Life in the time of COVID-19

Almost all GeMVi research work and capacity at KEMRI-Wellcome Trust Research Programme (KWTRP) and Warwick has now been redirected to COVID-19-related activity to good effect.

Kenya’s and Uganda’s emergency response to the outbreak using modelling and sequencing have been enhanced through the capacity established by GeMVi. In addition, the GeMVi teams at KWTRP and at Uganda Virus Research Institute (UVRI) have established whole genome sequencing (WGS) of SARS-CoV-2. Several GeMVi Research Fellows are also working on SARS-CoV-2 sequencing work (e.g. at UVRI and the Kenya National Public Health Laboratory (NPHL).

KWTRP has also initiated collaboration with and training of staff from NPHL and KEMRI Centre for Virus Research in sequencing using the Oxford Nanopore Technology (ONT) MinION platform to support transfer of this capacity.

The GeMVi modelling team at Warwick has developed a Kenya-specific forecasting model and is collaborating with KWTRP’s Epidemiology Department and Health Economics Research Unit to extend this work and link it to health service capacity and economic impact modelling. The GeMVi team has contributed to a Policy Brief for the Kenya Emergency Operations Centre on preliminary predictions of the spread of COVID-19 in Kenya, impact of interventions and health sector surge capacity.

GeMVi Director, Professor James Nokes, is a member of the modelling committee that evaluates countrywide modelling output to develop messages to inform policy decisions by the Kenya Ministry of Health. Warwick are advising the Uganda modelling team that responds to the Uganda MOH.

Researchers from KWTRP and UVRI (extreme right)
GeMVi Research Fellowships

GeMVi research fellowships continue to present an excellent opportunity for skill enhancement and to work with leading experts in the fields of pathogen sequencing, bioinformatics, predictive modelling and health economics.

2nd Round of Fellowships

The second-round fellows were recruited in December 2019. Their projects are now ongoing with expected end-date of December 2020. Details of the projects are given in the following table.

<table>
<thead>
<tr>
<th>#</th>
<th>Name of candidate</th>
<th>Project</th>
<th>Institutional Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cameline Orlendo</td>
<td>Modelling the spatio-temporal risk of measles outbreaks and options for their control in Kenya</td>
<td>Maseno University, Kenya</td>
</tr>
<tr>
<td>2</td>
<td>Winifred Mutuku</td>
<td>Estimating the Distribution of New HIV infections in Kenya (Modes of Transmission Study)</td>
<td>Kenyatta University</td>
</tr>
<tr>
<td>3</td>
<td>Victor Ogesa Juma</td>
<td>Modelling the impact of influenza vaccination in Kenya</td>
<td>University of Nairobi, Kenya</td>
</tr>
<tr>
<td>4</td>
<td>Utazirubanda Jean Claude</td>
<td>Modelling the risk of spill over from Ebola outbreak in Democratic Republic of Congo to neighbouring countries</td>
<td>AIMS, Rwanda</td>
</tr>
<tr>
<td>5</td>
<td>Mary Bridget Nanteza</td>
<td>Oral polio vaccine variants sequenced from acute flaccid paralysis patients: is recombination with locally circulating enteroviruses occurring at a detectable frequency and do such recombinants play a role in the disease?</td>
<td>UVRI, Uganda</td>
</tr>
<tr>
<td>6</td>
<td>Sheila Cecily Ommeh</td>
<td>Viral metagenomics of mosquitoes for outbreak surveillance and monitoring</td>
<td>JKUAT, Kenya</td>
</tr>
<tr>
<td>7</td>
<td>Benard W. Kulohoma</td>
<td>Characterizing the virus composition of outbreaks of non-malaria acute febrile illness (NM-AFI)</td>
<td>University of Nairobi, Kenya</td>
</tr>
<tr>
<td>8</td>
<td>Timothy Nzomo</td>
<td>Integration of virus whole genome sequencing into surveillance and outbreak investigations for non-malarial acute febrile illnesses at the National Public Health Laboratories-Kenya.</td>
<td>NPHL, MOH, Kenya</td>
</tr>
<tr>
<td>9</td>
<td>Gurdeep Jaswant</td>
<td>Genomic Surveillance to Support Rabies Elimination in East Africa</td>
<td>UNITID, UoN, Kenya</td>
</tr>
</tbody>
</table>

To kick-start the fellowships, GeMVi held a protocol development workshop at the Garden Hilton hotel, Nairobi on 30-31 January 2020.

Participants to the GeMVi Protocol Development Workshop in Nairobi, Kenya on 30-31 January 2020. Left to right Benard Kulohoma (GeMVi Fellow), George Githinji (GeMVi PDRA), James Abuje (GeMVi Project Manager), Cameline Orlendo (GeMVi Fellow), Mary Bridget Nanteza (GeMVi Fellow), James Nokes (GeMVi Director), Gurdeep Jaswant (GeMVi Fellow), Dorcas Mbuvi (iDeAL Programme Manager), Sheila Ommeh (GeMVi Fellow), Charles Kayuki (Oxford Nanopore Technology Representative) Victor Juma (GeMVi Fellow), Timothy Nzomo (GeMVi Fellow) Sam Kinyanjui (Director iDeAL), Winifred Mutuku and Utazirubanda Jean Claude (GeMVi Fellows)
1st Round of Fellows at Work

From left to right: Gurdeep Jaswant, Shabani Mziray, Prossy Namuwulya, Phionah Tushabe and Alfred Ssekagiri (GeMVi Fellows)
For more information: https://kemri-wellcome.org/gemvi/Fellows

3rd Round of Fellowships – September 2020

"The GeMVi Fellowship has provided me with the technical support required to design and implement the study protocols for my study on the application of metagenomics and bioinformatics in characterising viral components in outbreak of acute febrile illnesses in Tanzania."

Shabani Mziray, GeMVi Fellow
Work by GeMVi Research Team

The GeMVi group at KWTRP has, so far, designed primers for measles virus, and generated whole genome assemblies of influenza A virus and respiratory syncytial virus (RSV) from Oxford Nanopore MinION reads. Protocols for WGS are being prepared for uploading to protocols.io (lab methods) and on github.com (bioinformatics workflows).

Also, genome deposits of sequence reads are in process for 30 SARS-CoV-2 viruses.

Publications

Publications on COVID-19 epidemiology, forecasting and control measures are in preparation for submission, and two have been published on medRxiv:  
https://doi.org/10.1101/2020.02.26.20028167  
https://doi.org/10.1101/2020.04.09.20059865

Forthcoming Courses

Infectious Disease Dynamics Modelling Workshops

The GeMVi team at Warwick has developed materials for a series of half-day virtual workshops on infectious disease modelling. For each workshop a mathematical ‘notebook’ on a different topic in infectious disease modelling will be produced that will include both text and code and can be used to combine written explanations of mathematical models with computational implementations of the models and visualizations of their results in a single document.
Upcoming Events

East African Virus Genomics & Bioinformatics Workshop

The workshop planned for August 2020 will take place at KWTRP, Kilifi. It will focus on the bioinformatics of pathogen surveillance with the aim of sharing working experience and expertise and promoting additional collaborations. In addition, it will also support specific next generation sequencing (NGS) NGS wet lab training and a basic Python course. The workshop is funded through the GCRF University of Glasgow Centre for Virus Research collaboration grant. For further information on the workshop please contact us.

Further Funding

Additional funding for genomics and modelling work involving GeMVi scientists which has been secured in part because of GeMVi work includes:


4. **GCRF project money for collaborative workshops and symposium on Genomics** funded by Global Challenges Research Fund (GCRF).

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Website: [https://kemri-wellcome.org/gemvi](https://kemri-wellcome.org/gemvi)

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Disclaimer The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health and Social Care.