**LSTM**

LIVERPOOL SCHOOL
OF TROPICAL MEDICINE

# Controlling Emergent *Anopheles stephensi* in Ethiopia and Sudan (CEASE)

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# *An. stephensi*: a threat to malaria elimination in sub-Saharan Africa

- The Asian malaria vector *An. stephensi* has recently been discovered in the Horn of Africa.

- Invasive *An. stephensi* associated with increases in malaria in Djibouti.

- Competent for both *Plasmodium falciparum* and *P. Vivax*.

- Predominantly associated with container habitats common in rapidly urbanising settings.



Balkew et al 2020, Sinka et al 2020
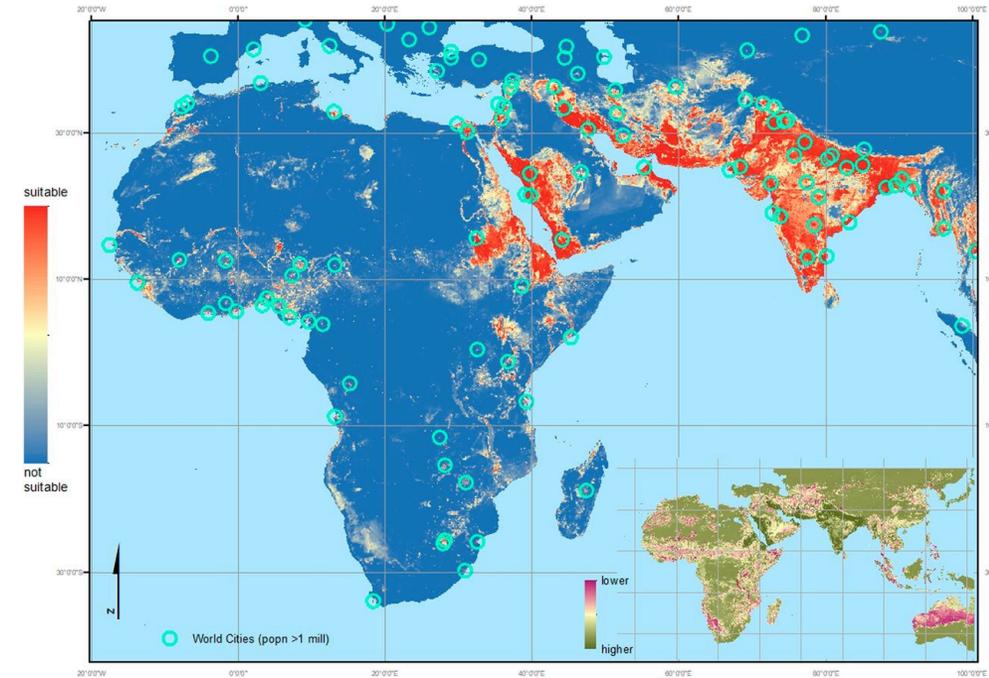
# Research will adopt a transdisciplinary approach
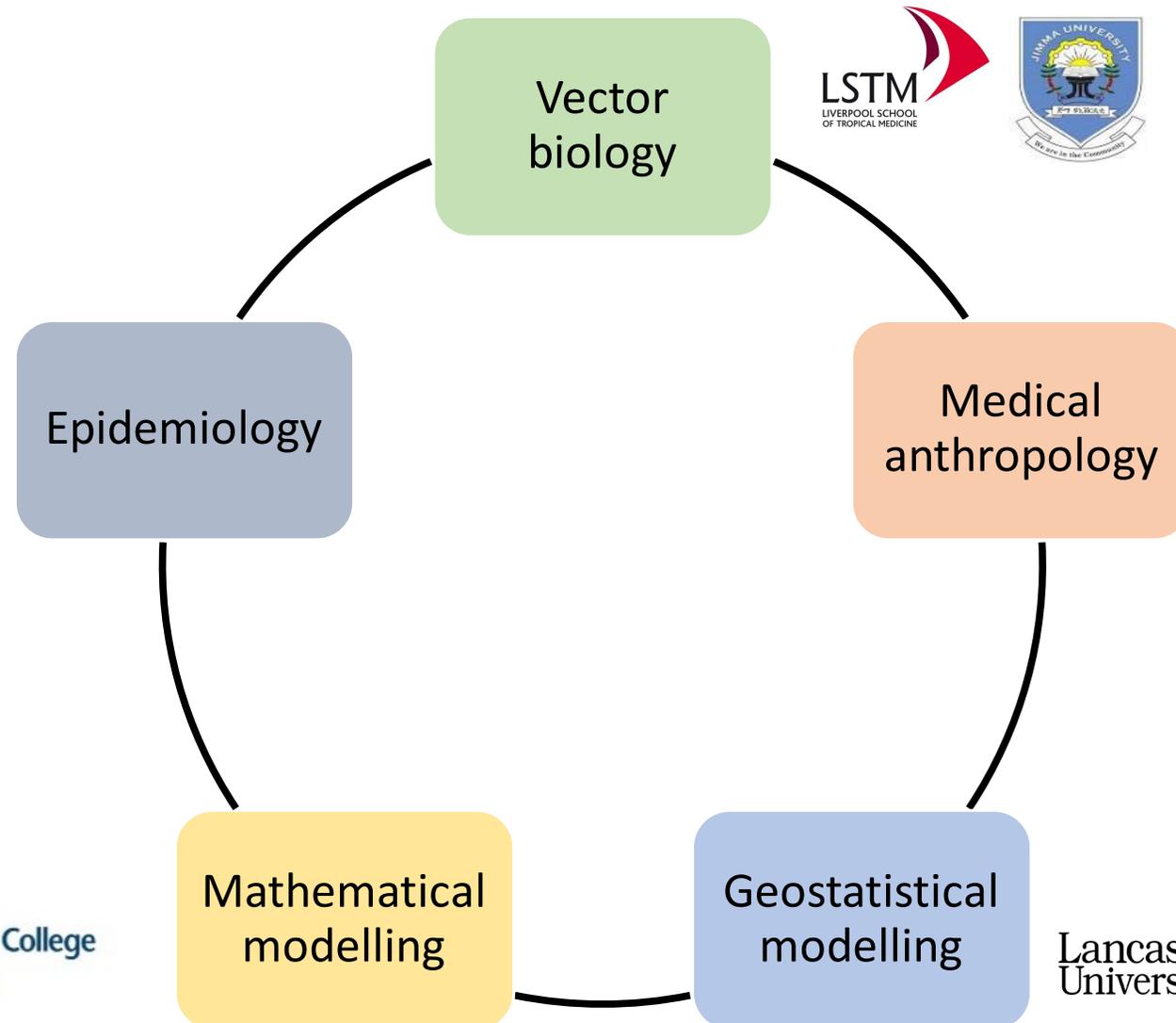
# Vision and Key Research Questions

**Vision: Control the spread of *An. stephensi* in Ethiopia and Sudan.**

1. What was / are the route(s) of invasion of *An. stephensi* and what is its current and potential future distribution?

2. What is the importance of *An. stephensi* for malaria transmission in the Horn of Africa?

3. What are the most effective targeted, multi-sectoral vector control strategies to combat further spread?



*An. stephensi* mosquito (Jim Gathany, CDC, 2004)

# Work package 1

**Overall Aim:** Identify the route of invasion of *An. stephensi* and its current and potential distribution



- Implement **entomological surveillance networks** using ecologically informed adaptive sampling frameworks.

- Investigate **bionomics** of invasive *An. stephensi* (blood meal composition, sporozoite rates, flight distance, insecticide resistance etc)

- Update and validate **predictive distribution maps** enabling us to identify habitats permissive to *An. stephensi* establishment.

- **Genomic surveillance** of *An. stephensi* invasion and spread.

**Co-Leads:**
- David Weetman (LSTM)
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- Luigi Sedda (Uni Lancaster)

# Work package 2

**Overall Aim:** Estimate the importance of *An. stephensi* for malaria transmission

- Spatio-temporal analysis of routine malaria morbidity data (DHIS2) and entomological data countrywide.

- Case control study to investigate the association between malaria and *An. stephensi* presence/density in urban centres.

- Identification of the spatial distribution of malaria cases and potential for focal screening and treatment.

- Mathematical modelling of the contribution of *An. stephensi* to malaria transmission



**Co-Leads:**
- Dr Anne Wilson (LSTM)
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- Prof Elfatih Malik (Khartoum)
- Dr Tom Churcher (Imperial)

# Work package 3

**Overall Aim:** Evaluate multi-sectoral vector control strategies to combat the spread of *An. stephensi*

- Mixed methods research to understand social and ecological context.

- Identification of factors that could constrain or enhance effectiveness of existing and novel vector control strategies;

- Pilot studies to determine the entomological efficacy of existing and novel multisectoral vector control strategies.

- Modelling of the public-health impact and cost effectiveness of vector control strategies.



**Co-Leads:**
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# Thank you for listening and please get in touch

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