

What are STH and other useful information

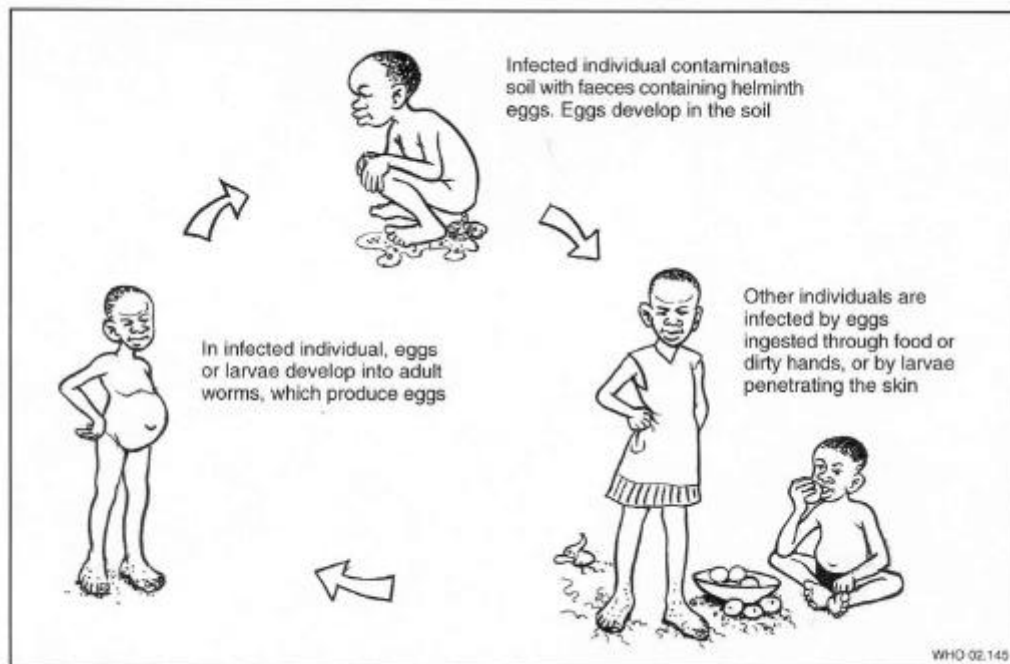
2. What are Soil Transmitted Helminths ?

Species:

- 'Helminth' is a technical word for a worm.
- Soil transmitted helminths (STH) are also known in many places simply as 'common intestinal worms'.
- In terms of public health, 3 species are important:
 - *Ascaris lumbricoides* Roundworm
 - *Ancylostoma duodenale* and *Necator americanus* Hookworms
 - *Trichuris trichiura* Whipworm

Transmission:

- A person infected with STH has parasite eggs in their faeces.
- In areas where there is no latrine system, the soil (and the water) around the village becomes contaminated with faeces containing worm eggs.
- In the soil the eggs mature, this takes from between 2-4 weeks. They can then infect humans in one of three ways:
 1. The eggs are ingested:
 - The eggs stick to vegetables grown in the area. If the vegetables are not carefully cooked, washed or peeled, the eggs are ingested and infect the person.
 - The STH eggs are ingested from the water sources which have become contaminated.
 - Young children who play on the ground and often put their hands in their mouths without washing them, ingest the eggs and become infected.
 2. The larvae penetrate the skin:
 - For Hookworm, the eggs also hatch into larvae which rest in the soil. As a person walks by, the larvae can penetrate the skin, usually between the toes.



Because schistosomes and STH do not multiply in the human host (as with viruses, bacteria, fungi and protozoa), re-infection is always the result of contact with an infected environment.

There is no direct person-to-person transmission or infection from *fresh* faeces because eggs passed in faeces need about 2 weeks (Roundworm and Hookworm) to 3 weeks (Whipworm) in the soil before they become infective.

Symptoms and Impact on health:

- The symptoms of STH are non specific and only become evident when the infection is particularly severe.
- The non-specific symptoms include: nausea, tiredness, abdominal pain, loss of appetite.
 - STH cause morbidity through various different mechanisms, three in particular are listed below:
- **Anaemia:** Hookworms live in your intestine. They attach and re-attach themselves to the intestine wall every few hours as they feed on blood from the cut vessels and mucosal tissues. This blood loss contributes to anaemia especially in countries where the dietary intake of iron is already marginal and malaria is widespread.
- **Vitamin A deficiency:** Worms need Vitamin A to live. In many countries, a person's vitamin A-intake is already marginal and in these situations, worm infections can compete for the limited amount of Vitamin A which is absorbed.
- **Loss of appetite:** One of the most noticeable changes after a child has been dewormed is that his/her appetite returns.

→ **Growth faltering:** A loss of appetite, increased levels of Vitamin A deficiency and higher anaemia levels all interfere with a child's ability to grow healthily and to its full potential. Moreover there is evidence to suggest that a child with heavy worm infections is less resistant to other infections. Altogether this means you will have a more sickly child, who will grow up to be a less healthy adult.

→ **Surgery:** When the number of worms becomes extremely high, they build up in the child's intestines, stopping the normal flow of blood and eventually blocking the intestine entirely. The only solution in this situation is surgical intervention and in many cases, this is not possible in remote areas and the child can die.

insert image of worm filled intestine

→ **Learning:** Worm infected children are less able to concentrate or memorize information. They score less well in school tests and therefore their only chance to gain a few years of schooling in their lives, is compromised.

Who is most at risk ?

From the time a child stops breastfeeding and starts crawling around the ground, frequently putting their hands in their mouths - they are at risk of STH infections. Without treatment, they become repeatedly re-infected and the number of worms living in them steadily increases. By the time they reach school, they can be harbouring hundreds of worms.

Why should school age children be targeted?

- They typically have the highest worm loads.
- If you reduce the infection rates in this group, the environment becomes less contaminated, benefiting the whole community.
- They are at a particularly important time of their lives for growing.
- High levels of worm infections make them less able to resist other infections.
- It may be the only time in their lives they have a chance to go to school and learn.

Treatment:

- There are four drugs to treat STH: Albendazole and Mebendazole which are particularly attractive because they are so easy to administer, or Pyrantel and Levamisole which are based on weight.

Table x: The 4 drugs to treat STH

	Dose by Age		Comment
	1-2 years	2 years upwards	
Albendazole (400 mg tablet)	½ tablet	1 tablet	These two drugs are particularly attractive because there is no need to weigh the children.
Mebendazole (500 mg tablet)	1 tablet		

Drugs	1-5 years	5-12 years	12 years and above	Comment
Levamisole (40 mg tablet)	2.5 mg/Kg	2 tablets	2.5 mg/Kg	The correct dose of levamisole and pyrantel is calculated according to the child's weight in kg. Scales are therefore necessary. Syrup formula is available.
Pyrantel (250 mg tablet)	10 mg/Kg			

All these drugs produce excellent egg reduction rates. For *A. lumbricoides* it is over 95%. For hookworm they are nearly as effective, > 90%. For *T. trichiura* these drugs are less effective - albendazole and mebendazole have a 50-80% egg reduction rate and levamisole between 10-50%. Pyrantel has very little effect on this parasite.

Albendazole and mebendazole tablets are chewable, normally fruit flavored and children like them. For small children, the tablet can be crushed between two spoons and offered to the child with a glass of water.

Drug Costs

- Albendazole costs only US\$0.02 per dose.
- For \$1 you can treat 50 children.
- For \$2,000 you can treat 100,000 children.