Schistosoma mansoni: Incorporating New Data into Future Strategies and Goals

Session Date: Saturday, November 4

Session Time: 9:00am – 12:00pm

Session Location: Harborview I

Session Description: Schistosomiasis (SCH) control and elimination efforts are at a crossroads that demands decisions about how best to maintain current gains while making critical choices about next moves. The data from the SCORE *S. mansoni* studies are now at a point where they can contribute to decision-making and help move the field through the crossroads. The major aim of this session will be to explain recent findings to the participants and to provide open opportunities for discussion of how they can contribute to the formulation of new approaches to schistosomiasis control and elimination. The aim of this session is to encourage a thoughtful and robust exploration of the implications of SCORE findings regarding *S. mansoni* infections.

Session Chairs: Dan Colley, Schistosomiasis Consortium for Operational Research and Evaluation (SCORE)
David Rollinson, Global Schistosomiasis Alliance (GSA)

Session Rapporteur: Arminder Deol

KEY DISCUSSION POINTS

The fundamental finding of the SCORE studies presented by Drs. Charlie King and Pauline Mwinzi were that all MDA strategies evaluated [school-based (SBT), community-wide (CWT), annual, biennial or 2-year only] over 5 years (4 years of the strategies) reduced prevalence and intensity of *S. mansoni* in both moderate level villages (10%-24% prevalence) or high prevalence villages (≥25%) if delivered with approximately 75% coverage. However, it was seen that MDA for 4 consecutive years was significantly better than 2 MDA rounds during the same period. Somewhat surprisingly, 4 years of SBT with high coverage also impacted prevalence and intensity in 'non-target populations' (1st year students and adults). Another finding was that in each study arm of 25 villages there were 'persistent hotspots' – villages that continued to have high prevalence in Year 5 despite 4 years of good MDA coverage. It was also noted that up to 66% of villages in the high prevalence area studies had, at baseline, already achieved the WHO definition of controlling morbidity (<5% prevalence of heavy infections) and all arms achieved this cut-off by the end of the studies.

The fundamental findings of the 2nd set of presentations, by Drs. Fiona Fleming and Dan Colley, were that for mapping in areas with low-to-moderate prevalence of *S. mansoni* the POC-CCA assay is much more sensitive than the Kato-Katz stool assay, but there remains the challenge of how to correlate POC-CCA assay data with Kato-Katz data and utilize the former in regard to the current WHO guidelines. In addition, Dr. Colley's presentation attempted to consolidate the findings of the first three presentations and outline what these studies say about moving forward. He emphasized that the main effort in sub-Saharan Africa should remain on morbidity control and that new guidelines need to be developed to deal separately with morbidity control and elimination efforts.

The new guidelines also need to take into account new tools and knowledge and be built with sufficient flexibility to adapt to new findings in a propitious manner.

Breakout session 2I had two discussion periods (each following 2 presentations) in each of which the attendees formed into 3 groups to discuss prepared questions based on the presentations. There was also a broader discussion period at the end of the breakout session.

The key discussion points during the 1st discussion period revolved around the design of the studies presented as well as the findings. Discussion ranged from whether the data were clear or compromised by other things happening in these villages (development, etc.) but in general a slight majority agreed that while all strategies worked to bring down prevalence and intensity, annual MDA prevented missing people and was somewhat more effective than biennial, while 2-year only was the least effective. Coverage and compliance remains a discussion issue in these and other studies, and the question of systematic non-compliance could be a major problem. One discussion group suggested that Arm 1 (2 years of CWT followed by 2 years of SBT) would be the most effective approach, as it would treat adults and non-school attendees (who may have the most morbidity) and continue to prevent morbidity in school-age/school-attending children. The question of monitoring progress to spot persistent hotspots before 5 or 6 years was discussed and it was thought that monitoring might be feasible every 2 years if a realistic sampling scheme could be developed. However, also systematic non-compliance and focusing on high-risk water bodies should be explored, as well as studies on both how to identify and how to deal with persistent hotspots.

Following the second set of presentations (also generated by breaking into 3 groups during the discussion period) the key discussion points focused on the differences presented by Kato-Katz results and POC-CCA results. The discussions were not only about their correlation, but also about what they each mean – and more critically how they do or do not represent meaningful data related to morbidity, both severe morbidity and functional morbidity as seen following the institution of control programs. Clearly, in areas of high prevalence and intensity, for example at the beginning of a national control program, the Kato-Katz assay and POC-CCA are essentially equivalent in determining prevalence and the Kato-Katz also provides egg counts which are considered to approximate the risk of severe morbidity. However, in areas of low-to-moderate prevalence the Kato-Katz assays result in lower estimates of prevalence than do the POC-CCA assays. Thus, with the Kato-Katz one runs the risk of undertreating given areas. Extensive discussions revolved around the question of at what prevalence (and using what assay) it makes sense to institute a test-and-treat approach as opposed to MDA. In part this was because test-and-treat means different things to different people and there is no agreed upon (or even widely discussed) strategy for test-and-treat for schistosomiasis. Various designs discussed had to do with the level at which it is done, the cost differential to MDA, the involvement of health systems (and their variability in different countries), benefits in terms of compliance and whether pooling of samples (presumably urine) would be feasible and helpful. A major discussion formed around morbidity and what that term does or does not mean in schistosomiasis before or during intervention programs. Since the case was made that morbidity control was still the primary goal in sub-Saharan Africa, there is much to be done to define what morbidity is in schistosomiasis and how it might be measured. The distinction between severe morbidity as presented in textbooks and functional morbidity in terms of impacting develop in children was reiterated and both are still important. Also mentioned was the lack of thought about the management of morbidity. The definition and measuring of morbidity due to schistosomiasis was a major focal point of different discussions and formed the bridge between Breakout Session 2I and Breakout Session 3I, which followed 2I.

CHALLENGES/KNOWLEDGE GAPS IDENTIFIED

1. We do not know how to identify persistent hotspots & we do not know how to effectively deal with persistent hotspots

2. We need confirmation of the impact of high coverage, school-based annual MDA on 'non-target populations (across all age groups and high-risk populations)

3. There is a major gap in our knowledge of how to both define and measure morbidity due to schistosomiasis, especially in endemic areas of low-to-moderate prevalence

4. The correlation between Kato-Katz and POC-CCA results, specifically in areas of very low, low and moderate prevalence is still confusing and needs to be sorted out in such areas and before and after interventions

5. We do not know when to implement test-and-treat strategies, and we do not know what test-and-treat strategies to use when we do learn when to use this approach to maintaining control

RECOMMENDED NEXT STEPS

1. Studies need to be designed and implemented in regard to identifying the characteristics that correlate with being a persistent hotspot, as compared to a responder village in the same general area

2. Studies need to be designed and implemented to determine the best approach(es) for dealing with persistent hotspots, i.e., to bring down prevalence and intensity in areas that do not respond to multiple annual MDAs

3. Studies, likely cohort studies on a smaller scale and including all age groups, need to be implemented that focus on defining morbidity due to schistosomiasis at the beginning of an intervention study and after multiple years, with a focus on functional morbidities and how to measure them

4. More analyses need to be done comparing Kato-Katz to POC-CCA results to specifically include data from areas with very low, low and moderate prevalence – before and after interventions – to reach a reasonable correlation for guidelines and to determine if there is a low level of prevalence at which the POC-CCA becomes less useful due to an unacceptable rate of false positivity

5. Meetings need to be held to review several possible test-and-treat strategies suitable for the focal nature and levels of schistosomiasis and then those possible strategies need to be turned into studies in naturally low prevalence areas, as well as areas that have become low prevalence areas following multiple years of interventions