Assessment of Schistosomiasis and Trachoma Distribution in Urban Areas for Targeted Intervention

Session Date & Time:	Tuesday, November 19 at 9:00 AM
Session Location:	MGM Salon C
Session Description:	Develop an integrated mapping protocol for Schistosomiasis and Trachoma in urban environments to determine areas where transmission is ongoing, and communities are at risk, enabling the optimisation of interventions targeted to affected communities under a Universal Health Coverage approach.
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KEY DISCUSSION POINTS - ***What key findings and data did the group identify via presentations? What issues were raised in discussions?***

1. Traditionally, trachoma is not thought to be endemic in urban settings, based on the assumption that urban populations have access to better facilities and services. Therefore, trachoma prevalence surveys tend to focus only on rural areas. Although studies comparing trachoma prevalence in rural and urban settings show that the prevalence is higher in rural areas, this does not necessarily mean that trachoma is not a public health problem in urban settings. Poor sanitation and waste disposal infrastructure may result from urbanisation, especially if it occurs rapidly. Furthermore, with rural-to-urban migration, individuals may have undergone multiple rounds of reinfection (TF) as children, but with trichiasis (TT) only developing in adult life once living in an urban setting.
2. A literature search was undertaken to determine whether there is any evidence of trachoma being a public health problem in urban settings and to inform whether urban areas should be included in trachoma prevalence surveys. Of the thirteen publications with results on the active trachoma (TF), three reported prevalence results above the threshold indicating that trachoma is a public health problem. Of the seven publications with results on the more advanced form of the disease (TT), all seven reported prevalence results above the threshold indicating that trachoma is a public health problem. In summary, there is some evidence from the published literature that trachoma is a public health problem in urban settings, with the evidence strongest for TT.

3. A systematic literature review was undertaken to get a better understanding of whether schistosomiasis transmission in peri-urban and urban settings is occurring, how it has changed over time, and to what extent this issue should be considered, at this stage in research and control activities, in order to identify research and mapping gaps. A large proportion (52/161) of the eligible publications were from Brazil, suggesting that the African urban situation may be somewhat neglected. The reviewed publications suggest that schistosomiasis is prevalent in peri-urban and urban areas in the countries assessed. There were similarities with findings from rural areas including higher rates of infection amongst boys and ages 8-15 and lower risk of infection associated with abstaining from swimming in open freshwater bodies and living further away from a water access point.
4. From the reviewed literature, recurring themes to explain a decline in infection in urban settings over time included continuous treatment, WASH improvements, fewer snail habitats as a result of environmental changes, and better recreational facilities. Recurring themes to explain the presence of infection in urban settings and possible risks included nearby water sources, urbanisation, rural-to-urban migration and other movement patterns, low levels of awareness, and climate/environmental change.
5. There was a presentation looking at how publicly available geospatial databases combined with survey data can be used to identify areas at risk for schistosomiasis. Data from the Global Human Settlements database were used to classify areas as either rural or urban based on population density. Then, geostatistical modeling was used to link georeferenced survey data (sources: ESPEN, GAHI, GNTD) to environmental predictors (land surface temperature, vegetation indices, rainfall, land use, distance to freshwater, etc.) and socioeconomic predictors (WASH, education, child/maternal mortality, degree of urbanisation, light density, etc.) in order to predict the disease risk. Conclusion: identifying risk areas in urban settings is not easy because you need predictors at high spatial resolution and a high enough number of survey locations to capture spatial heterogeneity within a small area.
6. Schistosomiasis and trachoma are both associated with poor sanitation and hygiene conditions and certain urban settings (e.g. slums) may therefore have conditions that would promote transmission. Given the lack of data on trachoma in urban settings, there is an opportunity to integrate trachoma data collection within schistosomiasis mapping surveys in order to provide evidence for further trachoma surveys that would conform to WHO recommendations. The Rapid Urban Schistosomiasis and Trachoma Assessment (RUSTA) method was presented as a proposed method to assess the distribution of schistosomiasis and trachoma in urban areas through an integrated rapid mapping strategy comprising:
    a. Schistosomiasis: snail sampling and collection of urine and stool samples (initial screen of urine only and then stool from children with positive CCA results)
    b. Trachoma: assess clinical signs (TF, TT) of populations living in areas likely at risk for trachoma (areas with poor sanitation and hygiene conditions) and areas less likely at risk (areas with better WASH infrastructure)

    Conclusion: in order to identify commonalities needed for an integrated approach, we should first optimize each of the assessments separately and then assess the feasibility of combining the two assessments into a RUSTA.

7. Mapping is needed because: (1) there are limited data available, (2) there is the risk of ongoing transmission and the resulting morbidities, (3) "leaving no one behind," and (4) to optimize resource allocation. For schistosomiasis, mapping is done to determine who, where, and when to treat. For trachoma, the rapid assessment is done to determine whether a population based prevalence survey is needed.

VARIABLE	**TRACHOMA (TRA)**	**SCHISTOSOMIASIS (BASELINE MAPPING)**
Sample population	15 to 20 socioeconomically deprived households in 3 to 7 socioeconomically deprived communities	5 schools
Sample size	50 children aged 1-9 (50% of which should be pre-school aged) and self-presenting adults	50 children aged 9-14
Risk factors	Socioeconomically deprived Prior knowledge	Proximity to water Prior knowledge Occupation
Diagnosis	Clinical: TF in children, TT in adults	Stool and urine samples Tests: Kato Katz, urine filtration, urine dipstick, CCA Blood in urine questionnaire

8. Some important things to consider regarding interventions in urban settings:
    a. Scale, cost-effectiveness, and rationale
    b. Existing administrative structures (and inclusion/exclusion of areas)
    c. Social mobilisation and awareness
    d. An evaluation of population dependencies on water sources
    e. A social network analysis to determine movements, connections, and main occupations
    f. A situational analysis of the communities including infrastructure and health centers
    g. Work with urban planning and other relevant actors in the communities to understand what other health delivery and WASH services are happening
    h. An analysis of prevalence data to identify correlations (e.g. at the household level)
    i. Alignment between schistosomiasis and trachoma: WASH, preschool and school setting, hygiene and education campaigns, early childhood education, behavior change activities
    j. Use urban settings to target other NTDs and morbidities (case identification and management)
    k. Health centers in urban settings could be used for diagnostic tools and tracking infected persons (test, treat, track) for both diseases.
    l. Building this into the country's strategic plan and linking to larger issues like human capital and environment
    m. Importance of having the appropriate denominator to match the implementation unit (perhaps using satellite imagery)

9. This topic was also addressed at last year's COR-NTD meeting and a paper has been published; this session is therefore building on what has already been done.

KNOWLEDGE GAPS IDENTIFIED - *What data and tools need to be generated to address the issues raised by the group?*

1. Urban vs. peri-urban: need a clear definition of each and how they are different. This definition will likely be different in different contexts. Experts have suggested that there is not a global definition so this also needs to be considered.
2. Are there common approaches being taken to collect data in urban environments?
3. In order to map in urban areas, we need to know:
    a. Evidence of endemicity from rural areas
    b. Connectivity to endemic rural areas
    c. Other evidence suggestive of urban endemicity (e.g. desk review, hospital records)
    d. Level of migration
    e. Where to sample – schools or households?
    f. Proximity to freshwater bodies that might harbor intermediate snail hosts
    g. How can geospatial predictions and/or satellite imagery help inform sampling strategies?
    h. How to measure migration and connectivity?
    i. What urban data are available through other programs (ebola, malaria)?
    j. What will be the unit of sampling and implementation for each disease?
    k. WASH questions related to both diseases?
4. Are there common approaches to set up urban intervention structures and/or reach urban populations?
5. Identification of areas at risk for both diseases: distance to water bodies, water used for various activities, and movement of people between rural areas and cities

RECOMMENDED NEXT STEPS - *What operational research and other actions need to be taken to address the knowledge gaps identified?*

1. The factors maintaining the prevalence of schistosomiasis in urban environments need to be resolved. How is schistosomiasis introduced into urban areas, how does transmission vary in different settings and how likely is reinfection? What lessons can be learnt from LF and other NTDs?
2. Knowledge on trachoma urban endemicity is limited and variable. Further work on determining whether trachoma (TF and TT) is a public health problem in urban settings is needed, including identifying routine data sources available to support health ministries identify that trachoma may be a public health problem (e.g. hospital reports of TT surgery). If trachoma is a public health problem, factors maintaining the prevalence of trachoma in urban environments need to be resolved.
3. What control interventions, in addition to preventive chemotherapy, can be used in the urban setting, what would be the role of behavioural change, WASH and for schistosomiasis - snail

control? In addition, what morbidity management interventions can be used in urban settings – e.g. organization of TT surgery for trachoma.

4. If urban health centres were to play a key role in diagnosis and treatment, what extra training and capacity building might be required? Is there a process to ensure praziquantel/azithromycin are available in urban health centres?
5. It was concluded that it was best to optimise the assessment for each disease separately and then assess the feasibility of combining the two assessments into a RUSTA. Test in nominated cities whether the proposed RUSTA method to assess the distribution of schistosomiasis and trachoma is feasible and whether integration provides benefits.