
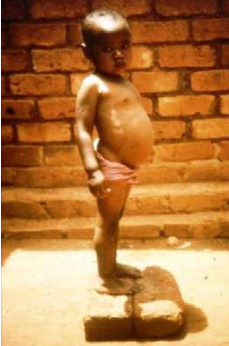

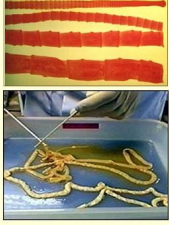

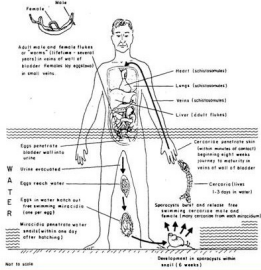
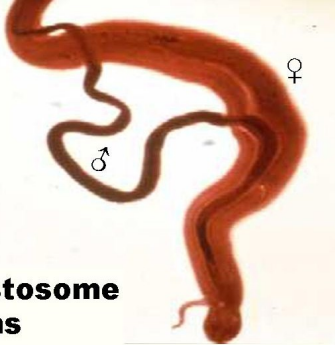



WATER- AND EXCRETA-RELATED COMMUNICABLE DISEASES

Part 4 of 5

<p>1.</p>	<p style="text-align: center;">Unitary environmental classification of water- and excreta-related communicable diseases</p> <p style="text-align: center;">Seven categories:</p> <ol style="list-style-type: none"> 1. Faeco-oral waterborne & water-washed diseases 2. Non-faeco-oral water-washed diseases 3. Geohelminthiases 4. Taeniasis 5. Water-based diseases 6. Insect-vector diseases 7. Rodent-vector diseases 	<p>We are now going to look at Categories 3, 4 and 5 of our environmental classification of water- and excreta-related diseases.</p>
<p>2.</p>	<p style="text-align: center;">3. The Geohelminthiases</p> <p><i>Ascaris lumbricoides</i> (human roundworm), <i>Trichuris trichiura</i> (human whipworm), <i>Ancylostoma duodenale</i> and <i>Necator americanus</i> (human hookworms)</p> <div style="text-align: center;">  <p><i>Ascaris</i></p> </div>	<p>Category 3 is the geohelminthiases, and these are caused by soil-transmitted helminths or worms, and they include <i>Ascaris lumbricoides</i> (the human roundworm), <i>Trichuris trichiura</i> (the human whipworm), and the two species of human hookworms: <i>Ancylostoma duodenale</i> and <i>Necator americanus</i>. <i>Ascaris</i>, an adult <i>Ascaris</i>, is about the size of a pencil, slightly smaller, but that sort of order of size.</p>
<p>3.</p>	<p style="text-align: center;">The Geohelminthiases:</p> <ul style="list-style-type: none"> <input type="checkbox"/> No intermediate host (person → soil → person) <input type="checkbox"/> Extremely common infections: prevalence often >50%; can be as high as 90%, even 100%, in low-income periurban communities. <input type="checkbox"/> About 2 billion people infected 	<p>These soil-transmitted helminths have no intermediate host, and basically the transmission pattern is the excreta of one person on to soil and then into another person somehow, either by mouth or through the skin; and they are extremely common infections. Their prevalence is often over 50 percent, and in low-income areas, particularly periurban areas, it can be over 90 percent or even 100 percent. In the world something like 2 billion people are affected, which is very roughly a third of the world's population; so they are very common and very serious.</p>
<p>4.</p>	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p style="color: yellow; font-weight: bold; text-align: center;">This four-year old Kenyan girl...</p> </div> </div>	<p>This four-year old Kenyan girl was given a vermifuge to kill the worms so that she would excrete them,</p>

5.	<p>excreted all these <i>Ascaris</i> worms:</p> 	<p>and she excreted a very large number of <i>Ascaris</i> worms, so her worm burden was extremely high.</p>
6.	<p>Unitary environmental classification of water- and excreta-related communicable diseases</p> <p>Seven categories:</p> <ol style="list-style-type: none"> 1. Faeco-oral waterborne & water-washed diseases 2. Non-faeco-oral water-washed diseases 3. Geohelminthiasis 4. Taeniasis 5. Water-based diseases 6. Insect-vector diseases 7. Rodent-vector diseases 	<p>We are now going to move on to Category 4.</p>
7.	<p>4. The Taeniasis</p> <p>Tapeworms:</p> <p><i>Taenia saginata</i> (beef tapeworm)</p> <p><i>T. solium</i> (pork tapeworm)</p> <ul style="list-style-type: none"> ▪ Cow or pig intermediate host 	<p>These are the taeniasis, or tapeworms; and we have the beef tapeworm, <i>Taenia saginata</i>, and the pork tapeworm, <i>T. solium</i>; and they have a cow or pig intermediate host.</p>
8.	<p>Unitary environmental classification of water- and excreta-related communicable diseases</p> <p>Seven categories:</p> <ol style="list-style-type: none"> 1. Faeco-oral waterborne & water-washed diseases 2. Non-faeco-oral water-washed diseases 3. Geohelminthiasis 4. Taeniasis 5. Water-based diseases 6. Insect-vector diseases 7. Rodent-vector diseases 	<p>We are now going to look at Category 5: the water-based diseases,</p>
9.	<p>5. Water-based Diseases</p> <p>These are all* helminthic (worm) diseases</p> <ul style="list-style-type: none"> □ the pathogen spends part of its life cycle in one or more intermediate aquatic hosts (the first or only one of which is an aquatic snail in which massive asexual multiplication takes place) <p>*except legionellosis and leptospirosis – bacterial diseases</p>	<p>and these are all helminthic infections, with the exception of a couple of bacterial diseases due to <i>Legionella</i> and <i>Leptospira</i>.</p> <p>For the helminthic diseases in this category the pathogen has to spend part of its life cycle in one or more intermediate aquatic hosts; the first or only one of which is an aquatic snail, and inside this snail huge asexual multiplication of the pathogen takes place.</p>

<p>10.</p>	<p>For example: schistosomiasis (bilharzia): man (faeces or urine) → water → snail → water → man</p> <p>☐ ~250 million people infected in DC's</p> 	<p>A very common water-based disease is schistosomiasis (also called bilharzia). The eggs of the worm are voided in either the faeces or the urine, and if they get into water, the eggs hatch and the hatchlings get into a water snail. Inside the snail there is this huge asexual multiplication and cerceriae leave the snail and then come into contact with a person who is in the water, and they bore through the skin to set up the infection again. It is quite a serious disease because something of the order of 250 million people, almost all in developing countries, are affected with this disease.</p>
<p>11.</p>	 <p>S. mansoni and S. japonicum leave via faeces</p> <p>LIFE CYCLE OF SCHISTOSOMA HAEMATOBIMUM • leaves via urine</p>	<p>This slide shows the life cycle in detail of <i>Schistosoma haematobium</i>. In this case the eggs are voided in the urine; but for the two other common schistosome infections, due to <i>Schistosoma mansoni</i> and <i>Schistosoma japonicum</i>, the eggs leave us in the faeces.</p>
<p>12.</p>	 <p>Schistosome worms</p>	<p>This slide shows two adult worms, the larger female worm and the smaller male worm.</p>
<p>13.</p>	 <p>Schistosome eggs encapsulated in liver</p>	<p>Most eggs are voided in the faeces or the urine, but a few get side-tracked and often end up in the liver, and the liver recognises them as foreign bodies and so encapsulates them to protect itself. If you have just a few schistosome eggs encapsulated in your liver in this way, it is not big deal; but if you have a large number, then your liver starts to malfunction, and if your liver malfunctions then so do you,</p>
<p>14.</p>	<p>Schistosomiasis & cognitive function</p> <ul style="list-style-type: none"> ▪ Heavy schistosomiasis and poor nutritional status associated with cognitive impairment in Tanzanian schoolchildren aged 9–14 ▪ Verbal short-term memory and speed of information processing most affected 	<p>and this can have an important effect on cognitive function.</p> <p>A study in Tanzania found that a heavy burden of schistosomiasis, together with poor nutritional status, was strongly associated with cognitive impairment in school children in the age group 9 to 14. Verbal short-term memory and speed of information processing were the two areas most affected – so schistosomiasis has a clear adverse effect on children's learning abilities and thus on their education.</p>