
Drinking Water and Health – Water Safety Plans

Professor John Fawell

Member of the WHO Guidelines Expert Committee

Not all Drinking Water Supplies are the Same



safe



WHO Framework for Safe Water

- Introduced in third edition of the Guidelines 2004 in the context of overall health priorities.
- Holistic approach to assessing and managing the risks to a drinking water supply to assure safety.
- Water Safety Plans are central in demonstrating that the system is capable of supplying safe drinking water.
- A change from reliance on end of pipe retrospective monitoring to proactive prevention and management of hazards that constitute a risk to health through drinking water. Prevention starts in the catchment.

Health and Water Safety Plans

- Providing a safe drinking water supply **consistently** is the primary objective of Water Safety Plans and so health is at the very heart.
- Risks measured against health-based targets, which are effectively the drinking water standards.
- WSPs are flexible and apply to all kinds of supply from large municipal supplies to small private supplies.
- There are significant additional benefits for the operation of drinking water supplies.



Microbial Pathogens

- Microbial pathogens remain the greatest threat to health. A single exposure to sufficient organisms in a susceptible individual is enough to result in disease.
- We do not have suitable ways of measuring pathogens so we use an indicator of faecal contamination.
- We take a very small sample in relation to the total supply but pathogen numbers can vary significantly in time and are not evenly dispersed. It is easy to miss.
- WSPs introduce the concept of putting the appropriate barriers in place and monitoring their operation.



What is the future for Pathogens

- We are understanding more about pathogens that are opportunist, they don't need to be in a suitable host all of the time.
- Antibiotic resistance means that treatment of infection will become more difficult.
- It is difficult to measure the contribution of drinking water to the background level of gastrointestinal infections.
- Global warming and increased movement of people brings the prospect of threats moving to unexpected places.

Chemicals

- Actually very few chemicals are known to cause health effects at the concentrations encountered in drinking water.
- However, others are known to be toxic in mammals at relatively high doses and we wish to minimise exposure, commensurate with affordability and practicality.
- Chemicals are only likely to result in adverse effects after relatively long-term, often very long-term exposure, to significant concentrations. Average exposure over time is more important, apart from unusual incidents.



Chemicals and WSPs

- Identify the chemical contaminants, assess the risks to health (really risks of exceeding standards or health-based values, usually with significant safety margin).
- Management steps to minimise exposure start with pollution prevention in the catchment and then management by treatment or blending water sources.
- Chemicals from materials prevented by a suitable approval system for materials and chemicals to be used in contact with drinking water.



Chemical Monitoring

- Potentially very expensive in relation to the benefits.
- WHO recommend standards are set for the most important chemicals and not a long list of substances that may or may not be present at significant concentrations.
- Monitoring should also be tailored to concentrate on the most important in a supply. Hence the recommendation for risk-based monitoring and better use of resources.
- Hazard and risk assessment in WSPs allow this to be soundly based. (Drinking Water Directive Annex II)

Emerging Contaminants

- Range of substances at trace levels, including pharmaceuticals and personal care products. Many present for a long time and probably reduced with improved water treatment. Public (media) perception.
- They come from us. Primary source is treated wastewater.
- WHO has assessed the risks to health and concluded that these are generally very low. That means that we have time to take appropriate action.
- WSPs indicate better wastewater treatment - but a very long-term approach.

Where does this take us?

- Safe drinking water is a vital resource and Water Safety Plans provide a more holistic way of thinking about how to provide safe drinking water consistently.
- The most important threat to health still comes from pathogens and we forget this at our peril.
- A few chemicals are also important but these are generally easily managed in large supplies - if there is a will. Small supplies can be more problematical.
- WSPs do provide a way to improve the safety of small supplies of which there are many in Europe.

