Title: ***Giardia* in water supplies**	
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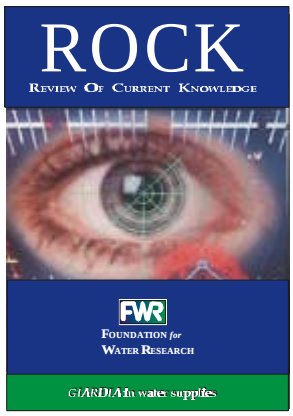
This report is the sixth in a series of FWR Reviews of Current Knowledge (ROCKs**)**. Each review focuses on a topical issue in the water environment area and provides concise, readable, scientific and technical information on the subject. They are intended to facilitate a wider understanding of the issues involved and to promote informed opinion about them.

This ROCK addresses *Giardia* in water supplies. It complements another ROCK entitled *Cryptosporidium* in water supplies. Like *Cryptosporidium*, *Giardia* is a parasite that can be waterborne and is found widely distributed around the world including Europe. When ingested it can cause an unpleasant illness referred to as giardiasis. Infections are transmitted by tiny pore- or egg-like cells called cysts which are oval in shape with a length of 9-12 ìm (a ìm is a micrometre, one millionth of a metre).



The symptoms of giardiasis are acute diarrhoea, abdominal cramps, bloating and excessive flatulence. The severity of the illness can vary considerably and only about a quarter of infected people show symptoms of the illness. Malabsorption of food can lead to considerable loss of weight and in children it can be a cause of failure to thrive. The incubation period can be anything from 1 to 75 days, but on average is 7-10 days. Treatment with drugs can be effective, but if untreated the illness may persist for 3-4 years.

Giardia is found in man, dogs, cats, pigs, sheep, beavers and many other domestic and wild mammals and also in birds. Cysts are passed in the faeces of infected animals, including humans, and are found in cattle slurry, untreated sewage and treated sewage. They are widely found in lakes and rivers especially where there is wildlife which uses these water sources.

Giardiasis is routinely observed in the population. *Giardia* is frequently waterborne in natural waters and infections have occurred from drinking contaminated water. However, there are many other possible ways of becoming infected with *Giardia* such as person-person contacts, animal-person contacts, contaminated food and contaminated swimming pools and other recreational waters (rivers and lakes), or foreign travel - giardiasis is also known as "travellers' diarrhoea".

Cysts are particulate and are fairly readily removed by the conventional processes used in drinking water treatment plants such as coagulation, settlement, rapid filtration and slow sand filtration. A well operated treatment plant based on chemical coagulation, sedimentation and filtration should achieve at least 99.9% removal of cysts. The effectiveness of standard chemical disinfectants such as chlorine and chloramine against *Giardia* cysts is limited. However, they do

present a further barrier to the entry of viable cysts into the supply system. There are strong indications that both ozone and UV light may be effective and work is currently in progress to identify the conditions in which UV radiation may be used with confidence.

In the UK there are regulations to control the risk of pathogens getting into the drinking water supply. The total numbers of infections of giardiasis in the UK are small. In the year 2000 the total number of reported cases of giardiasis in England & Wales was 3892 out of total population of 52.94 million of whom 51.2 million are connected to the public water supply. However, there is no evidence that any of these cases were caused by drinking the public water supply. Furthermore, it seems likely that a number of these cases were contracted by people travelling overseas. Data for Scotland and Northern Ireland suggest that the situation there is little different from England & Wales.

The review has a bibliography and a list of 40 individual references. The total length is 25 pages (A5 size).

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