Risk Assessment

Reference	RA111859/1
Status	Planning

Summary

Date Created	14/05/2025	**Confidential?**	No
Start Date	14/05/2025	**End Date**	14/05/2026

Assessment Title:

Understanding the climatic and environmental limits to mosquito-borne virus emergence

Assessment Outline:

Climatic and ecological processes are critical in shaping the dynamics and distributions of vector-borne diseases, including by influencing vector habitat, population dynamics, and the thermal limits to vector survival and pathogen transmission (1). There is broad scientific consensus that climate warming is expanding the suitable area for mosquito-borne arboviruses - including dengue, chikungunya, Zika and West Nile - which pose a rapidly escalating threat to human health across much of the globe (2). However, we still have a poor understanding of the climatic and ecological factors that constrain the endemic establishmnent of arboviruses in new regions, which is a major challenge to our ability to predict the near-term impacts of climate change on human outbreaks. Over 20 years of detailed surveillance data have now been collected for many arbovirual infections (e.g. dengue in Southeast Asia and Latin America; West Nile in the USA). This project will leverage these rich spatial and temporal datasets to study geographic variation in the seasonality and outbreak dynamics of arboviruses, and identify their critical climatic and ecological determinants, using cutting-edge statistical and/or machine learning methods. Focusing on a specific disease and/or region, the project will involve firstly developing models to classify and map different viral transmission settings (from sporadic epidemic to year-round transmission), using either time-series or mechanistic (e.g. SEIR) approaches (3-4). Next these will be linked to environmental and climatic covariates (e.g. temperature, rainfall, vegetation indices) to identify the critical thresholds between sporadic versus sustained outbreaks; if there is time, there is potential to explore then applying these models to project future emergence risks under alternative climate change scenarios (e.g. 5). For students with mathematical modelling backgrounds, there is alternatively the possibility to explore how theoretical models can help to understand the climatic limits to arbovirus endemicity.
This is a computational project and a basic understanding of scientific programming and statistics in R/Python will be essential. Depending on the student's background and interests, this project will offer the opportunity to develop more advanced skills in geospatial analysis, statistical/machine learning methods, and processing and analysing remote sensing and climate model data, as well as working on a topic of high significance for both ecology and human health.

Area Responsible (for management of risks)		**Location of Risks**	
Division, School, Faculty, Institute:	Faculty of Life Sciences	**On/Off Site:**	On-Site
Department:	Div of Biosciences	**Building:**	One Pool Street
Group/Unit:	Genetics, Evolution & Environment	**Area:**	ALL Areas
		Sub Area:	ALL Sub Areas

Further Location Information:

Filename	**Category**	**File size**	**Date uploaded**

Description of attachments	
Location-non-electronic-documents	

Assessor(s)	**Approver(s)**
Tsai, Yi Chen	HAYLEY BOAKES
	Rory Gibb

Authorised By	**Date**
none	

Assessor Safety Competence	
Team Leader	
Reason For Review Type	**Reason For Review**

PEOPLE AT RISK (from the Activities covered by this Risk Assessment) *	
CATEGORY	**ESTIMATED NO.**
Post-Graduates	0

Summary of Activities, Hazards, Controls

1.	work from home
repetitive movement	
With Controls: Likelihood: --------- Severity: --------- A - Very Low / Trivial	

1. work from home

computational-based research
see assessment outline

List those managing this Activity and their competence:

Hazard 1. repetitive movement

Staff risk discomfort or injury to hands and arms from overuse/improper user or poorly designed workstation layouts.

Existing Control Measures

All staff must complete a DSE assessment on Risknet. If a staff member begins to experience problems that is thought to be linked to their DSE Set-up, an assessment should be carried out to assess the problem and to see that these can be rectified with reasonable ajustments.

Staff encouraged to take regular breaks to rest from repetitive movements.

Other work methods to be explored to reduce the frequency of repetitive movements or work load management to ensure varied work.

Risk Level

With Existing Controls

Risk Level: A - Very Low / Trivial

Actions

Actions associated with this Risk Assessment

***** No Actions have been recorded*****