SACEMA NEWSLETTER

No 27: December 2014

We would like to wish our friends, colleagues and collaborators a Blessed Holiday Season and a Prosperous New Year!

NEWS:

SACEMA Researcher Reshma Kassanjee receives Ph.D. from Wits University for pioneering thesis on biomarker based HIV incidence estimation

SACEMA Researcher Reshma Kassanjee recently received her Ph.D. from Wits University for her pioneering thesis entitled "Characterisation and Application of Tests for Recent Infection for HIV Incidence Surveillance".

For long-enduring illnesses like HIV, incidence (i.e. the rate of occurrence of new cases of HIV in a population) is much more informative than prevalence (the proportion of a population which has a condition at some point in time). Unfortunately, incidence is also much harder to estimate. This thesis lays the foundation for the entire field of using biomarkers for 'recent HIV infection' as indicators for HIV incidence. In the words of one examiner: 'it is rare that work presented in a dissertation has already received such acceptance by practitioners'.

Reshma Kassanjee and PhD supervisor, Alex Welte

A week of meetings at SACEMA, November 2014

During the last week of October a number of scientists, with interests in epidemiology, converged on Cape Town for a meeting labelled "Research-for-Prevention" or R4P. Brian Williams saw the opportunity of using this as a springboard for inviting a number of the attendees to visit SACEMA during the first week of November. This turned into a diverse week of extremely useful meetings, seminars and informal chats between different sub-groups of the people available.

The week kicked off with a fine dinner at an Italian restaurant in Stellenbosch, kindly hosted by RHI, (the Reproductive Health Institute of the University of the Witwatersrand), headed by Professor Helen Rees.

On the Monday morning we had a very full programme of presentations made by members of the RHI. They show-cased an impressive range of projects and there are clearly very good opportunities for collaboration between SACEMA and RHI. SACEMA's Brian Williams is set to be an important link in this regard since he has accepted a part-time appointment at RHI and has been tasked with helping the RHI to strengthen their analytical capacity in regard to data analysis, statistics and mathematical modelling. RHI is doing many exciting and interesting projects in inner-city Hillbrow in Johannesburg. Their focus is on reproductive health and they are working closely with female sex-workers in their clients in Hillbrow and at truck-stops across the country.

On Tuesday morning, and during the rest of the week, SACEMA staff and students gave short presentations on their current work and received valuable inputs from the visiting scientists. Tuesday afternoon saw an interesting informal presentation from Nicole Fürst on the work she is involved with on modelling tuberculosis at the Desmond Tutu HIV Centre.

On Wednesday we spent most of the day considering different approaches to modelling. Addressing the question: "*How complicated do we want to make this?*?" various speakers looked at approaches that used deterministic differential equations, agent-based or network modelling.

Views were aired about the relative merits of different approaches to modelling under different circumstances. At what point do we feel we are forced to add complexity? And how much extra bang do we get for all the extra bucks spent?

Leading lights in the discussion were Brian Williams, Leigh Johnson, Wim Delva and Sandy Rutherford, Simon Fraser University, Vancouver. Sandy is the Director of the Interdisciplinary Research in the Mathematical and Computational Sciences Centre (IRMACS), a unique, interdisciplinary research facility that focuses on facilitating the human interactions that are critical in interdisciplinary research, removes traditional boundaries between scientific disciplines, and creates a stimulating environment for its researchers.

Thursday saw a serious highlight with a fascinating presentation given by Monique Andersson of Stellenbosch Health Sciences, Division of Medical Virology. The talk was entitled: "Hepatitis B in Africa. An eradicable problem?" Such was the interest and enthusiasm for the topic and material, by presenter and audience alike, that the session took up the entire morning. Again there are strong possibilities for collaboration between SACEMA and Dr Anderson.

The week ended on a very high note with Sandy Rutherford providing an entirely new approach to the problem of estimating HIV incidence. While the method is probably only applicable in settings such as British Columbia, where there is a level of surveillance unknown in Third (and probably most First) World settings, the results were none the less extremely impressive. Sandy's student Andrew Adams capped the week with a presentation on allied work that demonstrated a very remarkable level of expertise and understanding in one so early in his career.

Several excellent snack lunches were organised at SACEMA by Lynnemore Scheepers and Amanda October, to whom thanks must go for excellent organisation and planning of travel and accommodation arrangements.

CEPHIA collaborators gather at SACEMA to consolidate data

Members of the *Consortium for the Evaluation and Performance of HIV Incidence Assays* (CEPHIA) who are closest to the data were hosted at SACEMA over 2-10 December. The purpose of the meeting was to allow the visiting collaborators – namely Shelley Facente and Kara Marson (both from the University of San Francisco California, USA) and Sheila Keating (Blood Systems Research Institute, San Francisco, USA) – dedicated time to work with one another and the CEPHIA database manager, David Matten (SACEMA), to reconcile the various project datasets and import them into the CEPHIA database that has been developed for this project.

CEPHIA, which is funded by the Bill & Melinda Gates Foundation, aims to provide guidance to the community on the estimation of HIV incidence from cross-sectional surveys using incidence assays that aim to distinguish 'recent' from 'non-recent' HIV infection. Over the course of the project, a large repository of specimens has been established through collaborations with a number of blood banks and clinical studies around the world. A number of incidence assays have been applied to selected 'panels' of specimens, either by developers or in independent CEPHIA laboratories. The

project has therefore involved the collection of data from multiple and diverse sources. As the first phase of CEPHIA officially draws to a close this month, it is essential that data generated to date is carefully validated and stored for future work.

Shelley Facente, Kara Marson and Sheila Keating

SACEMA says goodbye to Hilmarié Brand and David Matten

In December we said goodbye to researchers, Hilmarié Brand and David Matten. We wish them both the very best for the future.

INTERNATIONAL MEETINGS:

Modelling Fellows Initiative (IMFI), Pittsburgh

In October, Alex Welte, Cari van Schalkwyk and Wim Delva participated in the kick-off workshop of the International Modelling Fellows Initiative (IMFI), collaboration between the Public Health Dynamics Laboratory at the University of Pittsburgh, Stellenbosch University, and the University of Public Health in Yangon, Myanmar. The IMFI will run until October 2017 and aims to build capacity in infectious disease modelling through the establishment of a student exchange program and joint research projects. During the workshop, participants shared past experiences and ideas for new research around modelling prevention and treatment of dengue fever, HIV and HPV. Furthermore, participants were introduced to state-of-the-art modelling software and methods, including the FRED platform (Framework for Reconstructing Epidemiological Dynamics) that was developed at Pitt, and the Simpact platform, the HIV simulation platform being developed by SACEMA, in collaboration with the Hasselt University and Ghent University.

Pittsburgh, October 2014

Network Statistics for Sexually Transmitted Infections Epidemiology, Hasselt

In December, the inaugural meeting of a so-called "Scientific Research Community" (SRC) in the field of Network Statistics for Sexually Transmitted Infections Epidemiology took place in Hasselt, Belgium.

This consortium is funded by the Research Foundation - Flanders (FWO) for a period of five years. The SRC will formalise the joining of forces between groups that are internationally acclaimed primarily for their work in STI and HIV epidemiology, microbiology and public health and groups that have an international track record in developing and applying advanced statistical methodology and

computer simulations for network analysis. In doing so, the SRC aims to advance science and strengthen academic capacity in network statistics and STI epidemiology. Besides SACEMA, the SRC consists of the International Centre for Reproductive Health (ICRH) at Ghent University, CenStat at Hasselt University, the HIV/AIDS Centre at the Antwerp Institute of Tropical Medicine, the Theoretical Biology Lab at McMaster University, and the Research Methodology Centre at the Human Sciences Research Council (HSRC).

EVENTS:

Summer School Network Statistics in Health Research, 18-22 August 2014

Network statistics is a rapidly expanding branch in statistics that is concerned with the description and inference of network properties. Analyses of sexual network data have made crucial contributions to an improved understanding of the epidemiology and sociology behind the transmission of sexually transmitted infections. Further, social network analyses have been conducted to study how individuals' social networks influence their health behaviours and how the social structure of health systems influence the delivery and quality of health care services.

To address the lack of postgraduate training in network statistics in health research in Flanders (and more generally worldwide), we organised the international summer school Network Statistics in Health Research at the Ghent University Hospital from 18 to 22 August 2014. This summer school was an initiative of the Scientific Research Community "Network Statistics for Sexually Transmitted Infections Epidemiology" and Ghent University, and funded by the Research Foundation - Flanders, the UGent Doctoral Schools Programme and the National Institutes of Health. Martina Morris, Steve Goodreau and Sam Jenness, the three main lecturers from the University of Washington who taught the brunt of the lectures and computer labs, are world-leading experts in network statistics and HIV/STI epidemiology. Kate Sabot (London School of Hygiene and Tropical Medicine) and Per Block (University of Oxford) gave additional guest lectures on Social Network Analysis to improve maternal and new-born health, and on Stochastic Actor Oriented Models, respectively. Given that we received many more applications (from fourteen countries!) than there were available places, and noting the very positive post-course feedback from participants, we plan to organise a second edition of this summer school next year around the same period.

Ghent, August 2014

Incidence Estimation Workshop, 17-19 September 2014

SACEMA hosted a second edition of the workshop on Incidence Estimation using Tests for Recent Infection from 17-19 September 2014, at the Wallenberg Conference Centre on the Mostertsdrift Campus where SACEMA is based. The course, sponsored by the World Health Organisation, was designed to familiarise data managers, health system managers, researchers, policy makers and others with the central concepts and practicalities of using markers for 'recent' HIV infection, as increasingly available in many cohorts and cross sectional surveys, to infer HIV incidence. The course was composed of 6 modules which were built, as far as possible, around interactive problem solving exercises and discussions. There were 20 participants from 10 countries including, Ethiopia, Uganda South Africa, Tanzania, Botswana, Zambia, Zimbabwe, Mozambique, Malawi, and the United States.

Bayesian Biostatistics, 20-24 October 2014

Professor Emmanuel Lesaffre, of the University of Leuven, Belgium, presented a second edition of his Bayesian Biostatistics course from 20th to 24th October. The class included participants from SACEMA, University of Stellenbosch, the Human Sciences Research Council, the South African Medical Research Council, the University of Vienna, UCT, UWC, and UNISA.

Emmanuel Lesaffre with course participants and SACEMA staff

AIMS students visit SACEMA

On 4 November, the new contingent of fifty-plus 2014/15 students at the African Institute for Mathematical Sciences made a visit to Stellenbosch, beginning with SACEMA. They were shown around the Wine Cellar, met students and researchers, and enjoyed an interactive session in which a number of SACEMA people spoke briefly about their work. The visit concluded with refreshments and informal conversations.

SACEMA Seminars

The following seminars were held between September and December:

- 3rd September: Prof Daniela Stefan, Head Haematology Oncology, Department of Paediatrics and Child Health, Stellenbosch University: "Global burden of cancer – How to plan a road map for cancer care in Africa"

- 11th September: Vash Mungal-Singh, CEO, Heart and Stroke Foundation South Africa: Non-communicable diseases: Global progress, national action"

- 1st October: Dr Guy Harling: Postdoctoral research fellow, Departments of Global Health & Population and Biostatistics, Harvard School of Public Health (HSPH): "Relationship age disparities and HIV acquisition among women in a rural KwaZulu-Natal setting"

- 17th October: Roxanne Beauclair, PhD Student: "Validating age data from Likoma Island, Lake Malawi"

- 21st November: Joseph Sempa, PhD Student: "Effects of longitudinal exposure to HIV viral load on ART treatment outcomes in sub-Saharan Africa"

- 21st November: Eva Liliane Ujeneza, PhD Student: "Modelling long term CD4(+) white cell evolution in HIV positive patients on HAART"

- 24th November: Roux-Cil Ferreira, MSc Student: "An individual-based model of tsetse fly populations dynamics: modelling an extensive mark-release-recapture experiment"

Roxanne Beauclair presents the beginnings of her PhD work to SACEMA staff and students

UPCOMING EVENTS:

Research Days, 24-25 March 2015

SACEMA will be holding its annual Research Days meeting in Stellenbosch over two full days on 24th and 25th March.

Advanced Epidemiological Methods Seminar, 18-21 May 2015

Dr Matthew Fox of the Department of Epidemiology and the Center for Global Health and Development at Boston University will be presenting an intensive 4-day course on advanced epidemiological methods at Stellenbosch University under the auspices of the South African DST/NRF Centre for Epidemiological Modelling and Analysis (SACEMA), 18-21 May 2015.

Clinic on the Meaningful Modelling of Epidemiological Data (MMED), June 2015

This two-week modelling clinic, mounted in collaboration with the International Clinics on Infectious Disease Dynamics and Data (ICI3D) Program, and the African Institute for Mathematical Sciences (AIMS), will emphasize the use of data in understanding infectious disease dynamics. The Clinic will bring together graduate students, post-doctoral students and researchers from Africa and North America, with the goal of engaging the participants in epidemiological modelling projects that use real data to grapple with practical questions in a meaningful way.

Course on Missing Data, 16-18 September 2015

Dr Jonathan Bartlett (Department of Medical Statistics, London School of Hygiene & Tropical Medicine, UK) will present this three day course at Stellenbosch under the auspices of the South African DST/NRF Centre for Epidemiological Modelling and Analysis (SACEMA).