerning access to safe drinking-water and the provision of sanitation, common requirements for surveillance systems and contingency plans for detecting and preventing waterborne outbreaks are specified.

WHO has developed the concept of water safety planning. This is a new approach to ensure safe drinking-water through enhanced risk assessment and management systems for the production and distribution of drinking-water. The three major components are system assessment, monitoring, and management and communication (8,16). Water safety planning is at an early stage in Europe.

In 2004, the Fourth Ministerial Conference on Environment and Health adopted the Children's Health and Environment Action Plan for Europe (CEHAPE), which includes four regional priority goals (RPG) to reduce the burden of environment-related diseases in children. RPG I aims at preventing and significantly reducing morbidity and mortality arising from gastrointestinal disorders and other health effects, by ensuring that adequate measures are taken to improve access by all children to safe and affordable water and adequate sanitation (17).

In the European Union (EU), the drinking-water directive (98/83/EC) presents parametric and indicator values for water intended for human consumption and specifies how the quality should be controlled to obtain safe drinking-water (18). The directive requires that all possible action should be taken in cases of contamination to prevent any negative effect on health.

The European water framework directive (19) represents a single system for all water management, replacing seven earlier directives. The main goal is to achieve a good status for all waters by 2015 in

Europe. The key objectives are the general protection of aquatic ecology, the specific protection of unique and valuable habitats, the protection of drinking-water resources and the protection of bathing water.

Bathing water

Council Directive 76/160/EEC on the quality of bathing waters included mandatory and guideline values for bathing water quality and instructions for reporting the results to the EU (20). According to the Directive, a reduction in the pollution of bathing waters is necessary to protect both the environment and public health. A new bathing water directive (2006/7/EC) entered into force in March 2006, containing instructions on improving the management of bathing sites by, for example, using bathing water profiling, emergency planning and better information for the public (21).

ASSESSMENT

This indicator assesses the number of reported outbreaks of waterborne diseases in a country. The data must be interpreted cautiously: the reported numbers may underestimate the real situation, and variations between countries are partially due to differences in surveillance systems. The chain of events leading to the detection of outbreaks is complex: an affected person must have symptoms and seek medical care, the surveillance agency must be notified, the number of cases must be noted as unusually high for a given time and place, and an effective outbreak investigation must be carried out. Owing to such complexity, the effectiveness of surveillance systems varies greatly. Paradoxically, for example, a high number of outbreaks may be reported in countries with high-quality drinking-water and an efficient surveillance system.

Drinking-water

The comparative assessment in this indicator was made using data on outbreaks of disease caused by drinking-water gathered from a questionnaire (see under Data source below) completed by Belgium, the Czech Republic, Croatia, Estonia, Finland, Greece, Hungary, Italy, Lithuania, Norway, Slovakia, Spain, Sweden and the United Kingdom (England and Wales). All the participating countries had a routine surveillance system for waterborne outbreaks, based on a legal framework. Child-specific data were mainly not available. In the 14 participating countries, there were 354 outbreaks during 2000–2007, resulting in 47 617 episodes of illness (Fig. 1 and 2). The most common causative agents were bacterial (*Campylobacter* and *Aeromonas* spp. and *Shigella sonnei*) and were responsible for 163 (44.9%) of the outbreaks and 33.3% of cases of illness. Viral agents were implicated in 136 outbreaks (37.5%) and 49.4% of cases of illness, while protozoa caused 17 of the outbreaks (4.7%) and 9.9% of cases of illness. Ten cases were caused by chemical contamination (0.2%), while in 37 cases (7.1%) an unknown microbial agent was implicated. The data present no evidence of trends either between or within countries.

Bathing water

For bathing water, the indicator showed that associated outbreaks were infrequent: 4–14 annual outbreaks among the 9 countries that have a monitoring system for bathing water outbreaks. The total number of bathing water outbreaks was 70 and resulted in 3132 cases of illness. Owing to the scarcity of data and difficulties in verifying the results, only summary information is presented in the fact sheet. The most common causative agents for bathing water outbreaks were protozoa, with 38 outbreaks (54.3%) and 59.3% of cases of illness. Viruses caused 12 outbreaks (17.1%) and 27.8% of cases of illness. Bacteria caused 11 outbreaks (15.7%) and 4.3% of cases of illness. Likewise, the chemical contamination caused 9 outbreaks (8.6% of cases of illness). Overall, the number of outbreaks and cases of illness were low compared with drinking-water outbreaks. This may be partly due to the known improvements in EU bathing water quality, as well as to the relative lack of routine surveillance systems for bathing water outbreaks.

While the numbers of reported outbreaks varied greatly among countries, they may not reflect the true situation (for reasons outlined above). It must also be noted that this indicator is only available for a few countries and provides a limited picture of the situation in the Region.

In general, there is a need for widespread and effective monitoring and reporting systems for outbreaks of waterborne diseases, in order to give a better idea of the true magnitude of such outbreaks and their effect on health in the Region.

DATA UNDERLYING THE INDICATOR

Data source

The data are based on a questionnaire concerning outbreaks of waterborne diseases in Europe and surveillance systems for such outbreaks.¹ The questionnaire covered items such as the legal framework for outbreak monitoring, the number of outbreaks and cases of illness, age groups and causative agents. It was completed by the following organizations: Scientific Institute of Public Health, Belgium; National Institute of Public Health, Croatia; National Institute of Public Health, Czech Republic; Health Protection Inspectorate, Estonia; Institute of Health and Welfare (previously National Public Health Institute), Finland; National School of Public Health, Greece; National Centre for Epidemiology and National Institute of Environmental Health, Hungary; Public Health Institute, Italy; State Environmental Health Centre, Lithuania; ISS Norwegian Institute of Public Health, Norway; Public Health Authority, Slovakia; Ministry of Health/National Network of Epidemiological Surveillance, Spain; Swedish Institute for Infectious Disease Control, Sweden; and Health Protection Agency, United Kingdom.

Description of data

Data were obtained mainly from national surveys. In most countries, the information concerning outbreaks of waterborne diseases is included in the general infectious diseases monitoring system. Finland applies a separate monitoring system for outbreaks of diseases attributable to drinking-water. Croatia, the Czech Republic, Estonia, Finland, Hungary, Italy, Slovakia, Spain, Sweden and the United Kingdom (England and Wales) have monitoring and reporting systems for bathing water outbreaks. Only Lithuania claimed to be able to produce statistics on cases of illness among young people under 18 years of age.

Geographical coverage

Belgium, Croatia, the Czech Republic, Estonia, Finland, Greece, Hungary, Italy, Lithuania, Norway, Slovakia, Spain, Sweden and the United Kingdom (England and Wales).

Period of coverage

The data cover the whole period, 2000–2007, in all the countries except Estonia (2000–2005), the Czech Republic (2000–2005), Italy (2000–2005), Greece (2004–2005) and the United Kingdom (England/Wales) (2000–2005).

Frequency of update

All the countries confirmed that routine reporting/monitoring systems were used. It must therefore be assumed that all the countries have continuous monitoring systems that include a periodic/annual national reporting system for such outbreaks.

Data quality

Reporting systems vary. Croatia, Finland, Greece, Lithuania, Norway and Sweden use a compulsory reporting system for outbreaks of waterborne disease. Other countries use national surveys that may include information collected using both compulsory and voluntary reporting systems.

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¹ The questionnaire is available on request at info@ecchbonn.euro.who.int.

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Author: Ilkka Miettinen, Institute of Health and Welfare, Kuopio, Finland.