Balancing urgency and caution in the face of climate change: how to advance new research for malaria control?

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A perfect storm

❯ Risk of reversing progresses made over the last decades

- 608,000 deaths in 2022 and 249 million cases.
- Biological threats – resistance, invasive alien species, conflicts
- Political risks as malaria is not seen as a priority for donors anymore

❯ Climate change impacting directly and indirectly malaria

- Impact of extreme weather events – e.g. malaria cases multiplied by 5 after the floors in Pakistan
- Changes in weather patterns affecting the mosquito and parasite development in different ways
  - 17.1% of the global land area became suitable for the transmission of P. falciparum over the last 60 years.
  - Changes in malaria seasonality across the globe (shorter vs longer)
- Climate change affecting interventions that are season-dependent
- Climate change impact on socio-economic determinants of health and access to health system services

❯ The window to control and eliminate malaria is closing considering the potential impact of climate change on the disease distribution
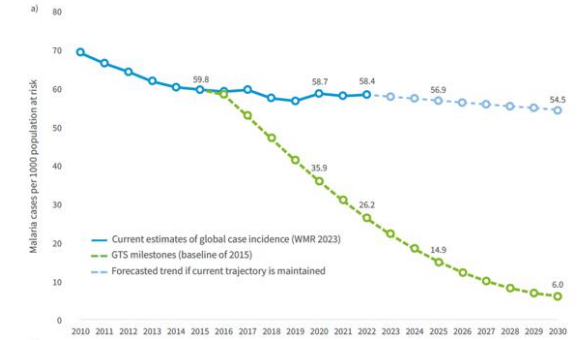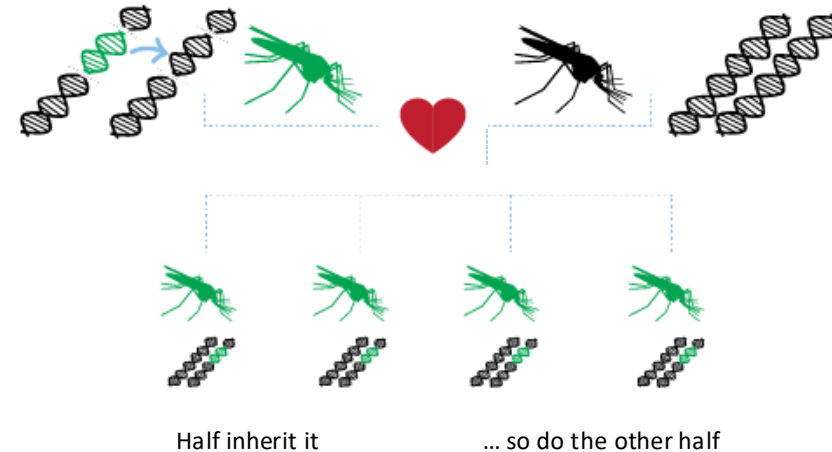
Genetic tools being considered – the example of gene drive mosquitoes

Most **genes** are inherited half the time

Half inherit one | Half inherit the other
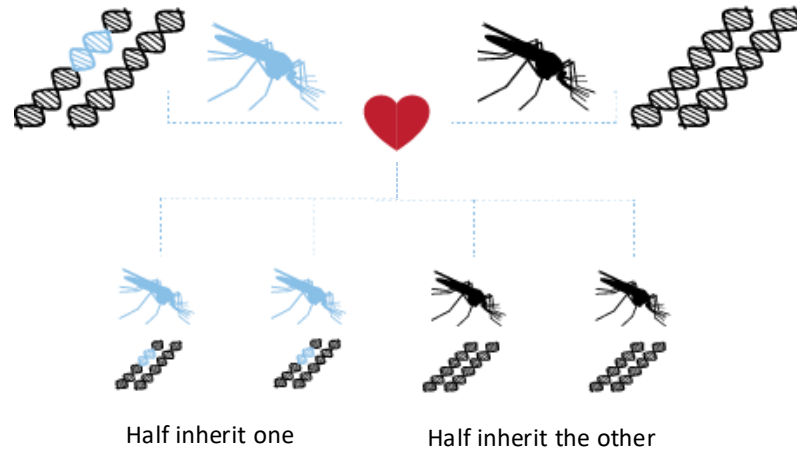
Driving genes are always inherited

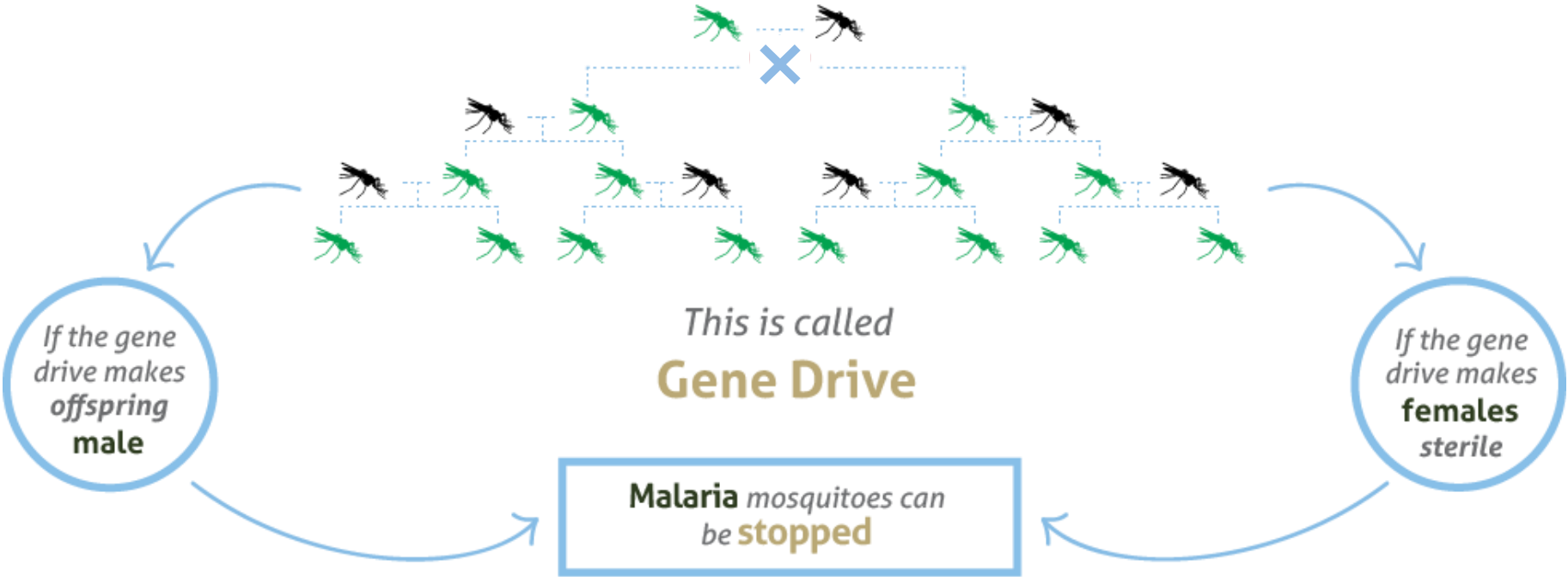Half inherit it | … so do the other half

Over 90% of the progeny inherit the modified gene.

Gene drive allows to bias inheritance and can be used to modify a wild population in a cost-effective and sustainable way.
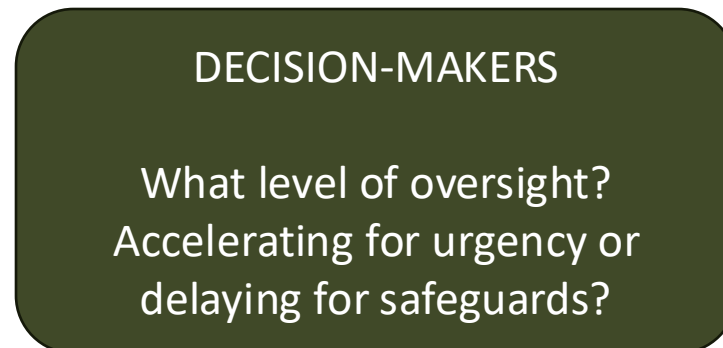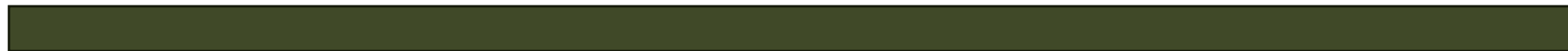
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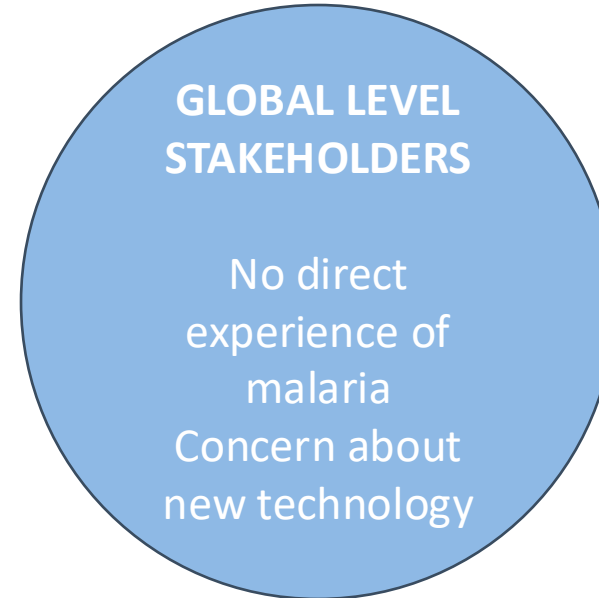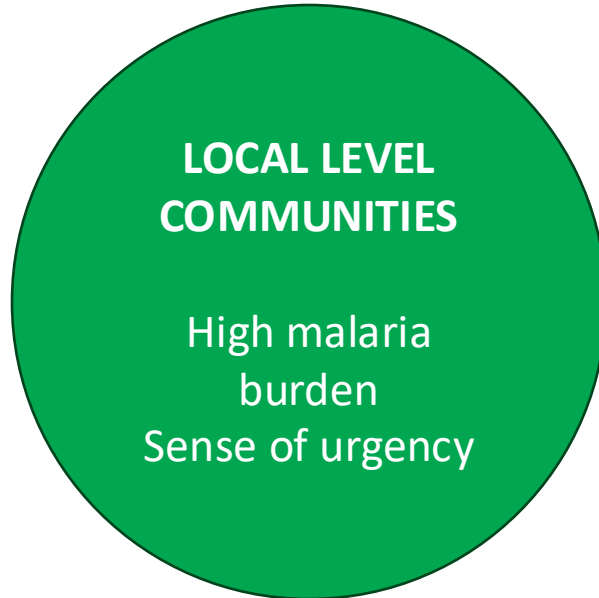# Using gene drive to reduce malaria-transmitting mosquito population

Gene drives *increase* gene spread

With only a **few individuals**, a **driving gene** can *spread*
a **modification** through the target population **effectively**

This is called
Gene Drive

If the gene
drive makes
**offspring
male**

If the gene
drive makes
females
sterile

Malaria *mosquitoes can
be* **stopped**

The ethical dilemma

LOCAL LEVEL COMMUNITIES

High malaria burden
Sense of urgency

GLOBAL LEVEL STAKEHOLDERS

No direct experience of malaria
Concern about new technology

DECISION-MAKERS

What level of oversight?
Accelerating for urgency or delaying for safeguards?

?

Question on global vs local governance and standards

⟩ Question of stewardship and governance for new technologies for environmental and health applications

- Who decides?
- Who is legitimate to make a decision?
- What are the ethical principles and standards that should guide this decision?
- What are the imperatives to follow here? Moral imperatives of saving lives? Should the precautionary principle apply instead?

⟩ Tensions about what global is in the context of global inequalities

- Is global the sum/balance of local needs and priorities or is it reflecting the geopolitical powers?

⟩ If local stewardship and governance is chosen, how to prevent ethical dumping and ensure a minimum standard?

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Thank you

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