COR-NTD 2020
Virtual Meeting, November 12 – 14
Integrating for Impact

Onchocerciasis - Clearing Hurdles for Elimination

Session Date: 11/12/20

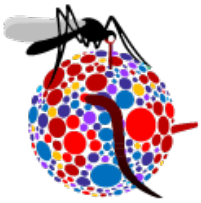
Session Time: 11:00 AM - 2:00 PM EST

Session Description: To achieve onchocerciasis elimination in Africa, it is necessary to map all previously-untreated areas, including those previously found to be hypo-endemic and those that were never previously mapped. In February 2019, the Onchocerciasis Technical Subgroup (OTS) met to review existing data with the goal of developing mapping strategy to recommend for routine programmatic use. The group agreed that onchocerciasis elimination mapping (OEM) should include purposeful sampling of communities that are closest to confirmed breeding sites (first-line villages) and, possibly, sampling of randomly-selected communities. However, specifics including sample size, number of villages included, and criteria for community selection have not yet been finalized. Criteria for prioritizing districts for mapping on the basis of environmental suitability are also pending further investigation. In addition, because the sensitivity and specificity of the serologic tests used to determine prevalence are currently unknown, there is a need for additional data and/or diagnostic tools to establish a serologic threshold that is consistent with the potential for ongoing transmission.
The aim of this session is to review the barriers to defining a mapping strategy for OEM and progress that has been made since OTS 3. Discussion will focus on prioritizing remaining questions and formulating operational research to address them. We will also discuss which methods may be dead ends and which should continue to be explored. Questions for discussion include:

- What are the most important barriers to establishing a serologic threshold for OEM, and what OR is needed to address these barriers?
- How can existing diagnostic tools be used for starting and stopping decisions? Are existing tools or combinations of existing tools adequate for these purposes? What further research is needed?
- What role, if any, should environmental suitability maps play in exclusion mapping, as well as in the prioritization of districts and first-line villages for OEM?
- What further validation is needed?

Session Chairs: Kira Barbre and Phil Downs

Session Rapporteur: Katie Gass



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KEY DISCUSSION POINTS

Following a set of rich presentations, the breakout groups and discussion centered around three separate, but related topics: the serologic threshold for OEM decisions, the diagnostic tools for both starting and stopping decisions, and the role for environmental suitability maps in OEM.

Serologic threshold

- The serologic threshold discussion focused on needs for determining thresholds for both starting and stopping treatment decisions.
- It is a challenge for some areas in need of OEM to identify 1st line villages.
- We shouldn't consider the serological threshold without also considering the survey strategy and the performance of the diagnostic tool that will be used.
- What is the role for 2nd (and 3rd) line villages? Should these be explicitly incorporated into Stage 2 OEM sampling?

Diagnostic tools

- Target product profiles lack a clear validation and approval pathway as prospective tools come online.
- We need rapid, point-of-care tests that are highly accurate; a well-functioning multiplex assay would be helpful for surveillance and integration.
- An antigen test would be desirable.
- As we approach the endgame, mass drug administration may no longer be the most cost-effective strategy; we should also be thinking about a good individual diagnostic.
- The World Health Organization guideline process can be lengthy; but we should use the ICT → FTS transition that the lymphatic filariasis programs went through as a blueprint for how to bring new tests into programs.
- We need strategies to entice test developers to make affordable tools.
- We should look to other sectors for some cross-fertilization of ideas, including non-communicable diseases.
- Overall, we need strengthening of the health system and the capacity to run lab-based tests.

Environmental suitability

- Suitability maps can help programs identify first-line villages and develop risk categorizations that don't require visits to the field.
- These maps can result in a more cost-effective and efficacious way of identifying areas that do (and don't) require OEM.

- Maps may also be able to identify areas that could benefit from vector control.
- Improvements in satellite imagery and their wide availability is a real aid to the mapping efforts. It will be helpful to determine when free satellite images and software are sufficient and when to use the paid high-resolution sources.
- Some fear that the innovation is going to be expensive and may be resistant.
- There is a need to address the barriers preventing countries from adopting these new technologies/maps.
- We need to engage communities with information from environmental suitability maps; local knowledge can aid in predicting breeding sites and validating models.
- The accuracy of the maps and models is dependent on the quality of the data.

KNOWLEDGE GAPS IDENTIFIED

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

Serologic threshold

- There is some concern that the new qPCR diagnostic for black flies (which will be used to validate a serologic threshold) is more sensitive. This also implies that the current stopping threshold for black flies, which was established based on older PCR approaches, may need to be revised if a more sensitive technique is to be used. The alternative is to accept that the entomologic threshold will be more conservative when assessed via qPCR (e.g. areas will be more likely to fail).
- We need point-of-care tests and diagnostic tools, especially for remote areas.
- We need empirical data to inform the models; particularly to relate serological prevalence with force of infection.

Diagnostic tools

- The lack of a sample repository is a real limitation for bringing on new tools, as is the lack of a gold standard tool against which to make comparisons.
    - A sample repository needs to reflect the different endemic areas.
- Current thresholds are specific to antibody tests; what happens if we select an antigen test?
- We need cross-border standards to protect program gains and encourage collaboration.
- Is a single standardized tool better than setting-specific tools or tools that adapt with the time?

- Vector identification tools are needed. For *S. damnosum* we are dealing with a big sibling species complex; adult flies cannot by typed by cytotaxonomy, advanced molecular tools are needed.

Environmental Suitability

- In many areas data are either missing or outdated.
- Research needs to be done to see how recent climate changes affect black fly-suitable habitats.
- It can be challenging to translate the suitability maps to practical information for the teams on the ground to find and delineate the areas.
- How does this suitability information impact our implementation unit formation? Should we be looking for transmission zones?
- Some programs require additional capacity building to leverage the software to create suitability maps.
- It would be helpful to have GPS coordinates of communities in the remote areas where onchocerciasis is endemic.
- We need to consider vector movement patterns, in addition to human movement.

RECOMMENDED NEXT STEPS

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

Serologic threshold

- We cannot move forward with setting the serologic threshold until we have the new qPCR methodology in place to ensure the black fly comparisons are standardized.
- There is a need to correlate the serologic threshold with entomologic data (the best way for determining force of infection).
    - Local knowledge is a resource that can help identify blackfly breeding areas, but this requires a presence in the field.
    - Increasing ubiquity of satellite images can enhance our ability to find both humans and black flies.

Diagnostic tools

- We should establish a sample repository for diagnostic tools.
- We need a method to set reliable cut-offs for tests.
- Diagnostic tools need to be standardized and require a set approach for establishing a Quality Assurance/Quality Control system.

Environmental Suitability

- Ground truthing of the models is needed.
- Ground truthing is also needed of satellite settlement predictions, as nomadic populations may have moved on.
- It would be good to explore collaboration with other sectors that have leveraged GIS technology well.
- What is the cost-effectiveness of this tool? What is the cost-effectiveness of the various tools for identifying first-line villages? There is fear that innovative tools will be expensive or that donors won't fund it.
- There is some fear that these innovations (e.g., environmental suitability maps) will be expensive and hard to use. User-friendly software is needed to make the maps accessible for programs and capacity building is necessary so that programs can use the information for decision making.
- There is a need to document the decision process, when it comes to making determinations of environmental suitability/non-suitability.