A WELL FACTSHEET

Chlorination: a contribution to reducing diarrhoeal diseases

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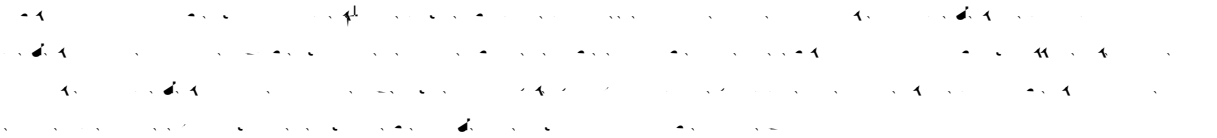

Amongst other things the factsheet mentions the following issues that are considered to be of current relevance:

- Health risks from disinfection using chlorine
- Chlorine-resistant micro-organisms
- Local production of sodium hypochlorite solutions from electrolysis of salt
- Ensuring that disinfection is effective
- Using chlorine products for household-level treatment

The basics

What is chlorine? – Chlorine is a poisonous gas which, when pressurised is in the form a liquid. It is available in a safer form when combined with other chemicals in liquids (e.g. bleach) or solids (powders and tablets).

Why chlorinate? – Chlorination is used primarily to kill or inactivate disease-causing organisms (pathogens) in drinking water. This removes one of the major routes for transmission of diarrhoeal diseases. Sometimes chlorination may also be used to oxidise certain unwanted chemicals.

How? – Chlorine, often in the form of a chemical compound (usually in solution), needs to be well

works) or, on a simple scale, at household level.

When? – The treatment system needs to be sustainable so that water is never supplied untreated. Sufficient ‘contact time’ (typically 30 minutes) needs to be allowed after the chlorine is added for it to inactivate the pathogens before the water is consumed.

Some of the problems:

- The water to be treated needs to be relatively free from organic or chemical substances that will react with the chlorine (unless this loss is allowed for). The presence of these in surface water will vary with rainfall, complicating their removal.
- Some pathogens found in surface water are resistant to normal doses of chlorine but they are likely to be removed if appropriate treatment (e.g. fine filtration) is provided prior to chlorination.
- Chlorination needs a ready supply of a suitable source of chlorine and the consumables used for testing the treated water.
- A trained person is needed to determine the right dose to add. They need suitable equipment to regularly measure the amount of active chlorine remaining after treatment. They must also have, and be able to maintain, suitable dosing equipment. Such equipment is complicated if it has to deal with variation in the flow rate of the water that is being treated.

Disinfection of water by chlorination appreciably reduces incidence of diarrhoea

Disinfection of water by chlorination appreciably reduces incidence of diarrhoea, a leading cause of illness and death in children less than 5 years old in the developing world. Chlorination and safe water storage can make a significant contribution to reducing diarrhoeal diseases. For example:

A systematic review of the effect of Evaluations of use of point-of-use chlorination and other water disinfection methods in developing countries has shown their effectiveness in reducing the risk of diarrhoeal diseases by between 11 and 47 percent. (Fewtrell et al. 2005)

One of the interventions to reduce HIV transmission from mother to child is the replacement of breast milk with infant formula milk. It is obviously important that safe water is used to prepare such formula or the child will be at great risk of numerous episodes of diarrhoeal diseases potentially leading to death. (

of developing countries, it is often not possible to include these necessary treatment stages and so some risk from these pathogens will remain if they are present in the raw water. However, these organisms are unlikely to be present in groundwater if the collection point is properly protected and the water is hygienically handled.

Risks from contamination after treatment

Determining the chlorine dose

Many books offer advice on the procedures for determining the required chlorine dose (see Skinner

References

CDC (2000) Centers for Disease Control and Prevention (CDC), United States Department of Health & Human Services, USA. Also available electronically via http://www.cdc.gov/safewater/default.htm

Fewtrell L, Kay D, Enanoria W, Haller L, Kaufmann RB, Colford JM (2005) . Lancet Infectious Diseases 5(1):42-52.

Parr J, Smith M and Shaw R (1999) , Technical Brief 46, in Rod Shaw (editor) Running Water – More technical briefs on health water and sanitation. ITDG O Hlishing:(tigby)6 -28xi wtrei wM2r and sanit m.S4D 0slchnical Brie.uTc -0.03 T.p>(echnic)4.b]TJ[46, insou(46,

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