Title: Should integrated deworming and water, sanitation and hygiene (WASH) programs for soil-transmitted helminth (STH) control be delivered in schools or the community? A pilot study

Scientific title: A pilot study comparing the impact of school- and community-based integrated water, sanitation and hygiene (WASH) and deworming programmes on soil-transmitted helminth infections in school-aged children in Timor-Leste

Secondary ID [1]: OPP11190421 (Grant number from Bill and Melinda Gates Foundation)

Universal Trial Number (UTN): U1111-1172-9719

Trial acronym: (S)WASH-D for Worms pilot

Health condition(s) or problem(s) studied:

- Soil-transmitted helminth infection - Trichuris trichiura, Ascaris lumbricoides, hookworms (Necator americanus and Ancylostoma duodenale)
- Stunting
- Wasting
- Anaemia
- Intestinal protozoa (Giardia duodenalis, Entamoeba histolytica, Strongyloides spp., Cryptosporidium spp.)

Condition category | Condition code
--- | ---
Infection | Other infectious diseases
Public Health | Epidemiology
Oral and Gastrointestinal | Other diseases of the mouth, teeth, oesophagus, digestive system including liver and colon

Intervention/exposure

Study type: Interventional

Description of intervention(s) / exposure:
The intervention to be evaluated in this proposal will involve provision of access to improved water and sanitation and improving related hygiene practices, implemented at both a community level and a primary school level. This intervention will be implemented by non-governmental organisation Plan International in Timor-Leste. The sanitation component will involve construction of school latrines by contractors working with Plan International, as well a Community Led Total Sanitation approach. Access to an improved water supply will also be provided, and local partner NGOs will provide house-by-house education on hygiene practices, in particular hand-washing with soap at critical times. Hygiene education including posters relating to handwashing with soap will be provided to schools, and handwashing stations with soap will be constructed as part of the school latrines.

Furthermore, communities in the intervention arm of the pilot study will receive mass chemotherapy (distributed to all members of the community) with one oral tablet of albendazole 400mg, which will be...
administered once 80% of the households have sanitation (as defined by the presence of a household latrine) and the school latrines have been completed. Albendazole intake will be directly observed by the field workers delivering the tablets, who will be working under the supervision of a registered nurse.

The intervention period will continue until the school latrine construction is finished; household latrine construction is complete, hygiene promotion has been conducted in all households and mass chemotherapy has been delivered. This is estimated to take between 2-4 months.

### Intervention code [1]
- Prevention

### Intervention code [2]
- Treatment: Drugs

### Intervention code [3]
- Behaviour

### Comparator / control treatment
- Communities in the control group will be provided with access to improved water and sanitation and hygiene promotion implemented only at primary school level. This will be implemented by non-governmental organisation Cruz Vermelha Timor-Leste (CVTL), and will involve construction of school latrines, access to an improved water supply and promotion of hand washing with soap and related hygiene behaviours. This intervention will be similar to that in the intervention arm (although conducted by a different NGO) but will only be delivered to primary school children.

Furthermore, communities in the control arm of the pilot study will receive chemotherapy (distributed to school-aged children only) with one oral tablet of albendazole 400mg, which will be administered once the school latrines have been completed. Albendazole intake will be directly observed by the field workers delivering the tablets, who will be working under the supervision of a registered nurse.

### Control group
- Active

### Outcomes

#### Primary outcome [1]
Cumulative incidence of of infection with A. lumbricoides, T. trichiura, N. americanus and Ancylostoma spp. (undifferentiated) in school aged children - to be assessed by both microscopy and PCR examination of stool.

#### Timepoint [1]
At baseline and at follow-up six months after the distribution of albendazole

#### Secondary outcome [1]
Proportion of eligible children for whom informed consent is gained - using school records to determine number of eligible children

#### Timepoint [1]
At baseline and at follow-up six months after the distribution of albendazole

#### Secondary outcome [2]
Proportion of eligible children for whom stool samples are provided - using school records to determine number of eligible children

#### Timepoint [2]
At baseline and at follow-up six months after the distribution of albendazole

#### Secondary outcome [3]
Proportion of eligible children who complete questionnaires - using school records to determine number of eligible children

#### Timepoint [3]
At baseline and at follow-up six months after the distribution of albendazole

#### Secondary outcome [4]
Proportion of eligible children who undergo measurement of height, weight and haemoglobin - using school records to determine number of eligible children

#### Timepoint [4]
At baseline and at follow-up six months after the distribution of albendazole

#### Secondary outcome [5]
Prevalence of S. stercoralis, G. duodenalis, E. histolytica, and Cryptosporidium spp. (composite outcome) - assessed using laboratory analysis (PCR) of stool samples

#### Timepoint [5]
At baseline and at follow-up six months after the distribution of albendazole

#### Secondary outcome [6]
Mean haemoglobin concentration - measured using serum assay on a Hb201 (Hemocue) analyser device

#### Timepoint [6]
At baseline and at follow-up six months after the distribution of albendazole

#### Secondary outcome [7]
Anthropometric index height-for-age Z-score (to identify stunting)

#### Timepoint [7]
At baseline and at follow-up six months after the distribution of albendazole

#### Secondary outcome [8]
Anthropometric index height-for-age Z-score (to identify underweight)

#### Timepoint [8]
At baseline and at follow-up six months after the distribution of albendazole

#### Secondary outcome [9]
Anthropometric index height-for-age Z-score (to identify wasting)

#### Timepoint [9]
At baseline and at follow-up six months after the distribution of albendazole

#### Secondary outcome [10]
Mean intensity of infection (average number of eggs per gram of faeces)

#### Timepoint [10]
Six months following distribution of albendazole

### Eligibility

#### Key inclusion criteria
Inclusion criteria for enrolment in the study:
- Child enrolled in and attending the primary school
- Informed consent obtained from parent/caregiver

Selection of communities for inclusion in the study:
- Communities were selected for inclusion in this pilot study in consultation with each partner NGO (Plan International and Cruz Vermelha Timor-Leste (CVTL))
- For the intervention clusters, Plan International identified three villages in which they were planning both a school- and community-based WASH programme.
**Minimum age**
1 Years

**Maximum age**
No limit

**Gender**
Both males and females

**Can healthy volunteers participate?**
Yes

**Key exclusion criteria**
- Not attending the primary school
- Informed consent not obtained
- Women in the first trimester of pregnancy
- Children under the age of 1 year

**Study design**

**Purpose of the study**
Prevention

**Allocation to intervention**
Non-randomised trial

**Procedure for enrolling a subject and allocating the treatment (allocation concealment procedures)**
All children who are enrolled in and attending the primary school in each of the six communities participating in this pilot study will be eligible for inclusion in the study. Consent will be sought from parents/caregivers at a meeting which will be held at the school. Allocation is not concealed.

**Methods used to generate the sequence in which subjects will be randomised (sequence generation)**
This pilot project is not randomised. This is because the WASH intervention for each arm of the study is being performed by a different NGO, and communities participating in the study are those in which those NGOs are working.

**Masking / blinding**
Open (masking not used)

**Who is / are masked / blinded?**

**Intervention assignment**
Parallel

**Other design features**
Not Applicable

**Phase**
Efficacy

**Type of endpoint(s)**
Descriptive statistics will be used to determine the proportion of eligible participants who gave informed consent, provided stool samples, completed questionnaires and underwent measurement of height and weight.

**Statistical methods / analysis**
Primary and secondary outcomes will be calculated and compared across both arms of the trial using mixed effects multivariate regression models that account for clustering of participants in villages.

**Recruitment**

**Recruitment status**
Completed

**Date of first participant enrolment**

| Anticipated | Actual |
|-------------|--------|
|             | 21/05/2015 |

**Date of last participant enrolment**

| Anticipated | Actual |
|-------------|--------|
| 7/06/2016   | 2/07/2016 |

**Date of last data collection**

| Anticipated | Actual |
|-------------|--------|
|             | 3/07/2016 |

**Sample size**

| Target | Current | Final |
|--------|---------|-------|
| 475    |         | 557   |

**Recruitment outside Australia**

| Country [1]  | Timor-Leste        |
|--------------|-------------------|
| State/province [1] | Aileu and Manufahi Districts |

**Funding & Sponsors**

| Funding source category [1] | Charities/Societies/Foundations |
|-----------------------------|---------------------------------|
| Name [1]                    | Bill and Melinda Gates Foundation - Grand Challenges Explorations |
This pilot study aims to establish the feasibility of conducting a large cluster-randomised trial in Timor-Leste to assess the impact of mass chemotherapy with albendazole on the prevalence of soil-transmitted helminth infections. The study will be conducted in six communities, with one community randomized to the intervention arm and five communities to the control arm. The intervention arm will receive mass chemotherapy with albendazole 400mg, while the control arm will receive no intervention.

Inclusion criteria for enrollment in the study:
- Children aged 5 to 14 years
- Informed consent obtained from parent/caregiver
- Availability of Timepoint 0 examination of stool

Exclusion criteria for enrollment in the study:
- Children under the age of 1 year
- Women in the 1st trimester of pregnancy
- Informed consent not obtained

Procedure for enrolling a subject:
1. Consent
2. Collection of stool samples
3. Measurement of height and weight

Purpose of the study:
To assess the impact of mass chemotherapy with albendazole on the prevalence of soil-transmitted helminth infections in school-aged children.

Intervention/exposure:
- Control arm: no intervention
- Intervention arm: mass chemotherapy with albendazole 400mg

Ethics approval:
- Ethics approval number: ACTRN12615001012561
- Ethics approval date: 20/03/2015
- Ethics application status: Approved
- Ethics committee name: The Australian National University Human Research Ethics Committee
- Ethics committee address: The Australian National University
  - Acton ACT 2601

Summary:
The study aims to assess the impact of mass chemotherapy with albendazole on soil-transmitted helminth infections in school-aged children in Timor-Leste. The study will be conducted in six communities, with one community randomized to the intervention arm and five communities to the control arm. The intervention arm will receive mass chemotherapy with albendazole 400mg, while the control arm will receive no intervention. The study will assess the impact of the intervention on the prevalence of soil-transmitted helminth infections in school-aged children.
**Brief summary**

The current WHO strategy for control of soil-transmitted helminths (STH) is school-based targeted drug treatment focusing on school-age children. Deworming programmes with anthelmintic drugs are highly effective in reducing morbidity but rapid reinfection occurs if there is no reduction in environmental contamination with parasite infective stages. Therefore, provision of water, sanitation and hygiene (WASH) programs is of critical importance in the sustainable control of STHs. In fact, WASH programs have been shown to reduce worm infection, both when implemented at schools and in entire communities. On the other hand, recent modeling has raised questions about WHO guidelines, demonstrating limited impact from school-based delivery of interventions on community health and, importantly, STH transmission. This is contrary to the currently accepted idea that adults benefit from school-based deworming as a result of its impact on the overall intensity of transmission within the population. Therefore, when thinking of the long-term control of STH, it will be necessary to optimise strategies for deworming and WASH programs, with respect to school versus community-based delivery of interventions.

This pilot study aims to establish the feasibility of conducting a large cluster-randomised trial investigating the differential impact of school- versus community-based integrated WASH and deworming programmes. The pilot study also aims to establish “proof of principle” that a community-based intervention will be more effective than a school-based intervention at reducing STH infections in school-aged children.

**Trial website**

**Trial related presentations / publications**

**Public notes**

**Private notes**

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**Contacts**

### Principal investigator

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| Name           | Naomi Clarke        |
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Six months following distribution of albendazole, a prevention strategy, at baseline and at follow-up six months after the distribution of albendazole. The pilot study aims to investigate the differential impact of school- versus community-based integrated water, sanitation and hygiene (WASH) programmes, focusing on soil-transmitted helminth infection. The intervention period will continue until the school latrine construction is finished, household latrines (distributed to all members of the community) with one oral tablet of albendazole 400mg, which will be administrated to the school children only. Education including posters relating to handwashing with soap will be provided to schools, and communities. On the other hand, recent modeling has raised questions about WHO guidelines, treatment focusing on school-age children. Deworming programmes with anthelminthic drugs are highly effective in reducing morbidity, cancer and other infectious diseases. Therefore, when thinking of the long-term control of STH, it will be necessary to optimise the settings and environments where these programmes are being performed by a different NGO, and communities participating in the study are those in which these programmes are being performed. Consent will be sought from all children who are enrolled in and attending the primary school in each of the six communities participating in this pilot study will be eligible for inclusion in the study. Consent will be obtained from parent/caregiver. Additionally, stool examination will be performed to diagnose the infection prevalence of S. stercoralis, G. duodenalis, E. histolytica, and Cryptosporidium spp. Anthropometric index weight-for-height Z-score (to identify wasting) will be used in children to determine the proportion of eligible participants who gave informed consent, provided stool samples, completed questionnaires and underwent measurement of height and weight. Descriptive statistics will be used to determine the proportion of eligible participants who gave informed consent, providing stool samples, completing questionnaires and undergoing measurement of height and weight.

Cancer fields

| Cancer stage(s) | Treatment type(s) |
|-----------------|------------------|
| Known and possible side effect(s) for each arm of the trial (if applicable) |
| Cost to participants |
| Time commitment |
| Travel |

Acknowledgment

Step 1: Titles & IDs

Step 2: Health condition

Step 3: Intervention/exposure

Step 4: Outcomes

Step 5: Other infectious diseases

Step 6: Anthropometric index

Step 7: Randomization & Blinding

Step 8: Funding & Sponsors

Step 9: Adverse events

Step 10: Dissemination

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