The Partnership for Health Research Training in Kenya (P-HERT) program

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Photo: P-HERT Members including the steering committee, representatives of collaborating universities, tutors and the secretariat during a past event

The Partnership for Health Research Training in Kenya (P-HERT) is a D43 grant awarded to the University of Nairobi by the National Institutes of Health to develop and implement a Research Capacity Building Program at the University of Nairobi and Kenyatta and Maseno Universities to support Junior Faculty gain in-depth research skills and expertise in the fields of HIV/AIDS, Mental Health and Maternal Newborn & Child Health.

The Specific Aims of the proposed program follow:

Aim 1: To develop skills set in epidemiology, biostatistics, implementation science and responsible conduct of research during the first year of a 2-year fellowship.

Aim 2: Mentor trainee faculty to develop and implement a research project, disseminate study findings and use the pilot data to develop and submit a grant for funding during the final year of the 2-year fellowship

Aim 3: Foster a research environment that supports junior faculty career development by creating research training and networking opportunities for a wide range of researchers at the 4 collaborating.

Collaborating institutions

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<td>University of Nairobi: is the premier and largest University in Kenya. UoN is the main grant recipient
http://www.uonbi.ac.ke/</td>
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<td>University of Washington: is a large, public flagship research university in Seattle, Washington, UW is subcontracted by the UoN in the P-HERT program</td>
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<td>Kenyatta University: Based in Ruiru, Kiambu County. The University has a young medical school. KU is a partner in the P-HERT program</td>
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<tr>
<td>  </td>
<td>Maseno University: Maseno University is a university based in Maseno, near Kisumu, Kenya, founded in 1991 it has a young medical school as well. KU is a partner in the P-HERT program</td>
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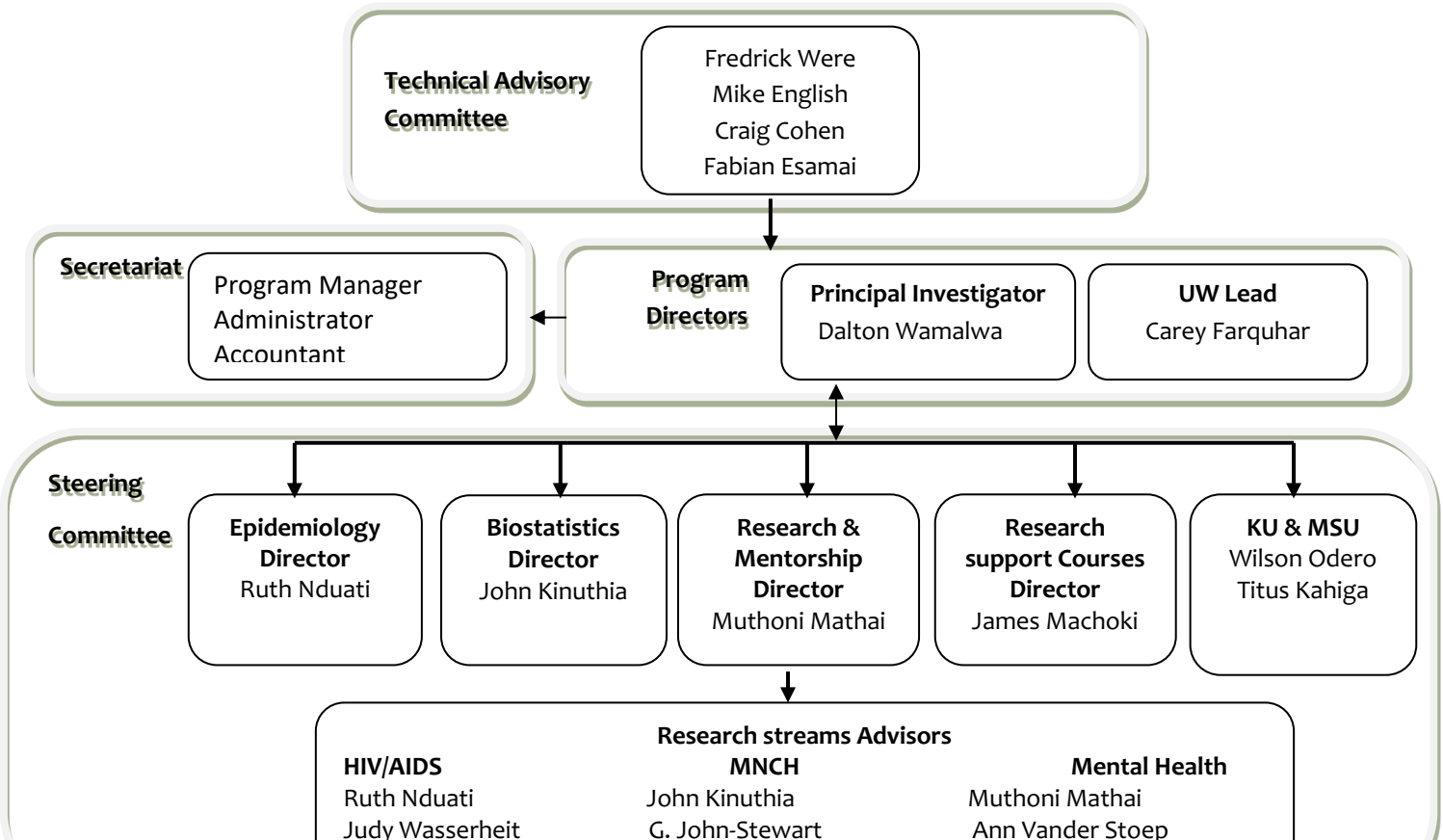
TAB 1 LEADERSHIP

Prof Dalton Wamalwa	**Principal Investigator**
	**Prof Dalton Wamalwa, MPH**, **MMed, MB.CHB** is an Associate Professor of Paediatrics and Child Health at the University of Nairobi. For the past several years, he has been providing clinical care to HIV infected children and adolescents in the Kenyatta National Hospital. He has led several research funded projects focusing on HIV infected children and adolescents, as well as a Maternal Newborn Child Health Research capacity building program. Prof Wamalwa led the NIH-funded Linked-MEPI grant on Strengthening Maternal, Newborn and Child Health research training in Kenya. He is now the PI of a recently funded D43 grant to support research training of junior faculty at the University of Nairobi in the fields of HIV, mental health and MNCH. Prof Wamalwa has over 40 publications in peers reviewed international scientific journals
Prof Ruth Nduati	**Epidemiology Coordinator**
	**Prof Ruth Nduati, MPH**, **MMed, MB.CHB** is Professor in the Department of Paediatrics and Child health, University of Nairobi and consultant paediatrician at the Kenyatta National Hospital. Nduati has over 20 years of experience in HIV research, mentorship of both undergraduate and postgraduate students, as well as program implementation, having pioneered implementation of PMTCT in Kenya.
Dr John Kinuthia	**Biostatistics Coordinator**
	**Dr John Kinuthia, MPH**, **MMed, MB.CHB** is the Head of Research & Programs, Kenyatta National Hospital he is a consultant Obstetrician Gynecologist, and Honorary Lecturer, Dept. of Obstetrics & Gynecology, University of Nairobi (Kenya) Dr. Kinuthia's research has primarily focused on prevention of mother-to-child transmission of HIV. He has coordinates trainings in Implementation Science, Maternal and Neonatal Child Health and Program Management for the University of Nairobi.
Dr Muthoni Mathai	**Research mentorship lead**
	**Dr Muthoni Mathai, PhD, MMed, MB.CHB** is a Psychiatrist and senior lecturer in the Department of Psychiatry at the University of Nairobi. She teaches mentors students in research and clinical care to patients at Kenyatta National Hospital and Mathari teaching and referral hospital. Dr Mathai was the PI of the MEPI-Linked project: Research capacity building in Mental health for better health outcomes, funded by NIH/NIMH.
Prof James Machoki	**Short Courses Lead**

	**Prof James Machoki**, **MB.ChB, M.Med, FMed. Anthro**, is the Director of the University of Nairobi Institute of Tropical and Infectious Diseases (UNITID, Associate Professor Department of Obstetrics and Gynecology, University of Nairobi; and Consultant Obstetrician and Gynecologist, Kenyatta National Hospital, Nairobi. Prof Machoki is the current P.I. of the UoN HIV Capacity Building Fellowship Programme. Prof Machoki is passionate about research grant writing administration capacity building, he previously lead the IEARDA grant and was in charge of the MEPI program area of research administration.
Prof Wilson Odero	**Maseno Coordinator**
	**Prof. Wilson Odero MBBS, MSc. PhD**, is an Associate Professor and Dean, School of Medicne, Maseno University. He obtained his medical degree from the Minsk Medical Institute and followed this with an MSc in Community Health from the London School of Hygiene and Tropical Medicine and a PhD in Epidemiology and Policy from the same institution. Dr. Odero has worked extensively in collaboration with organizations such as WHO and DFID on various traffic injury research and training programs. In the P-HERT program he represents and coordinates P-HERT program at Maseno University
	Dr Titus Kahiga Kenyatta University

Organizational chart



TAB 2: OBJECTIVES

Objection 1

Through a structured curriculum consisting of didactic and online courses in-country (UoN) and at the University of Washington, Seattle, junior faculty will be engaged to develop a robust skills set around epidemiology, biostatistics, implementation science and responsible conduct of research during the first year of a 2-year fellowship.

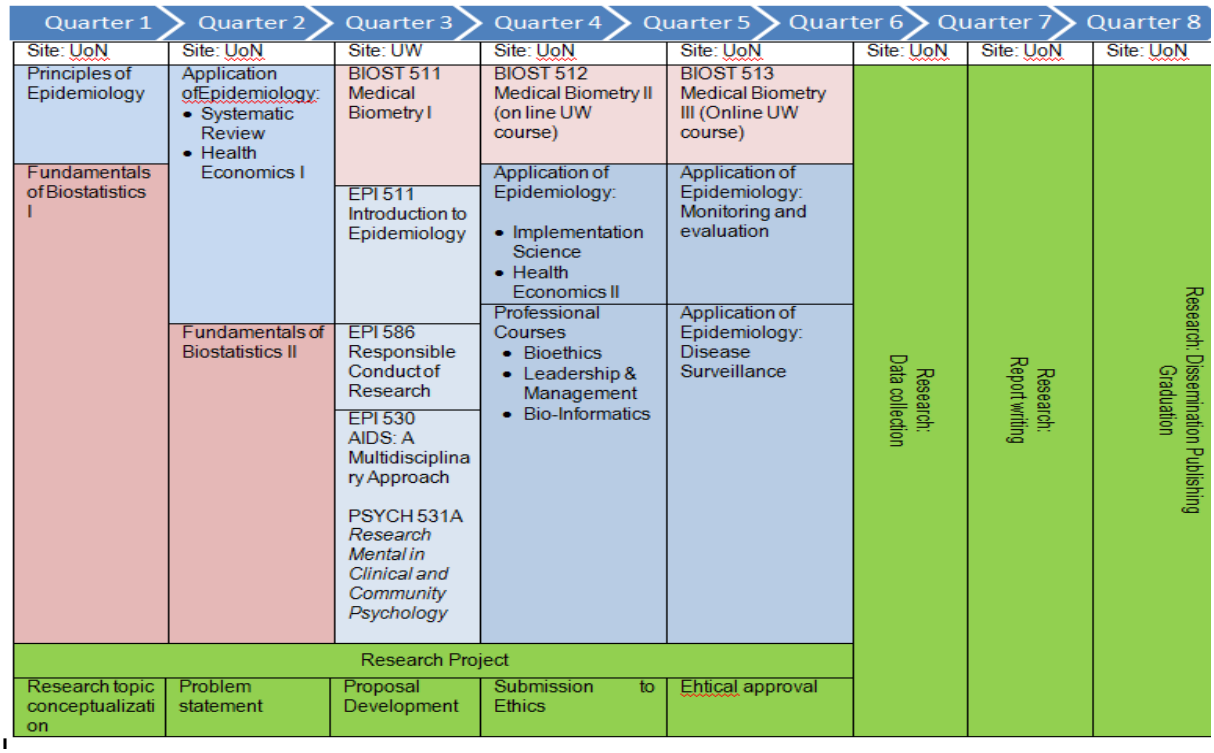
Key skills gained:

Epidemiology

- Ability to describe concepts in Epidemiology and design an appropriate Epidemiological study and analyze data.
- Capacity to identify health issues and formulate research question.

Biostatistics

- Ability to manage data and perform basic statistical analysis using Stata and R.
- Ability to choose the appropriate statistical technique for different outcomes and conduct statistical analysis and interpret output.



Objective 2

Building upon the research skills set acquired in the first year, junior faculty trainees will be mentored to develop and implement a research project, disseminate study findings and use the pilot data to develop and submit a grant for funding during the final year of the 2-year fellowship.

Key skills gained:

- Translation of epidemiology and biostatistics skills to design and implement an impact study in either MNCH/HIV/ Mental health
- Research mentorship by a paired team of University of Washington and local (UoN,KU, MSU and MoH) mentors
- Attachment to an ongoing research program
- Platform to present research proposal to a diverse and seasoned researchers

Objective 3

Foster a research environment that supports junior faculty career development by creating research training and networking opportunities for a wide range of researchers at the 4 institutions (UoN, KU, Maseno, UW) and by enhancing pre and post-award support for all faculty.

- Key skills gained:

Bioethics

- Ability to identify ethical issues and use reason to evaluate, discuss and argue about them.

Leadership and Management

- Ability to demonstrate integrity in health leadership and management.
- Explain theories of management and demonstrate skills to formulate, implement, monitor, evaluate and utilize data in decision making.

Responsible conduct of Research

- Apply established professional norms and ethical principles in the performance of all activities related to scientific research and conduct research independently in any setting (Locally and Internationally)

Bioinformatics

- Ability to experiment with data using a computer and understand results.

Grant Writing

- Capability to demonstrate leadership in writing and management of grants.

TAB 3: EPIDEMIOLOGY & BIOSTATISTICS

EPIDEMIOLOGY

Epidemiology course is the core course in this fellowship program. The course is delivered through face to face didactic lectures, coupled with group work. This course provides the learner with knowledge of basic concepts in epidemiology, design of epidemiological studies, analysis of epidemiologic data, application epidemiology tools in public health and principals of health policy formulation. The course is organized into 3 units:

Unit 1 Principals of Epidemiology

To equip the learner with knowledge and skills to apply epidemiologic principles and techniques in research, clinical and public health practice

Unit 2 Application of Epidemiology in Research and Public Health

To equip the learner with practical epidemiological skills through Systematic Review, meta-analysis, Health Policy formulation, Health Economics and health surveillance.

Unit 3: Application of Epidemiology in Research and Public Health 2

To equip the learner with epidemiological practical skills though Implementation Science and M&E

UW EPI 511 Epidemiologic Method

Focuses on research designs and methods to describe distribution and determinants of disease and health events in populations; uses quantitative and biomedical information to infer whether causal relationships exist between potential causes and disease in populations.

BIOSTATISTICS

Trainees undergo an onsite introductory course in Fundamentals of Biostatistics in the first three months of training. They will also be offered the complete set of UW biostatistics course (basic to advanced) Biostatistics 511, 512 and 513 (Medical Biometry I, II and III) leading to award of the Certificate of Applied Biostatistics. These online modules are supported by highly qualified and experienced biostatisticians from the UoN and UW. Trainees will come together on a regular basis to reinforce the online learning.

Unit 1 Fundamentals of Biostatistics (75 hours)

The objective of this course is to enable the learner to prepare data for analysis, summarize and present data using appropriate statistical techniques for data analysis.

UW Medical Biometry I - Biostatistics 511(75 hours)

The objective of this course is to provide students with an understanding of basic concepts and methods of statistical inference in the health sciences

UW Medical Biometry II - Biostatistics 512(75 hours)

Equip students with skills needed to analyze and interpret data using statistical regression models

UW Medical Biometry III - Biostatistics 513(75 hours)

To introduce the principles and methods of statistical inference for categorical data and survival data.

TAB 3: MENTORSHIP IN RESEARCH

Introduction

Mentorship is has been identified as a key component in the programs objective of fostering the next generation of researchers. The trainees will be

facilitated by the program to identify, establish contacts and in the management of the mentorship process.

Mentorship Structure in P-HERT program

Throughout the training program emphasis will be placed on individualized development through one-on-one mentorship. Each trainee will have two faculty mentors including one from the local institution and one from the University of Washington. Mentors are carefully selected from faculty who are active in research and with a strong mentorship track record. Each trainee is required to meet with their faculty mentor at least once in 2 weeks during the first year. At regular intervals at least monthly this meeting will take the form of teleconferencing in which the UW mentor will participate. At the beginning of the program each trainee and his/her mentor's pair will jointly develop individual career objectives with clear milestones. Mentors will provide the trainees with opportunities to be exposed to their (mentors) research activities through attachment to projects. The program director will convene quarterly joint sessions between all trainees and their faculty mentors where each pair (mentor & trainee) will share their experience, challenges and innovations. This meeting will be attended by the steering committee members and findings will be used to improve the mentorship experience. During these meetings the progress of the trainees towards achieving their set objectives career will be reviewed. Mentors will give input on any areas that may need improvement and offer continuous support to the trainee.

TAB 4: RESEARCH AREAS

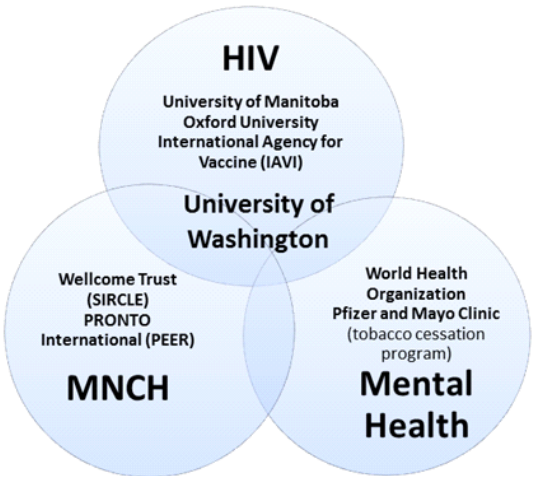
Research in health is critical to better understanding of determinants and presentation of disease as well as development and implementation of preventive and curative interventions. The PHERT Program has three research focal areas:

- Maternal Newborn and Child Health
- HIV and
- Mental health

These areas were selected because each represents an enormous disease burden in Kenya, include priority targets in the Kenya national health plan and

because relevant, locally led research in these areas could have a major impact on the health of the Kenyan population. These are also areas in which the UoN and its collaborators have a solid existing research base, thus providing trainees with potential projects and experienced mentors (Figure 1).

Figure 1: Examples of existing research collaborations with University of Nairobi for 3 scientific thematic areas



Maternal, newborn and child health is a key priority area in Kenya

Maternal, newborn, and child health is a high priority research area in Kenya given the high rates of morbidity and mortality among women and children. Maternal mortality rate (MMR) remains high at 488 per 100,000 live births and is due to largely preventable causes including obstetric hemorrhage, infection, eclampsia and unsafe abortion. Neonatal mortality rate (NMR) stands at 32 per 1000 births and has only marginally decreased over the past two decades and currently contributes to 69% of infant mortality (7 - KDHS 2009) with major contributors being prematurity, birth asphyxia and neonatal infection all largely preventable. The immense importance of MNCH in Kenya is reflected in the Kenya National Health Sector Investment and Strategic Plan which prioritizes reduction of MMR from 488/100,000 to 150/100,000 and NMR from 32 per 1,000 to 11 per 1,000 by 2017 (8).

HIV/AIDS research remains a high priority area

Kenya has made substantial progress in prevention of HIV transmission in adults and children through implementation of evidence-based interventions. Infant HIV transmissions have declined following scale up of PMTCT and HIV-related deaths in adults have been reduced by provision of ART; however the rate of new HIV infections in Kenya has stabilized at an unacceptably high rate and adolescents are disproportionately affected (Figure 2). In 2013, an estimated 1.6 million Kenyans were living with HIV including an estimated 191,840 children; and 101, 560 were new infections. Adolescent women aged 15-24 years contributed 21% of the new HIV infections and given that 70% of births occur among women this group the impact on adult and new paediatric HIV infections is substantial. The other major challenge is that paediatric diagnosis and care significantly lags adult care. In 2013, HIV infected children constituted 11% of the 1.6 million Kenyans living with HIV/AIDS, but they continue to have disproportionately higher mortality and poorer access to treatment with current coverage of ART at 42% compared to 77% and 80% for adult women and men. This underscores the serious weakness in the identification and linkage of HIV infected children and adolescents into care and ART treatment.

Mental Health

Mental Health and substance abuse is a serious growing and under-researched problem. Mental and neurological disorders account for 14% of the global

burden of disease, and 75% of those affected are in low-income countries. Substance abuse, including unhealthy alcohol use, is highly prevalent. The proportion of Kenyan adults who regularly consume alcohol is estimated to be 35%, while the proportion that smokes is 18% .

The need for increasing mental health research is indeed urgent. Mental health research must be conducted in collaboration with other disciplines as a result of the limited number of mental health researchers, and also because of the close synergy between poor mental health and other health outcomes. Postpartum depression, for example, occurs in approximately 13% of women worldwide, and typically goes unrecognized despite its serious lasting consequences on maternal and infant health. The impact of prenatal alcohol use on child health outcomes, including low birth weight, is well-documented. Substance use disorders are also closely associated with several non-communicable diseases, including promoting the spread of HIV and compromising adherence to treatment. It has been estimated that in Kenya 13% of all new HIV infections may be caused by behavior related to unhealthy alcohol use. Research has shown that post-traumatic stress disorder associated with gender based violence puts people at risk for HIV infection and poor subsequent treatment utilization, leading to poor health outcomes.

Current research areas

COHORT	THEME	RESEACH TOPICS
Cohort 1	MNCH	Association between antenatal and intrapartum care and still birth in 4 tertiary hospitals in Nairobi, Kenya: A case control study. **(Dr George Gwako)**
		Adherence to prescribed nutrition therapy among severely malnourished children aged 6 to 59 months discharged from an urban county hospital in Kenya: An open label randomized controlled trial. **(Dr Beatrice Mutai)**
		Predictors of appropriate Gestational weight gain among women attending antenatal clinics in Ahero and Bondo in Western Kenya. (**Dr Maurice K' Odhiambo**)
		Implementing Simplified Antibiotic Treatment For Neonates With Suspected Sepsis In Rural Communities Where Referral Is Not Possible: A Feasibility Study In Kisumu County, Kenya (**Dr Bernard B.O Awuonda**)
	HIV	Assessment of a mobile phone application to enhance adherence among HIV positive adolescents and young adults (15 – 24 years). Dr **Mary N. Kubo**
		Characterization of the steady state concentrations and pharmacogenetics of atazanavir in Kenyan HIV positive patients.

	Mental Health	Teacher Mental Health Literacy And Feasibility of Teacher Implemented School Based Mental Health Intervention. (**Dr Anne Mbwayo**)

COHORT	THEME	RESEACH TOPICS
Cohort 2	MNCH	Social ecological model to explore issues related to pregnancy and utilization of skilled maternal health services among Women of Reproductive age in Western Kenya **(Dr Amos Oyoko)**
		Imaging of Neonatal respiratory distress syndrome at the NBU in KNH; the association of pulmonary artery Doppler indices and the development of NRDS; a prospective cohort study with nested case-control **(Dr Gladys Mwango)**
		Kenyatta National Hospital retinopathy of prematurity study II (**Dr Lilly Nyamai**)
	HIV	Kidney disease and thrombotic microangiopathy among SARI associated infant and child mortality: Anested case control study (**Dr Edwin Walong)**
		HIV associated immune complex kidney disease: Clinical characteristics and risk factors (**Dr Anne Barasa)**
		Determinants of ART adherence among the Peri-natally HIV infected adolescents in Nairobi, Kenya (**Dr Tom Olewe**)
	Mental Health	Evaluation of routine use of self-care strategies as intervention for compassion fatigue amongst child welfare workers: A clinical trial **(Dr Lydiah Maingi)**
		Non-suicidal self injury prevalence and associated risk factors (**Dr Judy Kamau)**

TAB 5: SHORT COURSES

To build research capacity and to complement epidemiology and biostatistics skills the program is offering a series of short courses that have been open to other faculty and postgraduate students. This are:

- **Bioethics (30 hours)**

To equip the learner with knowledge and skills in ethics and to apply the skills in research and clinical settings

- **Responsible Conduct of Research (30 hours)**

To equip the learner with knowledge and skills needed to conduct in research a responsible manner and to adhere to rules and regulations governing responsible conduct of research

- **Leadership and Management (30 hours)**

To equip learner with knowledge and skills in leadership and management of research projects

- **ICT Tools and Informatics (30 hours)**

The purpose of this unit is to equip the learner with knowledge and skills on ICT tools used in data collection and processing

- **Research administration and Grants course (30 hours)**

The purpose of this course is to impart grantsmanship and research administration knowledge and skills to the learner and to foster positive attitudes and professionalism in the field of grants administration.

- **Manuscript Writing (60 hours)**

A practical course to assist trainee write and submit manuscript from their research project.

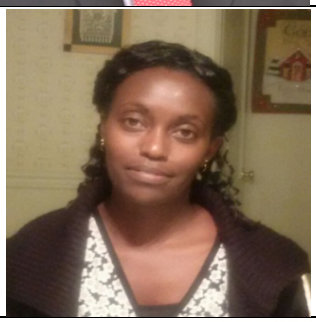
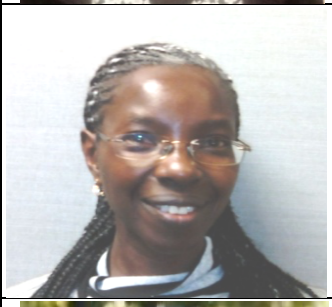
- **Responsible Conduct of Research (30 hours)**

To equip the learner with knowledge and skills needed to conduct in research a responsible manner and to adhere to rules and regulations governing responsible conduct of research

TAB 6: TRAINEES PROFILE

Cohort 1

Name **Department**	**Research Topic**
Mary N. Kubo, MB. Ch B; M. Med Department of Clinical Medicine and Therapeutics, University of Nairobi	

George N. Gwako MB. Ch B; M. Med Department of Obstetrics and Gynaecology, University of Nairobi	
Beatrice Mutai MB. Ch B; M. Med Department Paediatrics and Child Health, University of Nairobi	
Ann Wanjiru Mbwayo B.A, B Ed; MSc., PhD Department of Psychiatry, University of Nairobi	
George Mugendi B. Pharm, M. Pharm, Department of Pharmaceutics and Pharmacy Practice, University of Nairobi	
Maurice K' Odhiambo B. Pharm, M. Pharm Department of Pharmacy, Kenyatta University, Kenyatta University	
Bernard B.O Awuonda M. Med, MB. ChB Department of Paediatrics and Child Health, Maseno University	

Cohort two

Name Department	Research Topic
Dr Gladys Nthambi Mwango MMed (Diagnostic Radiology) MBChB , BSc Human Anatomy Department of Diagnostic Imaging & Radiation, UoN	
Dr Tom Mboya Olewe PhDc MPH, MBChB School of Public Health, UoN	
Dr Edwin Oloo Walong F. Anatomic Pathology, MMed (Pathology) MBChB Department of Pathology, UoN	
Dr Anne Kasyoka Barasa MMed (Pathology) MBChB Department of Human Pathology, UoN	

Dr Lilly Adhiambo Nyamai MMed (Ophth) MBChB Department of Ophthalmology, UoN	
Dr Judy Wanjiru Kamau MSc.(Child & Adolescent Metal Health), MMed Psychiatry, MBChB Department of Psychiatry, UoN	
Dr Lydiah Maingi-Ngunjiri PhD, M.A, B.Ed Department of Psychology, KU	
Dr Amos Oyoko MPH, MBChB Department of Family Medicine & Community Health, MSU