

1 Environmental classification of water-related infections

5. *Water- and sanitation-related diseases* 659

Category	Infection	Pathogenic agent
4) WATER-RELATED INSECT VECTOR		
a) <i>Biting near water</i>	Sleeping sickness	Protozoon
b) <i>Breeding in water</i>	Filariasis	Helminth
	Malaria	Protozoon
	River blindness	Helminth
	Mosquito-borne viruses	
	– Yellow fever	Virus
	– Dengue	Virus
	– Others	Virus

2 Environmental classification of excreta-related infections

Category	Infection	Pathogenic agent	Dominant transmission mechanisms	Major control measures (engineering measures in italics)
1) FAECAL-ORAL (NON-BACTERIAL) Non-latent, low infectious dose	Poliomyelitis Hepatitis A Rotavirus diarrhoea Amoebic dysentery Giardiasis Balantidiasis Enterobiasis Hymenolepiasis	Virus Virus Virus Protozoon Protozoon Protozoon Helminth Helminth	Person to person contact Domestic contamination	<i>Domestic water supply</i> <i>Improved housing</i> <i>Provision of toilets</i> Health education
2) FAECAL-ORAL (BACTERIAL) Non-latent, medium or high infectious dose Moderately persistent and able to multiply	Diarrhoeas and dysenteries – <i>Campylobacter</i> enteritis – Cholera – <i>E. coli</i> diarrhoea – Salmonellosis – Shigellosis – Yersiniosis Enteric fevers – Typhoid – Paratyphoid	Bacterium Bacterium Bacterium Bacterium Bacterium Bacterium Bacterium	Person to person contact Domestic contamination Water contamination Crop contamination	<i>Domestic water supply</i> <i>Improved housing</i> <i>Provision of toilets</i> <i>Excreta treatment prior to re-use or discharge</i> Health education
3) SOIL-TRANSMITTED HELMINTHS Latent and persistent with no intermediate host	Ascariasis (roundworm) Trichuriasis (whipworm) Hookworm Strongyloidiasis	Helminth Helminth Helminth Helminth	Yard contamination Ground contamination in communal defecation area Crop contamination	<i>Provision of toilets with clean floors</i> <i>Excreta treatment prior to land application</i>
4) BEEF AND PORK TAPEWORMS Latent and persistent with cow or pig intermediate host	Taeniasis	Helminth	Yard contamination Field contamination Fodder contamination	<i>Provision of toilets</i> <i>Excreta treatment prior to land application</i> Cooking and meat inspection
5) WATER-BASED HELMINTHS Latent and persistent with aquatic intermediate host(s)	Schistosomiasis Clonorchiasis Dipyllobothriasis Fasciolopsiasis Paragonimiasis	Helminth Helminth Helminth Helminth Helminth	Water contamination	<i>Provision of toilets</i> <i>Excreta treatment prior to discharge</i> <i>Control of animals harbouring infection</i> Cooking
6) EXCRETA-RELATED INSECT VECTORS	Filariasis (transmitted by <i>Culex pipiens</i> mosquitoes) Infections in categories I – IV, especially I and II, which may be transmitted by flies and cockroaches	Helminth Miscellaneous	Insects breed in various faecally contaminated sites	<i>Identification and elimination of potential breeding sites</i> Use of mosquito netting

3 General checklist of water-related and excreta-related diseases

Disease	Common name	Pathogen	Transmission	Distribution	Water-related category*	Excreta-related category**
BACTERIAL DISEASES						
Bacterial enteritis	Diarrhoea, gastroenteritis	<i>Campylobacter jejuni</i> <i>Escherichia coli</i> <i>Salmonella</i> spp. <i>Yersinia enterocolitica</i>	Faecal-oral, man-man or animal-man	Worldwide, particularly serious and common among children	1	2
Shigellosis	Bacillary dysentery	<i>Shigella</i> spp.	Faecal-oral, man-man	Worldwide	1	2
Cholera	Cholera	<i>Vibrio cholerae</i>	Faecal-oral, man-man	Worldwide	1	2
Paratyphoid	Paratyphoid	<i>Salmonella paratyphi</i>	Faecal-oral, man-man	Worldwide	1	2
Typhoid or enteric fever	Typhoid	<i>Salmonella typhi</i>	Faecal-oral, man-man	Worldwide	1	2
SPIROCHAETAL DISEASES						
Leptospirosis	Weil's disease	<i>Leptospira</i> spp.	Excreted by animals (notably rodents) in urine and infects humans through skin, mouth, or eyes, animal-man	Worldwide	1	—
Louse-borne relapsing fever		<i>Borrelia recurrentis</i>	Louse-borne, man-louse-man	Worldwide but mainly in poor mountainous parts of Africa, Asia and Latin America	2b	—
VIRAL DISEASES						
1) Excreted viruses						
Hepatitis A	Infectious hepatitis or jaundice	Hepatitis A virus	Faecal-oral, man-man	Worldwide	1	1
Poliomyelitis	Polio	Poliovirus	Faecal-oral, man-man	Worldwide	1	1
Viral diarrhoea	Diarrhoea	Rotavirus, Norwalk agent, other viruses	Faecal-oral, man-man	Worldwide	1	1
2) Mosquito-borne viruses						
Dengue	Breakbone fever	Dengue virus	Transmitted by mosquito <i>Aedes aegypti</i> & other <i>Aedes</i> + <i>Haemagogus</i> spp., man-mosquito-man	Dengue fever is now almost worldwide. A new serious form (dengue haemorrhagic fever) occurs mainly in the cities of S.E. Asia	4b	—

Disease	Common name	Pathogen	Transmission	Distribution	Water-related category*	Excreta-related category**
Yellow fever		Yellow fever virus	Transmitted by mosquito <i>Aedes aegypti</i> and other <i>Aedes</i> and <i>Haemagogus</i> spp., man or monkey-mosquito-man	Not reported from Asia or Australasia	4b	—
Other arboviral diseases		A large number of viruses causing various encephalitic and haemorrhagic infections	Mainly infections of animals and all transmitted by arthropods. Man infected accidentally by bites from mosquitoes (mainly), ticks, sandflies and midges	Worldwide	4b	—
RICKETTSIAL DISEASE						
Louse-borne typhus	Epidemic or classical typhus	<i>Rickettsia prowazeki</i>	Louse-borne, man-louse-man	Worldwide, but mainly in poor mountainous parts of Africa, Asia & Latin America	2b	—
PROTOZOAL DISEASES						
1) Excreted protozoa						
Amoebiasis	Amoebic dysentery	<i>Entamoeba histolytica</i>	Faecal-oral, man-man	Worldwide	1	1
Balantidiasis	Diarrhoea	<i>Balantidium coli</i>	Faecal-oral, man or pig-man	Worldwide	1	1
Cryptosporidiosis	Diarrhoea	<i>Cryptosporidium</i> spp.	Faecal-oral, man or animal-man	Worldwide	1	1
Giardiasis	Diarrhoea	<i>Giardia lamblia</i>	Faecal-oral, man-man	Worldwide	1	1
2) Vector-borne protozoa						
Malaria	Malaria	<i>Plasmodium</i> spp.	Transmitted by <i>Anopheles</i> mosquitoes, man-mosquito-man	Throughout most of the warmer parts of the world, although eradicated in some areas	4b	—
Trypanosomiasis (African)	Gambian sleeping sickness	<i>Trypanosoma gambiense</i>	Transmitted by riverine tsetse fly (<i>Glossina</i> spp.), man-fly-man	Mainly West and Central Africa	4a	—
	Rhodesian sleeping sickness	<i>Trypanosoma rhodesiense</i>	Transmitted by game tsetse fly (<i>Glossina</i> spp.), wild game or cattle-fly-man	Mainly East Africa	Not related to water or excreta (included for completeness)	
Trypanosomiasis (American)	Chaga's disease	<i>Trypanosoma cruzi</i>	Transmitted by bugs (<i>Reduviidae</i>), man or animal-bug-man	Latin America	Related to housing	

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HELMINTHIC DISEASES						
1) Excreted helminths						
Ascariasis	Roundworm	<i>Ascaris lumbricoides</i>	Man-soil-man	Worldwide	—	3
Clonorchiasis	Chinese liver fluke	<i>Clonorchis sinensis</i>	Animal or man-aquatic snail-fish-man	S.E. Asia	3b	5
Diphyllobothriasis	Fish tapeworm	<i>Diphyllobothrium latum</i>	Man or animal-copepod-fish-man	Worldwide	3b	5
Enterobiasis	Pinworm	<i>Enterobius vermicularis</i>	Man-man	Worldwide	1	1
Fasciolopsiasis	Giant intestinal fluke	<i>Fasciolopsis buski</i>	Man or pig-aquatic snail-aquatic plant-man	S.E. Asia, mainly China	3b	5
Hymenolepiasis	Dwarf tapeworm	<i>Hymenolepis nana</i>	Man or rodent-man	Worldwide	1	1
Hookworm	Hookworm	<i>Ancylostoma duodenale</i> , <i>Necator americanus</i>	Man-soil-man	Mainly in warm, wet climates	—	3
Ophisthorchiasis	Cat liver fluke	<i>Ophisthorchis felineus</i> , <i>O. viverrini</i>	Cat or man-aquatic snail-fish-man	Thailand, former Soviet Union	3b	5
Paragonimiasis	Lung fluke	<i>Paragonimus westermani</i>	Pig, man, dog, cat or animal-aquatic snail-crab or crayfish-man	East Asia plus scattered foci in Africa and S. America	3b	5
Schistosomiasis	Bilharziasis	<i>Schistosoma haematobium</i>	Man-aquatic snail-man	Africa, Middle East and India	3a	5
		<i>S. mansoni</i>	Man-aquatic snail-man	Africa, Middle East and Latin America	3a	5
		<i>S. japonicum</i>	Animal or man-snail-man	S.E. Asia	3a	5
Strongyloidiasis	Threadworm	<i>Strongyloides stercoralis</i>	Man-soil-man	Mainly in warm, wet climates	—	3
Taeniasis	Beef tapeworm	<i>Taenia saginata</i>	Man-cow-man	Worldwide	—	4
	Pork tapeworm	<i>Taenia solium</i>	Man-pig-man	Worldwide	—	4
Trichuriasis	Whipworm	<i>Trichuris trichiura</i>	Man-soil-man	Worldwide	—	3
2) Guinea worm						
Dracunculiasis (dracontiasis)	Guinea worm	<i>Dracunculus medinensis</i>	Man-Cyclops-man	Africa, India	3b	—
3) Mosquito-borne helminths						
Filiariasis (Bancroftian)	May cause elephantiasis	<i>Wuchereria bancrofti</i>	Transmitted by mosquitoes, mainly <i>Culex pipiens</i> , <i>Anopheles</i> spp. and <i>Aedes</i> spp., man-mosquito-man	Worldwide	4b	6

Disease	Common name	Pathogen	Transmission	Distribution	Water-related category*	Excreta-related category**
Filariasis (Malayan)	May cause elephantiasis	<i>Brugia malayi</i>	Transmitted by mosquitoes, mainly <i>Mansonia</i> spp. and also <i>Anopheles</i> and <i>Aedes</i> spp., man-mosquito-man	India and S.E. Asia	4b	—
Loiasis		<i>Loa loa</i>	Transmitted by mangrove fly (<i>Chrysops</i> spp.), man-fly-man	West and Central Africa	4b	—
Onchocerciasis	River blindness	<i>Onchocerca volvulus</i>	Transmitted by blackflies (<i>Simulium</i> spp.), man-fly-man	Latin America, Africa and Yemen	4b	—

* Related to Annex 5 Table 1.

** Related to Annex 5 Table 2.