Guidelines for Safe Recreational Water Environments
Volume 2: Swimming Pools and Similar Environments

Qs and As

Q: What is the purpose of the Guidelines?
A: The primary aim of the Guidelines is the protection of public health. The use of swimming pools and similar recreational water environments — and the resulting social interaction, relaxation and exercise — is associated with benefits to health and well-being. The purpose of the Guidelines is to ensure that swimming pools and similar facilities are operated as safely as possible in order that the largest possible population gets the maximum possible benefit — not to deter the use of these recreational water environments.

Q: What do the Guidelines cover?
A: The Guidelines provide an authoritative referenced review and assessment of the health hazards associated with swimming pools and similar recreational water environments, including hazards leading to drowning and injury, water quality, contamination of associated facilities and air quality; their monitoring and assessment; and activities available for their control, through education of users, good design and construction, and good operation and management. The Guidelines include both specific values and good practices.

Q: What sorts of facilities are covered by these Guidelines?
A: The information provided in the Guidelines is intended to be generally applicable to public, semi-public (as encountered in clubs, hotels and schools, for example) and domestic (private) facilities. These facilities include pools supplied with fresh, marine or thermal water, whether they are indoors or outdoors, as well as hot tubs (which, for the purposes of these Guidelines, is the term used to encompass a variety of facilities that are designed for sitting in, contain treated water usually above 32 °C, are often aerated and are not drained, cleaned and refilled for each user) and natural spas (facilities using thermal and/or mineral water). Although medical facilities (such as hydrotherapy pools) and bathing houses, such as hammams, are not specifically covered, the approaches outlined in these Guidelines should also be generally applicable to these environments.
Q: How do these Guidelines fit within the framework of WHO’s other water-related guidelines?

A: WHO has been concerned with health aspects of the management of water resources for many years and publishes various documents concerning the safety of the water environment and its importance for health. These include a number of normative “guidelines” documents, such as the Guidelines for Safe Recreational Water Environments, the Guidelines for Drinking-water Quality and the Guidelines for the Safe Use of Wastewater, Excreta and Greywater. Documents of this type are intended to provide a basis for standard setting. They represent a consensus view among experts on the risk to health represented by various media and activities and on the effectiveness of control measures in protecting health. They are based on critical review of the available evidence. Wherever possible and appropriate, such guideline documents also describe the principal characteristics of the monitoring and assessment of the safety of the medium under consideration as well as the principal factors affecting decisions to be made in developing strategies for the control of the health hazards concerned.

This volume of the Guidelines complements Volume 1 of the same series, which focuses on the safe recreational use of coastal and fresh waters.

Q: What are the health implications of the Guidelines?

A: Every year, an increasing number of recreational bathers around the world fall ill from improperly cleaned and maintained facilities or suffer often-horrific spinal injuries or death from improperly used recreational bathing facilities. While no comprehensive worldwide statistics exist, an abundance of case evidence points to a rise in the number of incidents and number of people affected.

An estimated 382,000 people die annually worldwide from all types of drowning, including in lakes, rivers and pools. Over 3,000 people can suffer the consequences of a single swimming pool being infected with a microbial pathogen. Yet the scale and the size of disease, injury and death caused by improperly used or maintained recreational bathing areas and facilities remain underestimated and underappreciated.

It is hoped that implementation of these Guidelines will significantly reduce the number of recreational users of swimming pools and similar environments who suffer from injuries or illnesses associated with these facilities.
Q: What are the biggest problems associated with improperly used or maintained swimming pools or similar recreational facilities?

A: The most important problems associated with improperly used or maintained swimming pools, spas and similar recreational facilities are drowning and other physical injuries and microbial contamination of water and air. Chemical contamination of water and air is only a minor contributor to adverse effects associated with these facilities.

1) Drowning and physical injuries — Drowning is a major cause of death, and it has been estimated that, in 2002, 382 000 people drowned worldwide, with 97% of drownings occurring in low- and middle-income countries. Drowning is the third leading cause of death in children aged 1–5 and the leading cause of mortality due to injury, with the mortality rates in male children being almost twice as high as those in female children. Not all drownings are related to recreational water use, and the percentage that is attributable to swimming pools and similar environments is likely to vary from country to country.

Most data on drowning are from developed countries. In the American state of New York, almost 60% of drownings in children aged 0–4 years occurred in swimming pools or hot tubs. For the whole of the USA in 2001, 18% of fatal drownings occurred in swimming pools. In the United Kingdom, 11% of drowning deaths of children aged 0–4 occurred in pools in 1998–1999.

Near-drowning is also a serious problem, with some survivors suffering subsequent anoxic encephalopathy leading to long-term neurological deficits.

Serious injuries, such as spinal injuries, as well as slip, trip and fall injuries are common as a result of the improper use of recreational facilities. Studies in Australia, France, Poland, South Africa, the United Kingdom and the United States found that diving-related injuries were responsible for anywhere between 2.3% and 21% of traumatic spinal cord injuries.

2) Microbial contamination — The risk of illness or infection associated with swimming pools and similar recreational water environments is primarily associated with faecal contamination of the water, usually due to faeces released by the bathers or contaminated source water. Many of the outbreaks related to pools and similar environments have occurred because disinfection was not applied or was inadequate. Non-faecal human shedding into the pool water or surrounding area is also a potential source of pathogenic organisms.

Some of the major infectious risks for users of substandard recreational waters include gastroenteritis outbreaks associated with the presence of, for example, Cryptosporidium or E. coli and non-gastroenteritis outbreaks associated with the presence of, for example, Legionella spp. in pools, spas and whirlpools.

Pool-related illness due to Cryptosporidium has been clearly associated with mismanagement of children’s use of pools, and single outbreaks can be large. A recent
outbreak in the United States, for example, is reported to have affected at least 1,800 people and caused the closure of an entire amusement park.

Outbreaks of legionellosis are normally much smaller, but can often be more dangerous. Several studies have isolated *Legionella* spp. from spa waters; in a study in Portugal, for example, 288 *Legionella* isolates from 14 sites were identified. France, Japan and Spain have also reported the presence of *Legionella* spp. bacteria in natural spas. The large number of positive samples indicates a potential risk to users of thermal waters, especially those people who are undergoing inhalation treatment with thermal water or those using hot tubs or natural spas or taking a shower. There are also numerous recorded cases of people having contracted Legionnaires’ disease after having simply passed close to hot tubs.

3) **Chemical contamination** — Chemicals found in swimming pool water can be derived from a number of sources, namely the source water, deliberate additions such as disinfectants and pool users themselves (these include sweat, urine, soap residues, cosmetics and suntan oil). The risks associated with such exposures are minor in comparison with those associated with drowning and microbial contamination.

**Q:** Why are these guidelines as opposed to regulations?

**A:** WHO has no power to force governments or other regulatory authorities to adopt its Guidelines. WHO works through the weight of scientific evidence and advice. In this case, the Guidelines are the result of a 10-year process that involved the participation of numerous institutions and more than 60 experts from 20 countries worldwide. As such, they represent what we believe is the compilation/consolidation of the best evidence and practice available throughout the world.

The Guidelines are intended to be used as the basis for the development of approaches to controlling the hazards that may be encountered in recreational water environments. The preferred approaches adopted by national or local authorities towards implementation of guideline values and conditions may vary between these types of environment. The idea is that the application of the Guidelines in different countries should take account of the social, cultural, environmental and economic circumstances of the country — and thereby the best way to protect and improve health. Therefore, WHO’s role is one of delineating best practice and leaving implementation decisions up to national authorities and other regulators.

**Q:** How are the Guidelines intended to be used?

**A:** The Guidelines are intended for a variety of different stakeholders with interests in ensuring the safety of pools and similar recreational water environments: national and local authorities; facility owners, operators and designers (public, semi-public and
domestic facilities); special interest groups; public health professionals; scientists and researchers; and facility users.

The Guidelines include specific values for contaminants and outline a set of recommended best practices to support safe recreational waters, pools and spas. The Guidelines are intended to be used as the basis for the development of approaches to controlling the hazards that may be encountered in swimming pools and similar recreational water environments, as well as providing a framework for policy-making and local decision-taking. The Guidelines may also be used as reference material for industries and operators preparing to develop facilities containing swimming pools and similar environments, as well as a checklist for understanding and assessing the potential health impacts of projects involving the development of such facilities.

Because hazards may give rise to health effects after short- as well as long-term exposures, it is important that standards, monitoring and implementation enable preventive and remedial actions within real timeframes. For this reason, emphasis in the Guidelines is placed upon identifying circumstances and procedures that are likely to lead to a continuously safe environment for recreation. This approach emphasizes monitoring of both conditions and practices and the use of threshold values for key indicators assessed through programmes of monitoring and assessment.

Concerned bodies — including national and local agencies, facility owners and operators, and nongovernmental organizations — have diverse management interventions. These range from proper facility planning to good operation and management practices, provision of appropriate levels of supervision (i.e. lifeguards), general educational activities to enhance awareness of health hazards and inform users on ways to avoid and respond to the hazards, and compliance with applicable regulatory requirements.

Q: What are the characteristics of a safe swimming pool or similar recreational water facility?

A: Several features are important in determining the safety of a swimming pool or similar recreational environment. These include, but are not limited to, the following:

- Clean water (e.g. disinfected to reduce exposure to pathogenic microorganisms)
- Clear water (e.g. filtered to ensure low turbidity and high visibility)
- Clean facilities (e.g. regular cleaning and disinfection of spas, decks, floors, etc.)
- Well ventilated facilities (i.e. to ensure good air quality)
- Clean bathers (e.g. pre-swim hygiene)
- Well managed monitoring, treatment and disinfection of water
- Effective supervision (e.g. lifeguards, parental supervision)
- Bather education (e.g. signage regarding appropriate hygienic behaviour and areas where diving is allowed)
- Good pool/facility design (e.g. non-slip surfaces to prevent slip, trip and fall injuries; easy access to toilets and showers)
• Good accident response capability (e.g. a well planned emergency response to an accidental faecal release)

Q: Will most countries follow the recommendations?

A: As these are the first Guidelines published by WHO on safe recreational water quality, it is impossible to answer this question from an evidence base. However, it is hoped that most countries will use them in some way or another, either directly or indirectly, in setting national standards.