ASSESSMENT OF MALARIOGENIC POTENTIAL TO INFORM ELIMINATION STRATEGIES AND PLANS TO PREVENT RE-ESTABLISHMENT

Malaria Policy Advisory Committee Meeting
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Global Malaria Programme
World Health Organization
Malariogenic potential is a critical factor in determining strategies to achieve elimination and prevent re-establishment of transmission

WHO recommends that countries approaching elimination or working to prevent re-establishment of malaria stratify their geographical units by malariogenic potential, to help in targeting appropriate interventions

WHO also recommends that this assessment should determine whether vector control can be withdrawn after transmission is interrupted in an area

There is a lack of guidance on methods to measure the components of malariogenic potential and on thresholds relevant for programmatic decisions
1. To review current **definitions** of receptivity, vulnerability and malarialogenic potential contained in the WHO glossary and, if required, recommend improvements to ensure that the definitions are valid and appropriate;

2. To review available **methodologies** for assessing receptivity and recommend appropriate and valid methodological approaches, including data requirements, for national malaria programmes to use to measure receptivity in their respective countries;

3. To advise WHO on **options for classifying receptivity** according to programmatically relevant categories aimed at guiding interventions to prevent re-establishment of transmission;
4. To review the validity and practicality of available methods for assessing vulnerability and recommend appropriate and valid methodological approaches, including data requirements, for national malaria programmes to use to assess vulnerability in their respective countries;

5. To review data on the regional receptivity (‘infectivity’) of endemic anophelines to exotic strains of human malaria;

6. To advise WHO on approaches to combining measures of receptivity, vulnerability and infectivity to guide national malaria programmes in designing strategies to prevent re-establishment of transmission.
• ERG convening endorsed
• Use the ERG to standardize terminology to avoid confusion
• Maintain the focus of the ERG on those countries nearing elimination and moving to prevent re-establishment of transmission at either the subnational or national level
• Acknowledge the impact on vulnerability and receptivity that has already occurred
• Important to emphasize of the final objective (6) that will provide national programmes with the guidance needed
ERG Convened 2-4 October 2018

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ERG Conclusions

• Update terms
• Methods to assess receptivity have not been cross-validated or compared.
• Reduced infectivity of local mosquitoes to exotic parasite strains should be further investigated, to help inform response strategies to imported cases.
• Measures of importation risk have not been cross-validated or compared in a systematic way.
• Development of programmatic thresholds for malariogenic potential will require additional investigation and modelling
ERG Recommendation 1: Proposed changes to the WHO Malaria Terminology
• Likelihood of local transmission that is the product of receptivity, risk of importation of malaria parasites and infectivity of imported parasites.

Note: The concept of malarialogenic potential is most relevant for elimination and prevention of re-establishment when indigenous transmission is mostly or entirely eliminated.
Receptivity (Update)

- Degree to which an ecosystem in a given area at a given time allows for the transmission of Plasmodium spp. from a human through a vector mosquito to another human.

Note: This concept reflects vectorial capacity, susceptibility of the human population to malaria infection, and the strength of the health system, including malaria interventions. Receptivity can be influenced by ecological and climatic factors.
Likelihood of malaria infection based on living conditions or behavioural risk factors, or likelihood of increased risk of severe morbidity and mortality from malaria infection.
• Risk or potential influx of parasites via infected individuals or infected *Anopheles* spp. mosquitoes.

Note: “Infected individuals” includes residents infected while visiting endemic areas as well as infected immigrants.
Infectivity (Add)

- Ability of a given *Plasmodium* strain to establish an infection in an *Anopheles* mosquito species and undergo development until the mosquito has sporozoites in its salivary glands.
2. Update the WHO *Malaria surveillance, monitoring & evaluation: a reference manual* to:
   - more clearly articulate the importance for entomological surveillance to identify principal versus secondary vectors, given ongoing and likely temporal and spatial changes in vector distribution and abundance; and
   - provide more detailed guidance on site selection, and on the frequency and timing of entomological surveillance, to inform assessment of receptivity.

3. Revise other current WHO guidance documents in line with recommendations 1 and 2, to ensure consistency.
4. Prioritize further development of methods for assessing maliariogenic potential to ensure that these are applicable and informative for programmatic use:

- compare methods for the three potential measures of receptivity for selected countries, to ascertain comparability within countries, between countries or between neighbouring regions, to inform their use in receptivity assessments;
- compare entomological parameters, as well as each of their associations with parasitological indicators, to identify key components that should be included in assessment of receptivity;
- examine outbreak data from certified countries, to determine the origin of the imported parasite strains and the number of resultant infections;
- compare existing data on infections identified through border or workplace screening with those identified through passive case detection at clinics, to ascertain whether information from passive case detection provides an accurate picture of importation risk; and
- examine examples where countries can generalize data on imported cases for populations in specific regions to other areas with similar population movement or influxes.
5. Once methods for measurement of the components of maliariogenic potential have been identified, interpret these measurements and develop thresholds to guide programmatic decision-making regarding maintenance of vector control and intensified surveillance.

6. Further evaluate the issue of infectivity with respect to the mosquito and parasite factors that may reduce vector competence for different strains of *Plasmodium*, to determine whether there are programmatic implications for these findings. This may require additional review of evidence in future.
• Endorsement of changes to the WHO Malaria Terminology
• Suggestions for pursuing comparisons of different measures of receptivity