



ParaDesign 2.0: an improved E-tool to identify the most cost-effective survey design to monitor deworming programs targeting soil-transmitted helminthiasis

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Background

- There is a worldwide upscale in deworming programs to combat soil-transmitted helminthiasis
- Periodically assessment of epidemiology is essential to monitor progress programs
- Guidance is needed, but not straightforward

Goal ParaDesign 2.0

- To support program managers in identifying the most cost-effective study design, without the need of prior knowledge on statistics/mathematics

Mathematical backbone

- 3-level hierarchical model describing the variation in fecal egg counts (FECs)
 - ✓ **Level 1:** variation in mean FECs across schools from the same district/province
 - ✓ **Level 2:** variation in FECs between children from the same school
 - ✓ **Level 3:** variation in FECs within the same child due to the egg counting procedure.
- The model also accounts for variation in drug efficacy both at the level of school and child. el).

User interface – www.starworms.org/tools

Side panel

The side panel contains several interactive elements: a dropdown for 'Study goal' (set to 'Presence of infection'), a slider for 'Probability of detecting worm infections' (set to 90%), a dropdown for 'Worm species' (set to 'Roundworm'), and three sliders for the distribution of infections: 'Mean FEC between schools' (set to 6.6 EPSC), 'Aggregation of infections between schools (k)' (set to 0.81), and 'Proportion of extra schools free of worms (p)' (set to 99.1%).

Main panel

The main panel displays the 'Background' section, which explains the mathematical framework based on worm egg counts in stool that allow health-care decision makers to identify a study design that best fits the local fecal worm epidemiology and resources (Lima et al., 2011). It also includes a 'Goal of ParaDesign 2.0' section and a 'Work with ParaDesign 2.0' section with five numbered steps: 1) choose your study goal, 2) include which worm species you will target, 3) match the distribution of infections between school with those in the district / province of interest, 4) complete the information about the schools, and 5) customize the costs linked to both field and laboratory procedures if wanted.

- 4 sections
 - ✓ study goal; worm species; distribution of infections across school; school information
- 4 tabs
 - ✓ background; required information; identify the distribution of infection; select study design;
- Drop down lists & sliders
- Built-in links to WHO documents
- Reactive sample size calculator

Software

- ParaDesign was developed using the *Shiny* package of R studio
- R studio is an open source software for R

Work with ParaDesign

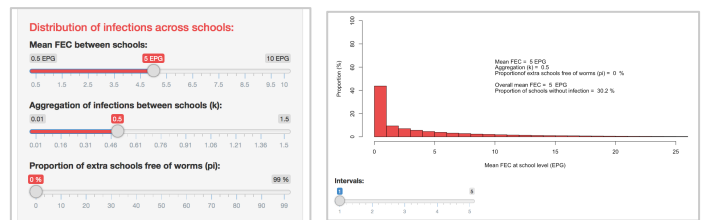
Step 1: Choose your study goal

The 'Study goal' dropdown menu is open, showing options: 'Presence of infection', 'FEC with precision', 'FEC exceeding threshold', 'Presence of infection', 'ERR with precision', and 'ERR exceeding threshold'.

Step 2: Select the worm species targeted

The 'Worm species' dropdown menu is open, showing options: 'Roundworm', 'Whipworm', and 'Hookworm'.

Step 3: Define the distribution of infections



Step 4: Provide information on the schools

The 'School information' section features three sliders: 'Total number of schools' (set to 1,000), 'Average number of subjects per school' (set to 250), and 'Maximum number of schools that can be included in the survey' (set to 79).

Step 5: Select the most cost-effective study design

Show 25 entries Search:

Technique	N_of_schools	N_of_subjects	Pool_size	N_of_days
FLOTAC	45	10	1	71.5
FLOTAC	45	15	5	66.8
FLOTAC	45	20	10	70.9
FLOTAC	45	20	20	69.2
Mini-FLOTAC	45	13	1	73.0
Mini-FLOTAC	45	20	5	72.1
Mini-FLOTAC	45	20	10	69.9
Mini-FLOTAC	45	40	20	92.5
Kato-Katz	45	15	1	73.8
Kato-Katz	45	20	5	71.2
Kato-Katz	45	30	10	81.6
Kato-Katz	45	40	20	92.0