

Developing the Target Product Profile for Gene Drive Mosquitoes

February 25-26, 2019

London Marriott Hotel County Hall

Agenda, Day 1: February 25, 2019 (Meals will be in *Queen Mary*; the main meeting room is *King George V*)

8:00-9:00	REGISTRATION and BREAKFAST	
9:00-9:30	Introductions and goals of the meeting	Stephanie James
9:30-10:00	Proposed testing pathway for gene drive mosquitoes: Decision gate for moving to field trials	Fredros Okumu
10:00-11:00	Group Discussion: Modeling the toolkit for malaria elimination <ul style="list-style-type: none">➤ How do gene drive mosquitoes fit into the toolkit of products for malaria elimination/eradication?<ul style="list-style-type: none">• How can models account for interactions with other malaria and vector control strategies?• What information do models need to make good predictions of the impact of gene drive mosquitoes?• Are there particular limitations of other vector control strategies that models should focus on in exploring the role of gene drive mosquitoes?	Moderator: Jaline Gerardin Rapporteurs: Karen Tountas David O'Brochta
11:00-11:30	COFFEE/TEA	
11:30-noon	Review of TPPs/PPCs for malaria transmission-blocking tools	Larry Slutsker
Noon-13:00	Review of current draft TPPs for gene drive mosquitoes <ul style="list-style-type: none">• Population replacement• Population suppression	UCI Malaria Initiative Austin Burt
13:00-14:00	LUNCH	
14:00-18:00	Group discussion: Assessing efficacy expectations for gene drive mosquitoes	
14:00-15:30	Session 1 <ul style="list-style-type: none">➤ What should we aim for in a first gene drive product? How is this informed by modeling?<ul style="list-style-type: none">• What are the expectations of benefit for a first gene drive product? What would be considered minimally acceptable efficacy to justify releases in Africa?• How does this relate to different malaria transmission conditions in Africa? How might this inform selection of potential testing sites?• How might expectations for efficacy of gene drive mosquitoes change by the time a first gene drive candidate is ready for testing, as a result of ongoing malaria control and elimination efforts? How might this be taken into account in the TPP?➤ Should availability of a remediation strategy be taken into account in the TPP criteria?<ul style="list-style-type: none">• If so, how might modeling inform this?	Moderator: Azra Ghani Rapporteurs: Carolyn Buckee Nakul Chitnis
15:30-16:00	COFFEE/TEA	
16:00-18:00	Session 2 <ul style="list-style-type: none">➤ How can modeling be used to predict the efficacy of gene drive mosquito products?<ul style="list-style-type: none">• Do differences in existing models or models currently in development influence predictions? If so, how practically important is this and what should be done?• How do models take into account differences in products intended to reduce population size or change vector competence? Do downstream impact predictions depend on product characteristics?• What data is needed to adequately parameterize the models?	Moderator: John Marshall Rapporteurs: Andrea Beaghton David O'Brochta

Session 2 (continued)

- How should criteria for durability of efficacy be determined?
 - How does this relate to malaria reduction goals?
 - Can the timescale for evolution of resistance to the drive or effector mechanism be predicted? What data would be required?
 - Can other potential changes in the mosquito or parasite be predicted? What data would be required?

19:00 **GROUP DINNER, 1212 Restaurant at the Royal Horseguards Hotel**
<https://www.quoman.com/en/london/the-royal-horseguards/restaurants/1212.html>

Agenda, Day 2: February 26, 2019 (Meals will be in Queen Mary; the main meeting room is King George V)

8:00-9:00 **REGISTRATION and BREAKFAST**

9:00-10:30 **Group Discussion: Translating to TPP efficacy criteria**

- How do malaria reduction goals translate to entomological and epidemiological criteria for gene drive mosquito products (transmission reduction, time to effect, duration of effect,...)?
- What realities need to be taken into account (other vector species and mosquito metapopulations, spatial ecology, immigration/emigration,...) in setting TPP goals for entomological and epidemiological efficacy?
- What geographic range should be considered (initial release site, regional, continent wide) in setting TPP goals?
- How might release design influence efficacy results? What release strategies should be modeled?

Moderator:
Ace North
Rapporteurs:
Greg Lanzaro
Karen Tountas

10:30-11:00 **COFFEE/TEA**

11:00-12:30 **Group discussion: Setting consensus efficacy characteristics**

- Are we currently able to agree on justifiable entomological and epidemiological efficacy criteria for a minimally acceptable product to bring to field testing?
 - Do these criteria differ for products intended to reduce vector population size or change vector competence?
- What are realistic efficacy criteria for an ideal gene drive mosquito product? Does it have to be perfect?
 - Do these criteria differ for products intended to reduce vector population size or change vector competence?
- If questions remain, what more needs to be done?

Moderator:
Neil Ferguson
Rapporteurs:
Shaibal Dasgupta
George Christophides

12:30-13:30 **LUNCH**

13:30-15:00 **Group discussion: Relating efficacy criteria to measurable parameters**

- How can efficacy criteria be translated to measurable parameters? (in the lab/insectary, in the field)?
 - Life history parameters
 - Construct biology

Moderator:
Tony Nolan
Rapporteurs:
Geoff Turner
Nikolai Windbichler

15:00-15:30 **COFFEE/TEA**

15:30-17:00 **Group discussion: Cost goals for gene drive mosquito products**

Presentation - Current considerations

- How do cost goals relate to goals for durability of efficacy and potential use scenarios?
- Are we currently able to agree on justifiable cost criteria for gene drive mosquitoes?
- If questions remain, what more needs to be done?

Michael Santos
Moderator:
Michael Bonsall
Rapporteurs:
Camilla Beech
Karen Tountas

17:00-17:30 **Final discussion and next steps**

Stephanie James

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February 25-26, 2019 Participant List

Luke Alphey The Pirbright Institute	Brian Greenwood London School of Hygiene & Tropical Medicine
Andrea Beaghton Imperial College London	Stephanie James Foundation for the NIH
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Ethan Bier University of California, San Diego	John Marshall University of California, Berkeley
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Anna Bowman World Health Organization	Ace North University of Oxford
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Austin Burt Imperial College London	Fredros Okumu Ifakara Health Institute
Nakul Chitnis Swiss Tropical and Public Health Institute	Michael Santos Bill & Melinda Gates Foundation
George Christophides Imperial College London	David Schellenberg World Health Organization
Andrea Crisanti Imperial College London	Dominic Schuler World Health Organization
Shaibal Dasgupta Tata Institute for Genetics and Society	Larry Slutsker PATH
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Jennifer Gardy Bill & Melinda Gates Foundation	Frédéric Tripet Keele University
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