COR-NTD 2021
Research Links Series
Spread Truth, Not Disease

Putting Schistosomiasis Precision Mapping into Practice

Research Links Session Date: Wednesday 22nd September 2021

Session recording available here

Cor NTD Annual meeting session: Tuesday 9th November 2021

Session Description: Putting Schistosomiasis Precision Mapping into Practice; Comparing mapping activities, outputs, and decision-making processes for schistosomiasis elimination programmes. What lessons can be drawn from implemented schistosomiasis precision mapping across different contexts and variability in terms of implementation, decision making and outputs?

Session Moderators: Stella Kepha, Anouk Gouvras, Cosmas Ejong Ndellejong, David Rollinson

Speakers: Jean Bosco Mbonigaba, Wyckliff Omondi, Fiona Fleming, Louis-Albert Tchuem Tchuenté, Humphrey D. Mazigo, Pauline Mwinzi

Co-facilitators: Elodie Yard, Jane Lillywhite, Suzy Campbell, Laura Appleby

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Report Contents

KEY DISCUSSION POINTS

What key findings and data did the group identify via presentations? What issues were raised in discussions?

Standard schistosomiasis (SCH) control strategies are based on district level overall prevalence, which can lead to over-treatment in some areas, and under-treatment in others. Precision mapping, or sub-district mapping, is recommended by the WHO and the GSA, and rolled out by national programmes in collaboration with partners as a method for refining a targeted treatment strategy, to ensure optimum treatment and improved efficiencies in resource utilization.

Multiple countries have implemented revised SCH mapping protocols in the past five years and more recently during the COVID-19 pandemic, incorporating mitigating measures to ensure the safety of all involved. Some of these countries, as well as those who implemented precision mapping surveys prior to the pandemic presented their experience on the selection of sub-districts, the development of sampling protocols, and the challenges faced in the implementation of the revised protocols in the Research Links Session on the 22nd of September 2021.

Schistosomiasis updates from ESPEN & WHO Protocol Development Group

- **ESPEN's schistosomiasis sub-data analysis too**l and country data analysis updates - Dr Pauline Mwinzi (ESPEN /WHOAFRO). Dr Mwinzi presented the ESPEN SCH MDA Optimization & Data analysis tool. This tool collates and uses existing data to guide MDA decisions, it identifies where there are gaps in data or where the data may not be adequate (quality), this can guide where mapping is needed to address these gaps and improve the data going into the tool, such as by using precision mapping.

- **Overview of the over-sampling study** conducted by the WHO SCH protocol development group - Dr Fiona Fleming (SCIF). The oversampling survey will use existing data from countries, and will collect additional data from other countries, using an oversampling approach, to feed into modelling simulations that will compare and contrast survey protocols, including for impact assessment, in different settings. These modelling simulations will describe survey protocol advantages, disadvantages and costs in different settings and inform WHO Protocol Development for SCH M&E.

Country experiences of Precision mapping

- **Kenya's experience of precision mapping**, Dr Wyckliff Omondi, (Kenyan Ministry of Health). Precision mapping was carried out in the Coastal region, 6 Counties, 26 sub-counties (original IUs), 130 wards (Sub-IUs). The team adapted the WHO AFRO NTD mapping guide to the lower ward level. Originally planned for school-based survey but changed to community-survey using villages (645 villages) due to school closure during the pandemic. The target age range was SAC (8-14 years). The survey included a WASH questionnaire. The survey captured the variability within sub-counties (original IUs), identified wards whose treatment needs were not being met and wards who did not need MDA. The MoH planned an enhanced SCH MDA hereafter, addressing treatment needs of underserved mid-to-high prevalence wards (>2%).
    - **Lessons learnt**:
        - Precision mapping highlights the variation of SCH prevalence within traditional implementation units (district/sub-county level).
        - WHO AFRO mapping protocol can be adapted to a lower administrative level. It is important to have a standard, flexible protocol that can be used for precision mapping in the Country.
        - Mapping protocol can be adapted to accommodate COVID-19 (targeting School Aged children in their households as opposed to in schools if schools are closed)
        - It was possible to treat sections of the population at the sub-IU level, targeting only eligible wards. The mapping enabled the MoH to make the shift in the SCH elimination approach from school based to community based and have an expanded target as per the BTS and the WHO guidelines.
        - Prudent utilization of available resources as 4 sub-counties which were found not to have met the MDA threshold and as in some of the sub-counties, some of the wards were also not eligible for MDA (22 out of 26 sub-counties).
- **Tanzania's experience of precision mapping**, Dr Humphrey Mazigo, (Catholic University of Health and Allied Sciences). Tanzania needed to carry out mapping following 15 years of MDA implementation to assess impact of MDA. Mapping was carried out in six regions of north-western Tanzania. School-based surveys were carried out with 290 schools surveyed in 29 districts. Of these,145 were sentinel site assessment schools and 145 were precision mapping schools selected using ecological data. In each school 30 boys & 30 girls were sampled, using single urine and stool for filtration and KK. The prevalence and infection intensity levels of both

schistosomiasis and STHs were determined, and maps were generated to show prevalence at school level for the schools that were mapped using this approach.

- **Lessons learnt**
  - Precision mapping highlights the need to change treatment strategies- from blanket mass treatment to every district to a more focused treatment at ward/school levels.
  - Need to utilize data at the ward level for treatment planning to improve the efficiency and effectiveness of MDA.

- **Cameroon's experience of precision mapping**, Prof. Louis-Albert Tchuem Tchuenté (University of Yaoundé I). Precision mapping is mapping at a finer geographical resolution, potentially examining all schools within every subunit in each implementation unit in order to eliminate errors caused by missing focal variation on SCH prev. In 2016 Cameroon started implementing precision mapping in certain Health districts that had complex data &/ lacked adequate data for correct classification. Mapping was implemented using the sub-district level, Health Areas (HA), which captured large variation of schistosomiasis prevalence within Health districts. This led to a better understanding of the potential scale of inadequate treatment. Following precision mapping Health Areas were classified according to the actual schistosomiasis prevalence in that Health Area and appropriate treatment implemented. Cameroon is planning to map all HA and have identified that 83% of Health Areas need mapping.
  - **Lessons learnt**
    - Data was compared between "conventional" district level mapping, with lower-level precision mapping and the conclusion was drawn that the "conventional" district level mapping missed variation and led to inefficient use of medicine distribution and use.
    - It is difficult to extrapolate sub-district prevalence if there is no sub-district data, due to the high variation of SCH prevalence.
    - Precision mapping in sub-districts delivered a better understanding of SCH distribution and optimized implementation of interventions.

- **Rwanda's experience of precision mapping** Mr Jean Bosco Mbonigaba (Rwanda Biomedical Centre). Rwanda moved to community-based mapping using villages. A multi-stage approach to site selection was used, starting by categorising villages using admin structures and wetland ecosystem to find villages close to water bodies, then used ecological data & local knowledge, using a decentralized approach with participatory engagement with community health and local leadership. This data and knowledge was used to rank villages according to schistosomiasis risk levels (score levels). Sampling units based on risk were mapped for each district and then at risk

villages selected – in each village the household (HH) unit was used. For each HH members were listed including age and gender. 20 HH per village were selected then a sampling selection strategy was used to sample 1 individual per HH and ensure representation of age group and gender per HH. Rwanda worked with districts and health centres, and used ODK-based App for data collection.

- **Lessons Learnt**
  - The community-based survey is very practical and effective when diligently planned & coordinated with local governments and communities. No huge funding required.
  - SCH history and ecologies alone cannot be the sole selection criteria for geographic sampling but combining with all transmission factors is more effective. Example: Closeness to water bodies is not sufficient for effective precision mapping but also activities in those water bodies (51% excluded as no activities despite their closeness)

Following the talks and a Q&A, breakout groups used Easy Retro boards (see Appendix page 15) to look at and discuss the following themes:

1. Additional value of precision mapping in helping the NTD program managers decide on SCH intervention strategies.
2. Best strategies for precision mapping implementation and approaches for site selection.
3. Merits and demerits of community-based surveys versus schools-based surveys.

Lessons learnt and challenges

The following lessons learnt, and challenges were raised by the talks and Easy Retro Board discussions in the Research Links session:

- **Methodology and data analysis.** The talks of country experiences demonstrated different approaches to precision mapping methodologies.
  - <u>Commonalities & differences included:</u>
    - All included some ecological and environmental considerations in their mapping approach, though different sources of data were used.
    - Diagnostics - all used kato-katz and urine filtration, Rwanda also used CCA.
    - School or community – some used school-based surveys others used villages and households.

- Gender – all countries put in place measures to collect from different genders.
- Age groups sampled – some focused-on sampling for school ages only others included different age groups (preschool and adults).
- Site selection: there were different approaches to site selections.

- **Decision-making for mapping & M&E resource allocation**
  - Lessons learnt:
    - Precision mapping highlights the variation of SCH prevalence within traditional implementation units (district/sub-county level).
    - WHO AFRO mapping protocol can be adopted & mapping protocol can be adapted to accommodate COVID-19.
    - Precision mapping in sub-districts enables optimized implementation of interventions.
    - It can be difficult to extrapolate sub-district prevalence due to the high variation of SCH prevalence.
    - Community-based surveys can work well when done with local governments and engaging local and health leadership.
    - SCH history and ecologies alone cannot be the sole selection criteria for geographic sampling but combining with other transmission factors & available data is effective.
  - Challenges:
    - Rwanda found interesting results by age groups – the higher CCA positivity in PSAC should be further explored
    - How often should a precision mapping exercise take place - every 5 years or longer period? Is it important to factor in short-term costs versus longer-term savings? SCORE studies suggest assessments every 3 years are more efficient.
    - Diagnostics – need for more sensitive diagnostics.
    - The diagnostics KK and urine filtration are not ideal for community-based surveys and adult surveys. More logistically feasible and acceptable diagnostics for community-based surveys are needed. This would also improves consent rates.
    - Ability/capacity of the current laboratory infrastructures to accommodate the increased need for more accurate information?
    - How to avoid/check for bias in sampling approach?

- Communities need to be included from the mapping stage – especially in the context of the pandemic, to improve buy-in and compliance with the programmes, in both school-based and community platforms for mapping.
- Information on logistics of sub-district implementation, costs and coverage is needed.
- Community & household surveys could be more expensive to implement than school-surveys, due to accessibility, coverage need, effort to reach required sampling size, acceptability of diagnostic sampling method, pandemic mitigating factors and other.
- School-based surveys advantages are to do with ease of access and of field work in schools as well as comparability with historical data. Concerns for school-based sampling is that children who are not in school (whether not enrolled or high level of absenteeism) are more likely to be infected and to have heavy infections (increased exposure & missed MDAs). So, missing them can mean the data is biased because it does not capture these likely infected and higher infection intensity children. Similarly, if relying on school enrolment data to identify households may again mean that these high-risk children are missed.

- **Decision-making for interventions**
  - <u>Lessons learnt:</u>
    - Precision mapping allowed countries to identify new areas that are endemic and that had not received adequate treatment, this allowed the reallocation of medicines to treat those underserved endemic communities.
    - Including different age groups in the mapping helped reveal the burden in adults and preschool aged children, this gave the MoH and local govs a clear picture of SCH and informed planning and resource allocation for health (Rwanda).
    - To be cost-effective we need targeted interventions, this requires the data.
    - Precision mapping allowed the targeting of treatment to areas that needed PC, saving resources and medicines. There is an investment in the mapping stage that leads to more efficient resource use later.
    - Using precision mapping the medicine request may or may not change much however the distribution of medicines does change and the medicines go to the sub-IUs that have an MDA need/ are eligible for MDA according to WHO and national guidelines.

- Challenges:
  - How to decide if the inclusion of adult population for treatment against SCH and STH is needed and what are the best approaches to assess & implement treatment in this age group?
  - Need for delineation of the adult population and other at-risk groups in SCH-endemic areas to facilitate planning and rolling out of treatment based on the 'saved medicines' from precision mapping.
  - Including communities for buy-in, e.g. by using participatory implementation approaches for sub-district community-based interventions.
  - Precision mapping the cluster index of the communities will be reduced, and focality will be shared among close communities – what is the treatment decision for low/non-endemic communities that are neighbouring hyperendemic communities?
  - Need info on logistics of sub-district implementation, costs and coverage.
  - How does precision mapping help with decisions on treating preschool aged children?

KNOWLEDGE GAPS IDENTIFIED

What data and tools need to be generated to address the issues raised by the group?

Needs identified through the Research Links Easy Retro Boards:

Additional value of precision mapping in helping the NTD program managers decide on SCH intervention strategies.

- Tools to expand IU mapping
- Accurate population data & shapefiles (geodata) to sub-IU level & GIS data
- Tools to create community engagement & buy-in
- Tools to strengthen health district operational capacity
- Data visualization tools to enable/facilitate understanding of results & support decision making

Best strategies for precision mapping implementation and approaches for site selection.

- Cost of different surveys and how these can be planned and budgeted for – is there a need for an updated recommendation on how much of the programmatic budget should be targeting mapping & M&E?
- Site selection and number depends on survey approach (single stage or multi-stage?), area being mapped, whether integrating other NTDs e.g. STHs, and resource available/allocated. Data that can support site selection and sampling approach include:
    - historical data
    - population data
    - Geospatial data
    - evidence of spatial variation in prevalence
    - risk linked to the wetland size, ecology and water contact-use
- Demographic selection: what are the best methods to identify at-risk populations and make decisions on demographics needed for evidence-based decision-making using precision mapping?

Merits and demerits of community-based survey versus schools-based surveys.

- Need new/adapted diagnostics for community-household based sampling surveys and when sampling from adults.
- Better estimation of the cost of community-based sampling surveys to allow for budgeting and resource allocations.
- Cost-efficient access to people in different risk groups (age, occupation, gender, social status).
- Need to engage the community through participatory approaches to ensure compliance and buy-in – and need tool/approach to check that sections of a population/community are not being systematically missed (people in the periphery, social and physical).
- Need a sampling framework for community surveys.
- Are hybrid surveys feasible using entry/access points for different at-risk groups (for example children in schools, occupational & domestic chores sites for adults & non-school attending children e.g., markets/fishing landing sites for occupational risk, rice paddies, water collecting sites)?

RECOMMENDED NEXT STEPS

What operational research and other actions need to be taken to address the knowledge gaps identified by the group?

Summary

We identified 5 research priorities in the COR NTD Research Links session that took place on the 22nd of September – Sampling Frameworks, Cost-Benefit Analysis, Diagnostics, Data criteria, analysis & visualization, and Integration with other NTDS. These were listed in the draft COR NTD report and shared with COR NTD participants ahead of the session at the annual meeting (9th November). At the COR NTD annual meeting we reviewed and refined these priorities. Our session was attended by 50 to 60 participants. Speakers & participants gave their views and experiences of these priorities. We used an Easy Retro Board with prepopulated cards capturing these research priorities and asked the audience to "vote" on which they thought were the top priorities. A total of 34 participants voted, a couple added new cards and comments. The detailed Easy Retro Boards of this session and of the Research Links session are in the Appendix.

Operational Research Priorities

Priorities highlighted; order based on the Easy Retro board votes, showing items with more than 10 votes. Other priorities listed in Appendix:

1. **Diagnostics for Precision mapping**:
    - Determine what diagnostic tests could be deployed in a public health setting (rather than clinical)? Rank current diagnostics for precision mapping in terms of:
        - Are they at a stage where they could be pilot tested for mapping and/or surveillance in different endemicities?
        - Knowledge of cost implications
        - Knowledge of logistics and technical expertise
        - Knowledge of acceptability for community-household or school surveys and for different age groups.
        - Knowledge of sensitivity required to reach goals (EPHP and/or approaching transmission break e.g. BTS)
    - Develop new or adapt current diagnostics to increase feasibility & patient-acceptability for use in community-household based sampling surveys and for sampling from adults.?

        - Note that the oversampling survey will be using duplicate kato-katz and single urine filtration and urine dipstick for microhaematuria, on single day stool/urine samples.

2. **Cost - benefit analysis**: *Community & household surveys at sub-IU could be more expensive to implement than school-surveys, due to accessibility, coverage need, effort to reach required sampling size, acceptability of diagnostic sampling method, pandemic mitigating factors and other. Savings could be made by improving targeting of treatments and interventions. These costs and benefits could change as elimination targets are approached.*
    - Evaluate costs of different survey approaches, including diagnostics used, demographics sampled, and goals aimed for (EPHP, Elimination of Transmission).
        - Develop estimation of the cost of community-based sampling surveys to allow for budgeting and resource allocations.
        - Determine potential cost-efficient access to people in different risk groups (age, occupation, gender, social status).
    - Public health economists to assess cost-benefit, cost-efficiency of precision mapping sampling approaches, short term costs for long term savings and frequency of surveys for mapping & impact assessment.

3. **Data criteria, analysis and visualization**:
    - What data can be integrated into precision mapping that could improve decision making, and how?
        - Geospatial data (GIS, Remote-Sensing, ecological, population etc)
        - Cross-sector available data:
            - Water and agriculture,
            - Education sector
            - Health sector

4. **Sampling Framework**
    - Test & compare community/school/hybrid surveys
        - Determine & delineate at risk populations
        - Determine entry/access points for different at-risk groups (for example children in schools, occupational & domestic chores sites for adults & non-school attending children e.g., markets/fishing landing sites for occupational risk, rice paddies, water collecting sites)
        - Develop and test hybrid community, household and school sampling surveys.

        - Develop how to track who has been sampled and where? How to capture the data at different access points?
        - Determine feasibility, training and resource needs, cost-benefit analysis (Linked to the Cost-benefit analysis priority).
    - Develop and test logistically feasible community-based sampling:
        - starting with participatory approach to developing mapping plan,
        - engaging local government, health and community leaders,
        - getting buy-in to increase consent for sample collection and diagnostics,
        - ensure people on the peripheries (physical and social) are not being missed and
        - set up report back systems to local government, local leaders and communities to build trust.

5. **Integration with other NTDs**:
    - when and how to integrate STHs (including strongyloides), *T. solium* and other NTDs of national importance, and how to ensure data are shared with relevant cross-sector departments and authorities *(received less than 10 votes on Easy Retro but was discussed in Research Links)*.

Appendix Easy Retro Boards

Easy Retro Board Refining priorities & Recommended Next Steps 09th Nov 2021

(in order of most voted priority)

1. Sampling Framework *Description: What research is needed for community/school/hybrid sampling frameworks?*	**2. Implications on cost & elimination targets** *Description: What research should be undertaken to determine precision mapping impact on costs, resources and intervention strategies for elimination targets?*	**3. Precision mapping diagnostics** *Description: What are the research priorities for precision mapping diagnostics?*	**Other** ***Description:*** *Other Research priorities for precision mapping*

○ Test & compare community/school/hybrid surveys ■ Determine & delineate at risk populations ■ Determine entry/access points for different at-risk groups (for example children in schools, occupational & domestic chores sites for adults & non-school attending children e.g., markets/fishing landing sites for occupational risk, rice paddies, water collecting sites) ■ Develop and test hybrid community, household and school sampling surveys. ■ Develop how to track who has been sampled and where? How to capture the data at different access points? ■ Determine feasibility, training and resource needs, cost-benefit analysis (Linked to theme 2). **(15 votes)**	○ Evaluate costs of different survey approaches, including diagnostics used, demographics sampled, and goals aimed for (EPHP, Elimination of Transmission). ● Develop estimation of the cost of community-based sampling surveys to allow for budgeting and resource allocations. ● Determine potential cost-efficient access to people in different risk groups (age, occupation, gender, social status). **(25 votes)**	○ Determine what diagnostic tests could be deployed in a public health setting (rather than clinical)? Rank current diagnostics for precision mapping in terms of: ■ Are they at a stage where they could be pilot tested for mapping and/or surveillance in different endemicities? ■ Knowledge of cost implications ■ Knowledge of logistics and technical expertise ■ Knowledge of acceptbility for community-household or school surveys and for different age groups. ■ Knowledge of sensitivity required to reach goals (EPHP and/or approaching transmission break e.g. BTS) **(31 votes)**	○ What data can be integrated into precision mapping that could improve decision making, and how? ■ Geospatial data (GIS, Remote-Sensing, ecological, population etc) ■ Cross-sector available data: ● Water and agriculture, ● Education sector ● Health sector **(25 votes)**

○ Develop and test logistically feasible community-based sampling: ■ starting with participatory approach to developing mapping plan, ■ engaging local government, health and community leaders, ■ getting buy-in to increase consent for sample collection and diagnostics, ■ ensure people on the peripheries (physical and social) are not being missed and ■ set up report back systems to local government, local leaders and communities to build trust. (11 votes)	○ Public health economists to assess cost-benefit, cost-efficiency of precision mapping sampling approaches, short term costs for long term savings and frequency of surveys for mapping & impact assessment. (11 votes) Comments - And related to this, costs of low, moderate and heavy intensity infections to calculate the cost effectiveness of interventions pre and post precision mapping	○ Develop new or adapt current diagnostics to increase feasibility & patient-acceptability for use in community-household based sampling surveys and for sampling from adults. (23 votes)	○ What data visualization tools could support decisions on surveys and interventions? (8 votes)
Methods of delineation of the adult population and other at-risk groups such as pre-school age children, occupationally-at-risk in SCH-endemic areas, to facilitate planning and rolling out of treatment based on the 'saved medicines' from precision mapping. (7 votes)	○ Analyse and determine programmatic costs & investment costs of medicine donation, and potential savings of medicines, and public health benefits of targeted interventions at the sub-IU level (health, education, development). (5 votes)		○ when and how to integrate STHs (including strongyloides), T. solium and other NTDs of national importance, and how to ensure data are shared with relevant cross-sector departments and authorities. (7 votes)

Is precision mapping providing a district or sub-district treatment decision? More guidance/research on sample size calculations to understand what power is needed to determine this MDA threshold. (3 votes)	○ Modelling cost-benefit analysis to see how this changes as EPHP is achieved at the sub-district level and prevalence decrease? (2 votes)		When will the new WHO guidelines be published? This will be very helpful to advocate to NTDPs to conduct precision mapping
● First test if hybrid surveys are feasible by using entry/access points for different at-risk groups (for example children in schools, occupational & domestic chores sites for adults & non-school attending children e.g., markets/fishing landing sites for occupational risk, rice paddies, water collecting sites)? (2 votes)			

Easy Retro Boards from Research Links 22nd September 2021

1. Additional value of precision mapping in helping the NTD program managers decide on SCH intervention strategies.

How does precision mapping help decision-making?	What precision mapping data is useful for decision making?	What are the cost implications of precision mapping and intervention decisions?	What is needed to improve/support decision-making using precision mapping data?
Highlighting only areas where schisto transmission is ongoing and leaving out those that do not warranty treatment (1 votes)	prevalence (0 votes)	focus intervention- e.g., MDA at focal level (0 votes)	map more IUs (1 votes)
Focalize treatment decisions rather than blanket district MDA (2 votes)	intensity of infection (0 votes)	reduce wastage of effort-money and drugs (0 votes)	support national programs complete all IUs mapping (1 votes)
It reduces uncertainty (0 votes)	Prevalence data (0 votes)	possible increased sample size of mapping (1 votes)	accurate population data & Shapefiles (Geodata) to sub-IU level (2 votes)

gave an accurate idea of the real needs (0 votes)	Prevalence and intensity of infection (0 votes)	Large initial investment to fund the survey but potential (not guaranteed) cost-saving if MDA is focalized if some areas can stop MDA (1 votes)	Greater community sensitization and buy-in (0 votes)
reduces over / under treatment to avoid waste of resources in case of overtreatment and morbidity increases in case of undertreatment (0 votes)	Prevalence & Intensity data + WASH information (4 votes)	In long term if precision mapping is conducted appropriately, then there will be savings in implementation cost (0 votes)	community involvement (0 votes)
provides targeted data for drug requirements and requests from WHO (0 votes)	WASH (0 votes)	Increase cost may be observed at setting up but recovered during control (MDA) programs as treatment is sub-district specific (0 votes)	Strengthen health district operational capacities (1 votes)
Allowing to identify sub-districts that require MDA and other control interventions (0 votes)	Prevalence and intensities (0 votes)	may not necessarily reduce cost but allow it to be better targeted and potential expand to inclusion of other age groups, e.g. adults, under-5s (when paediatric formulation is available) (0 votes)	Include GIS data to help highlight risk. community buy in and sustainability (0 votes)
	associated environmental data (1 votes)		strong data visualization to enable/facilitate understanding of results, to ensure the tools, decisions and results are used to the best possible outcomes (0 votes)

2. Best strategies for precision mapping implementation and approaches for site selection.

How should sites be selected for mapping?	**Who should be sampled at selected sites?** **[Age, Sex, occupation etc?]**	**How many sites should be surveyed**?	**What diagnostics should be used for precision mapping?**
It depends with the prevalences and infection worm density (1 votes)	PSACs, fishermen and those at risk population regardless of age (0 votes)	Depends on survey methods: is this a single stage or two stage or multi-stage survey like oncho elimination mapping? (2 votes)	Community surveys seems to be more expensive versus school based mapping (1 votes)

This is the way we did in Rwanda i. Locating all villages surrounding wetland ecosystem/ hydrology (ii) Collection of ecological and schistosomiassi exposure information for each villages and if located in a previous known endemic area: office work; (iii) Ranking each village with a schistosomiasis risk level and select villages had significant level and (iv) Selection of villages to survey based on risk level with consideration of the representation of each type of waterbodies and geospatial representation in a district: workshop, (2 votes)	Based on 3 age groups: 1-4, 5-14 or 15, & 15/16+ considering equal gender representation (2 votes)	as many as possible according to resources available (0 votes)	CCA (0 votes) Comments - I am concerned that CCA does not hold up to quality assurance standards - results are not reliable. - currently not reliable
Based on the historical endemicity and MoH infection and treatment registry. (0 votes)	School children, Fishermen, agricultural workers (0 votes)	Should depend on risk. (0 votes)	It depends on the target. If prevalence (and not intensity) is what is needed, then point-of-care tests are ideal in terms of feasibility. But today's POC tests are not sufficiently accurate, so I'm afraid we are limited to KK and Urine Filtration (3 votes) Comments - maybe can include microhematuria for S.h.
spatially regulated if possible, randomly if not (with appropriate stratification) (3 votes)	School age-children and at risk population (1 votes)	This depends on how precise you want your estimate to be and what level of unit you want the outcome (0 votes)	It depends on the endemicity and the disease. For S. mansoni in hyper and meso endemic areas the ones available are fine, but for hypo endemic areas none of the available ones are acceptable. (0 votes)
Based on proximity to water bodies and access to safe water sources (0 votes)	May depend on goals: for control, SAC are sufficient but if a particular site/EU is trying for elimination of transmission then a broader group is needed (5 votes)	Depending on the area been mapped and the available resources (0 votes)	AT the moment we only have KK and urine filtration that are reliable. CCA was promising but there are now manufacture issues. CAA is hopeful but not ready for programmatic use, yet (2 votes)

Sub-district mapping helping in better planning for NTD programmes and more efficient allocation of the dugs in endemic countries (0 votes)	Ideally SAC as evidence has demonstrated that they are a good proxy for community prevalence (in pre-SAC and adults. However, if they are still a good proxy post-MDA requires further evidence. (1 votes)	Dependind on the distance towords the water bodies (0 votes)	Cca and katokatz (0 votes)
Districts/subdistricts might be selected based on years of treatment (and years since last mapping was performed), with preference given to sites that haven't been surveyed recently (0 votes)	All people above 1 year in the community (2 votes)	It depends on the spatial variation in prevalence; this will hopefully be informed by ongoing studies. The minimum number of sites needed to make a sufficiently accurate treatment classification is ideal. (0 votes)	POC CCAs but ultimately if possible best diagnostics are kato katz and urine filtration and should always be used where possible (0 votes)
Basically on Ugandan experience this should be based on risk of water bodies and how close and often communities access and utilize them. We have always considered 5-7 sites per zone;I.e high risk, moderate and low meaning areas closes tithe water bodies less than 5 km radius, 5-10km radius for moderate and more than 10km radius for low. This should be complimentary to questionnaire based surveys (0 votes)	Adults,fishermen,sandharvesters, school going kids (0 votes)	As many as possible, contingent upon available resources (2 votes)	CCA and katokatz (0 votes)
Unit to be used for mapping depends on whether solely for schisto. or want to incorporate integration with STH (0 votes)	Age: SAC. Other age groups to be included for corroboration of what is observed in SAC (SAC is known to be a good predictor of prevalence in other age groups, but this could also vary by setting). Gender: both gender representation (0 votes)	Depend on the sample sizes needed with precision level and ecology. (0 votes)	Innovation is required in diagnostics: perhaps a test that can detect both intensity and prevalence at the site, perhaps a nucleic acid based test, needs be developed and widely adopted. (2 votes)
Key drivers: a combination of several is based on water sources, local knowledge, previous data, and also where there are gaps in data (0 votes)	50-50 gender balance across SAC and at risk populations. If additional resources are available, more emphasis on females (FGS) (0 votes)	This should depend on the endemicity level of SCH in each considered cluster or community. (0 votes)	GIS to select the villages, data collected from Ministry of agriculture and water. Entered in Data base to help select the villages. Villages ranked based on ecology, risks according to scores. Classified according to 1. Water 2. Human activity 3. Agriculture (rice) 4. Ecology. High ranking villages - Sampling hereafer (0 votes)

proximity to water, for example: <=5km (1 votes) Comments - communities that don't live near water can still have schistomiasis though, for example if they travel to areas with water for market/work/school, and they would need treatment	Children, Nomads, Farmers, Fishermen and children in non schooling areas (0 votes)	It depends on methods and on the wetland size, numbers and the size of district (0 votes)	KK, duplicate slides, Urine filtration- single slide. POC-CCA in areas with low prevalence, POC-CAA once it becomes available (0 votes)
Depending on the previous history of prevalence, areas around fresh water bodies and from sub counties can be selected (0 votes)	Evidence so far is that children act as Proxi for adult prevalence. Less evidence on whether after many rounds of School surveys, this is still the case. Results from Kenya, Tz, Rwanda and Camer (0 votes)		CCA, CAA, and KK (0 votes)
	Mapping is fundamental and we need to think about site selection in each location - Selection of site need to benefit from existing studies conducted by research organisations (To help with the selection process) (0 votes)		Parasitological and immunological and others depending on teh obejctive (0 votes)
			Depend on the purpose and the stage of the program. More sensitive methods are needed towards later stage. (0 votes)

3. Merits and demerits of community-based survey versus schools-based surveys.

What are the advantages of community-based surveys for mapping?	What are the advantages of school-based surveys for mapping?	What are the challenges for community-based surveys?	What are the challenges for school-based surveys?	Is a hybrid version feasible and if so how?
More accurate for transmission and morbidity potential across the whole community (6 votes)	Easier to sample the required number of participant (2 votes)	reaching people on the peripheries (social and physical) of the communities and therefore making assumptions about whole communities without representing all of the community. (2 votes)	low school enrolment / attendance (1 votes)	Using key locations to recruit: schools for SAC, markets/fish landing sites for adults/pre sac (4 votes)

Higher chance of identifying demographic groups responsible for the majority of transmission in a certain setting (3 votes)	Quicker to recruit required sample sizes (1 votes)	You have to collect stools in house sampling. Difficult. We need new diagnostics (2 votes)	Missing non enrolled SAC (1 votes)	I think going to test households of school children would be very biased in some areas with low scholarity. (2 votes)
I would suspect children out of school would have higher morbidity from schisto than those in...if you want most efficient use of drug then.. (1 votes)	Comparable with a lot of historical data (1 votes)	high cost of implementation (1 votes)	School based work engages the ministry of education. this program should be with the ministry of health, especially if we are aiming to eventually treat adults (0 votes)	No one has mentioned gender issues where girls are not in school.... (2 votes)
As MDA progresses infections in SAC may become less and less representative of community level infections. (1 votes)	less costly in terms of implementation (1 votes)	Bias in recruitment possible, with certain groups being more or less likely to consent (1 votes)	not so many challenges for the survey itself, but the data obtained is not representative enough anymore - if we are to reach elimination (0 votes)	should be, probably different entries into communities needed for different groups. Perhaps SAC a good entry point for communication and sensitisation for families of the children (1 votes)
minimum bias with respect to sociological representation (1 votes)	Quick and ensure good compliance (0 votes)	Cost-efficient access to community level, eg. can be a problem to reach people working (0 votes)	Some children travel further to attend their schools - may not reflect the local areas - we may be missing private schools or schools for children with disabilities? (0 votes)	may be operationally feasible but not technically in terms of covering representative target (0 votes)
Capture all SAC without school enrolment biais (1 votes)	It's easier to get at kids in schools...schisto and STH is about 'Stools in Schools' Trapped by convenience does not give good data, as in most convenience surveys (0 votes)	risk of missing certain demographics, e.g. if certain occupationally at risk groups live further out from village centers (0 votes)	when we have low school enrollment (0 votes)	Recruiting children in schools and asking them to ask their families to be recruited maybe? (0 votes)
gives true reflection of the prevalence of schistosomiasis (0 votes)	easy access and comparable data (although limitation with extrapolation to other groups incl. children not in school) (0 votes)	need of sampling frame (0 votes)	selection bias (0 votes)	

More targeted interventions to the most in need (0 votes)			risk of missing certain high risk children (0 votes)	