

## 5. Sequencing Platform

The improved Platform will play a crucial role in supporting a diverse range of projects, spanning from sample processing to complex global DNA sequence analyses. Its importance will be especially notable in our efforts to discover and characterize viruses. Furthermore, the facility will continue to serve as a training hub for up-and-coming African and international scientists.

### PILLAR 3: TRANSFORMATIVE CAPACITY BUILDING TO CREATE RESEARCH LEADERS

The Unit's main goal is to nurture future leaders in global health research through an exceptional training environment. With strong infrastructure, facilities, expertise, and global collaborations, the Unit experienced a 16% rise in PhD enrollment, totaling 44 students in the recent quarter. Among them, 40% are female and 15% come from outside Uganda, with about 80% receiving external grants.

To address the shortage of postdoctoral opportunities in Africa, the Unit will prioritize mid-career scientist training through competitive postdoctoral fellowships.

Affiliated with UVRI, the Unit is a trailblazer in Uganda's health research sector, playing a vital role in training laboratory technologists and scientists in areas like immunology, virus sequencing, and bioinformatics. It actively participates in regional capacity development networks, such as the DELTAS-Africa Makerere-UVRI Centre of Excellence for Infection & Immunity Research & Training and the East African EDCTP network. The Unit also allocates resources to enhance training and career growth for research managers and support staff.

### PILLAR 4: EFFECTIVE KNOWLEDGE TRANSLATION AND EXCHANGE

Bridging the gap between scientific progress and practical implementation is a global challenge, including in Uganda. Thus, prioritizing enhanced Knowledge Transfer and Exchange (KTE) is a vital part of our comprehensive strategy.

Our primary objective is to effectively communicate, interpret, and share research findings in an accessible manner for maximum real-world impact. Collaboratively, we engage with government bodies, universities, and research institutions.

Our association with UVRI facilitates the dissemination of findings to the Ministry of Health. Strategically, we prioritize KTE by involving policymakers in shaping research inquiries and sharing results through workshops, involvement in Ministry of Health Technical Working Groups, and contributions to national and international health policy committees.

As a prominent research institution in the region, the Unit provides specialized services, such as functioning as the regional HIV drug resistance reference laboratory, offering intricate patient diagnostic services, and providing central repository and sample analysis services for collaborative projects. Our significant role in the H3A Diabetes Study spans 11 sites across East, West, and Southern Africa. The knowledge and resources we generate adhere to transparent governance standards, ensuring their visibility, accessibility, and practical usefulness.

## SECTIONS AND RESEARCH PLATFORMS

The Unit has established research sections and platforms that provide vital infrastructure, serving as training resources accessible to all Unit researchers and attracting external collaborators.

### Statistics and Data Science

Offers data management and statistical supervision for clinical trials, along with meticulous organization, documentation, and strategic analysis strategies for data from population-based cohorts.

### Bio-informatics Platform

Leverages our infrastructural data framework, the Uganda Medical Informatics Center (UMIC), to analyze extensive big data, encompassing both pathogen and human host information. The UMIC stands as one of Africa's largest bioinformatics centers, equipped with impressive resources, including 2048 processing cores, 512 TB of fast disk space (Lustre) for high throughput processing, 348 TB of extended storage, and 64 nodes.

### Cohorts

Established in 1989, the Unit has developed and employed community-based cohorts for a diverse range of studies, spanning from observations to innovative intervention tests. These cohorts include the General Population Cohort in rural Kyamulibwa-Kalungu district, the now-closed Entebbe Mother and Baby cohort (EMaBs), Good Health for Women (GHFW) cohort in Kampala, and the fisherfolk cohort in Masaka. Furthermore, the Unit has established a strong partnership with The AIDS Support Organization (TASO).

### Funding

Our main funding comes from UKRI/MRC, supplemented by significant support from sources including Wellcome Trust, UK NIHR, EDCTP, The Bill and Melinda Gates Foundation, USA NIH, PEP-FAR, Johnson & Johnson, among others.

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## MRC/UVRI and LSHTM Uganda Research Unit



Medical  
Research  
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Uganda  
Virus  
Research  
Institute

LONDON  
SCHOOL of  
HYGIENE  
& TROPICAL  
MEDICINE



IMPROVING THE UNDERSTANDING AND CONTROL OF INFECTIOUS AND NON-COMMUNICABLE DISEASES IN EAST AFRICA TO SAVE LIVES WORLDWIDE

## ABOUT US

In 2023, the Unit marked 35 years of existence in Uganda. It is one of two (2) UKRI/MRC Units outside the UK, the other one in the Gambia. With strong affiliation to the Uganda Virus Research Institute (UVRI), the Unit enjoys vital representation at government level, which facilitates translation of research findings. In 2018, the Unit was transferred to LSHTM, a major UK global health institution. This new partnership is boosting research capacity into some of the current and emerging health issues in Africa and globally.

## WHERE WE WORK



The Unit is based at the UVRI Entebbe campus with established outposts in Kalungu and Masaka Districts.

## OUR MISSION

To conduct high-quality research that adds knowledge and leads to improved control of infectious and non-communicable diseases in Uganda, Africa and globally, through translation of scientific findings into policy and practice, and rigorous research capacity building.

## STRATEGIC PILLARS

The Unit's overarching goal is delivered through investment in 4 strategic pillars:

### PILLAR 1: FOCUSED COLLABORATIVE RESEARCH THEMES

Our Science is delivered via three (3) strategic research Themes, with underlying focus areas that maximize collaboration where needed, for enhanced results. These are:

#### 1. The Viral Pathogens Theme

The theme capitalizes on our partnership with UVRI, a renowned African virus research institute. It builds upon our unit's extensive expertise in various aspects of HIV research, including epidemiology, prevention, immunology, drug resistance, superinfection, and emerging viruses.

The theme is dynamic and adaptable, addressing complex HIV challenges and new threats, as evident from our significant contributions during the COVID-19 response. It focuses on three key research areas: Epidemiology and Intervention, Virus Discovery and Impact, and Oncogenic Virus Immunovirology.

Research priorities include understanding viral recombination's complexity and its implications for interventions like antiretroviral therapy and vaccines. Other goals are predicting drug resistance, improving access to prevention and treatment for high-risk HIV populations, and utilizing COVID-19 for ongoing research, such as genomic surveillance to understand transmission patterns and prepare for future pandemics.

#### 2. Vaccine Research Theme

This theme encompasses two primary research focus areas: vaccines for viruses and immunomodulation, both aimed at optimizing vaccine impact for distinct populations in Africa.

The vaccines for viruses group will undertake work to develop and test vaccine/intervention combinations to enhance outcomes. This involves, for example, the exploration of PrEP and vaccinations for people with HIV, or scheduling of vaccines such as hepatitis vaccine for young female sex-workers who are hard to reach areas, for follow-up doses. The group will test novel virus vaccines, spanning early safety and immunogenicity assessments to later-stage efficacy studies.

The immunomodulation group will merge research efforts to assess the benefits of interventions against modifiable factors that hinder vaccine responses, such as chronic parasitic infections and research into immunological pathways that govern compromised vaccine reactions and explore strategies like adjusted dosing, adjuvants, or simultaneous administration of other immunomodulators, aiming to amplify the response.

#### 3. NCD Theme

The theme brings together efforts in diabetes/cardiometabolic disorders, mental health, and emerging NCD genomics. Notably, diabetes in Uganda/Africa affects lean individuals without insulin resistance, unlike the common link with obesity in high-income countries. The current focus involves understanding the mechanisms behind this, considering factors like infections and malnutrition. Traditional diabetes prevention methods targeting obesity will be assessed for efficacy in lean individuals in Africa.



In mental health, we build on previous research showing higher depression rates in young people with HIV. We will create and validate tools to measure these conditions accurately and collaborate with youth and stakeholders to develop suitable psychological interventions.

Social Science: Our Unit's strong social science portfolio spans all themes, including rigorous studies to understand political and social influences on vaccine confidence. The aim is to boost public trust, acceptance, efficacy, and adoption of vaccines and treatments, as well as engagement in vaccine research. Furthermore, we investigate the social factors affecting NCDs, striving to improve care access for people with disabilities and exploring links between chronic health conditions and violence, especially in adolescents.

### PILLAR 2: OPTIMISED CORE PLATFORMS

We have established five distinct research platforms designed to effectively uphold our research themes and ensure the optimal achievement of the Unit's overarching strategic objectives:

#### 1. The General Population Cohort (GPC) Platform

The GPC aims to create a strong basis for population-based research, which has significantly improved our understanding of HIV. This flexible framework has also been crucial in studying community transmission and the impacts of COVID-19. Consequently, the GPC provides valuable longitudi-

nal data, serves as a platform for externally funded short-term studies, and offers a unique resource for training efforts.

#### 2. The Clinical Research Platform

The platform will consolidate the Unit's multi-site clinical trial resources and infrastructure, including clinics, laboratories, biorepositories, and a GCP-compliant data management system. This integration aims to create an efficient system that promotes procedure harmonization, standardization, enhanced quality, and improved accessibility.

#### 3. Clinical Diagnostic Laboratory Services (CDLS) and Biobanking Platform

The accredited platform (ISO15189\_12) hosts modern analytical equipment vital for Unit clinical trials and research. It supports diverse tests including biochemistry, microbiology, and molecular diagnostics. The facility also features compliant sample management and contemporary Biobanking, including a vast sample collection dating to the 1990s. With over 80 -80°C freezers and liquid nitrogen storage, it offers extensive sample preservation capacity.

#### 4. Immunology Platform

The Platform centralizes and streamlines the management and expansion of the Unit's immunology laboratory resources, including P2 and P3 laboratories for sample processing and assays. It houses advanced equipment like flow cytometers, a BioRad Luminex instrument, AID iSpot three-color ELISPOT reader, AID single-color ELISPOT reader, and the pioneering Cytex Aurora Spectral Analyser (acquired in 2021) capable of analyzing up to 64 parameters. Funding for an antibody microarray reader from MRC Capital is secured. These resources will benefit diverse projects spanning various research themes.