

**Table 7.1 Waterborne pathogens and their significance in water supplies<sup>a</sup>**

<b>Pathogen</b>	<b>Health significance<sup>b</sup></b>	<b>Persistence in water supplies<sup>c</sup></b>	<b>Resistance to chlorine<sup>d</sup></b>	<b>Relative infectivity<sup>e</sup></b>	<b>Important animal source</b>
<b>Bacteria</b>					
<i>Burkholderia pseudomallei</i>	High	May multiply	Low	Low	No
<i>Campylobacter jejuni, C. coli</i>	High	Moderate	Low	Moderate	Yes
<i>Escherichia coli</i> – Pathogenic <sup>f</sup>	High	Moderate	Low	Low	Yes
<i>E. coli</i> – Enterohaemorrhagic	High	Moderate	Low	High	Yes
<i>Legionella</i> spp.	High	May multiply	Low	Moderate	No
Non-tuberculous mycobacteria	Low	May multiply	High	Low	No
<i>Pseudomonas aeruginosa</i> <sup>g</sup>	Moderate	May multiply	Moderate	Low	No
<i>Salmonella typhi</i>	High	Moderate	Low	Low	No
Other salmonellae	High	May multiply	Low	Low	Yes
<i>Shigella</i> spp.	High	Short	Low	High	No
<i>Vibrio cholerae</i>	High	Short to long <sup>h</sup>	Low	Low	No
<i>Yersinia enterocolitica</i>	High	Long	Low	Low	Yes
<b>Viruses</b>					
Adenoviruses	High	Long	Moderate	High	No
Enteroviruses	High	Long	Moderate	High	No
Astroviruses	High	Long	Moderate	High	No
Hepatitis A viruses	High	Long	Moderate	High	No
Hepatitis E viruses	High	Long	Moderate	High	Potentially
Noroviruses	High	Long	Moderate	High	Potentially
Sapoviruses	High	Long	Moderate	High	Potentially
Rotavirus	High	Long	Moderate	High	No
<b>Protozoa</b>					
<i>Acanthamoeba</i> spp.	High	May multiply	Low	High	No
<i>Cryptosporidium parvum</i>	High	Long	High	High	Yes
<i>Cyclospora cayetanensis</i>	High	Long	High	High	No
<i>Entamoeba histolytica</i>	High	Moderate	High	High	No
<i>Giardia intestinalis</i>	High	Moderate	High	High	Yes
<i>Naegleria fowleri</i>	High	May multiply <sup>i</sup>	Low	Moderate	No
<i>Toxoplasma gondii</i>	High	Long	High	High	Yes
<b>Helminths</b>					
<i>Dracunculus medinensis</i>	High	Moderate	Moderate	High	No
<i>Schistosoma</i> spp.	High	Short	Moderate	High	Yes

Note: Waterborne transmission of the pathogens listed has been confirmed by epidemiological studies and case histories. Part of the demonstration of pathogenicity involves reproducing the disease in suitable hosts. Experimental studies in which volunteers are exposed to known numbers of pathogens provide relative information. As most studies are done with healthy adult volunteers, such data are applicable to only a part of the exposed population, and extrapolation to more sensitive groups is an issue that remains to be studied in more detail.

<sup>a</sup> This table contains pathogens for which there is some evidence of health significance related to their occurrence in drinking-water supplies. For these and other pathogens, there is more information available, which is presented in chapter 11.

<sup>b</sup> Health significance relates to the severity of impact, including association with outbreaks.

<sup>c</sup> Detection period for infective stage in water at 20 °C: short, up to 1 week; moderate, 1 week to 1 month; long, over 1 month.

- <sup>d</sup> When the infective stage is freely suspended in water treated at conventional doses and contact times and pH between 7 and 8. Low means that 99% inactivation at 20 °C generally in <1 minute, moderate 1–30 minutes and high >30 minutes.
- <sup>e</sup> From experiments with human volunteers, from epidemiological evidence and animal studies. High means infective doses can be 1–10<sup>2</sup> organisms or particles, moderate 10<sup>2</sup>–10<sup>4</sup> and low >10<sup>4</sup>.
- <sup>f</sup> Includes enteropathogenic, enterotoxigenic and enteroinvasive.
- <sup>g</sup> Main route of infection is by skin contact, but can infect immunosuppressed or cancer patients orally.
- <sup>h</sup> *Vibrio cholerae* may persist for long periods in association with copepods and other aquatic organisms.
- <sup>i</sup> In warm water.

