

**SUMMARY OF ACTIVITIES IN THE DEPARTMENT OF PAEDIATRICS AND CHILD HEALTH –
2009-2012**

Prepared by

Prof Ruth Nduati (immediate past Chairman)

TABLE OF CONTENTS

	Page
TITLE PAGE	1
TABLE OF CONTENTS	3
A. STAFF DEVELOPMENT	4
B. ACADEMIC PROGRAMS	5
C. RESEARCH	8
D. SYSTEMS STRENGTHENING	9
E. INCOME GENERATION	9
F. CURRICULUM DEVELOPMENT	10
G. UNFINISHED BUSINESS	10
H. DEPARTMENT OF PAEDIATRICS AND CHILD HEALTH PUBLICATIONS 2010-2012	11

A. STAFF DEVELOPMENT

During the period 2009-2012 Department of Paediatrics was able to strengthen the teaching of our undergraduate and postgraduate programs by staff. The following are the staff development programs carried out to achieve this goals.

1. In-service training:

(i) Department of Paediatrics and Child health Retreat held on 2 and 3rd of December 2009

The purpose of this retreat was to review the post-graduate training. This followed a very successful review of the undergraduate teaching carried out the previous year which had resulted in a significantly re-energized program and excellent results in the terminal evaluation of the students. Of nearly 300 undergraduate students in the 201-2012 class, only two students are repeating the year. It was felt that there is need to do the same type of review for the post graduate program. The objectives of the meeting were to;

- a. Review the existing MMED paediatrics Curriculum,
- b. Evaluate the current training strategies
- c. Review the current and new monitoring and evaluation processes
- d. Discuss strategies for staff development.

The training was carried out at the University of Nairobi, Chiromo conference facility. The venue was excellent, well designed meeting room, adequate lighting, beautiful safe surrounding and excellent meals. There was excellent attendance of the meeting by all the academic staff. The meeting was opened by the Prof Isaac Kibwage, Principal of the College of Health Sciences and closed by Prof Omwantho the Deputy Dean School of Medicine.

The outcomes of the review were as follows:

- a. The Principal Prof I Kibwage emphasized the importance of continuing medical education for the staff and the importance of terminal qualifications as a requirement for career progression.
- b. There is a need to develop sub-specialty training within the department and neonatology, nephrology, endocrinology and HIV medicine were identified as a priority.
- c. There is a lack of sufficient detail on the expectations for the students and host departments where external rotations are taking place. An immediate activity will be to develop these guidelines. Critical gaps were identified in the ICU, Haematology, and Psychiatry rotations and Child health.
- d. There is an urgent need to bring onto the staff a specialist in paediatric critical care to strengthen teaching on the same.
- e. An internal assessment will be introduced at the end of the second year and it will include a clinical exam and MCQ.
- f. Formal teaching on clerkship and clinical assessment of patients will be provided to all incoming SHO's to ensure standard practice.
- g. Doctors earn as long as they are well enough to work. The need to create passive income to tide over difficult times and to minimize the pressure to charge high prices

[2009-2012 Department of Paediatrics and Child Health Report]

for services was identified. There was a resolution that there is need to include financial education into the postgraduate program and for staff development.

5 days training on Medical Education 3-7th January 2011:

This course was adopted from St John Christian Medical College, Bangalore who are a leading centre for medical education in Southern India. The course conducted on 3-7th January 2011 was initially planned for staff in the Department of Paediatrics and Child Health but in the spirit of team work and collaboration was offered to 29 staff members from across the College of Health Sciences (CHS), the majority from Department of Paediatrics and Child health who were the original target. This course has subsequently rolled out to over 100 faculty members in the CHS and 129 senior staff in 9 Internship centers throughout Kenya under the auspices of PRIME-K an NIH funded grant at the University of Nairobi College of health sciences led by Prof James Kiarie. A spin-off of this course has been the participation of faculty from St John's medical College as external examiners in department of Paediatrics and Child Health and other

departments in the college.

Fig 1: Participants in the Medical Education Course



5 days Advanced course on Asthma and Allergy 23rd -27th January 2012:

The Department of Paediatrics and Child Health in collaboration with the Kenya Allergy Society, Christian Medical College Vellore India conducted a 5 days advanced course on Asthma and Allergy was held on 23rd-27th January 2012. This was based on the course content of a diploma course on asthma and allergy offered by the Christian Medical College Vellore India. The training brought 4 faculty– 3 from the USA and one from CMC Vellore for the training. The training was recognized and supported by the American Academy of Allergy, Asthma and Immunology. Our vision was that this could be the start of a fellowship program in the same area. The course was partly financed by the Department of Paediatrics and Child Health, KEMRI-Wellcome Trust, and through workshop subscriptions.

2 day training on Paediatric HIV 24-25 September 2012

A two day residential course was held in Nairobi, Kenya from 24-25 September 2012 at the Hilton Hotel as a collaboration between Department of Paediatrics and Child Health, PENTA (the European paediatric HIV collaborative group) and NARESA an AIDS NGO. The course was adapted from a training the PETNA group offers paediatricians in Europe and previously successfully offered in Uganda and Zambia. Participants were provided with study materials before the course for self learning. The 2-day course focused on similar topics to those covered in the modules with lectures, working groups, problem solving, and case discussions. Lecturers and discussion group leaders were drawn from an expert faculty of both African and European paediatricians and HIV scientists.

Course participants for the Paediatric HIV course brought cases from their own experience to present to the groups. The facilitators as well had a set of cases to illustrate various key points in paediatric HIV. The Case Discussion Topics included:

Cases 1 - Infants and children presenting with HIV

Cases 2 - Talking with children and families about HIV including disclosure

Cases 3 – Counselling women for HIV and starting ART in pregnancy

Cases 4 – Complications of treatment and adherence,

A certificate of participation in the course was issued by Tr@inforPedHIV. CME credits were provided as required.



Fig 2 – Participants in Paediatric HIV course

4 day training on Leadership, Management and Curriculum development 4th-8th Nov 2012:

The objective of this workshop was to provide some training on leadership and management, how to incorporate it into the training of MMED Paediatrics and Child Health and to review the MMED Paediatrics and Child Health Curriculum. The Department of Paediatrics and Child Health substantially reviewed the MMED Paediatrics and Child Health Curriculum to reflect the challenges of current practice. This activity was supported by Management Sciences for Health (MSH)– an International Health NGO and a leader in the field of Health Management Sciences.

TOT on Leadership and Management training:

This was a 5-day training supported by Management sciences for Health. The aim of this training is to increase the capacity of faculty in the CHS to teach leadership and management subjects incorporated into the undergraduate programs. The attendance was from the College of health Sciences. The trained staff will provide leadership in training undergraduates on leadership and management.

Good Laboratory Practice

Each year the laboratory staffs have to attend a 5 day course in good laboratory practice and as a result the Department of Paediatrics and Child Health has some of the best managed laboratories in the School of Medicine-KNH complex.

B. STAFF MOVEMENT

STAFF PROMOTIONS

Promotions are a tacit recognition of the individuals' performance and serves as a powerful tool for staff promotions. In the period 2009-2012 the following promotions took place.

- (i) **Senior Lecturer** - Dr Grace Irimu and Dr Dalton Wamalwa
- (ii) **Associate Professor** - Prof Elizabeth Obimbo (current Chairperson of the Department)
- (iii) **Professor** - Prof EWafula, Prof A Wasunna, Prof Fred Were and Prof Ruth Nduati

NEW STAFF APPOINTMENTS:

In order to grow and retain vitality academic departments need to regularly bring on board new staff and young faculty who can be mentored over the years to leadership as older members exit through natural attrition. In this period the Department was able to bring on board new faculty.

- **Tutorial Fellow** –
 - **Dr Diana Marangu** hired during her MMED Paediatrics and Child Health training. This has only happened once in the past when the new chairperson to the department Prof Elizabeth Maleche-Obimbo was hired. In both instances academic excellence prompted these appointments.
- **Lecturers**
 - **Dr Rashmi Kumar, Critical Care specialist** - a past graduate of out MMED Paediatrics and Child Health program and who went on to specialize in Critical care at a leading hospital in India. Dr Kumar has been with us for 2 years and in that time completely transformed care of children in the Intensive Care Unit (ICU) at Kenyatta National hospital and the training on critical care at postgraduate level.
 - **Dr Boniface Osano** a graduate of the MMED Paediatrics and Child Health program at the University of Nairobi, and is currently specializing in Child Health through the University of Cape Town. Dr Osano has been a research associate in the department for the past two years seconded from the Ministry of Health.
 - **Dr Buphi Reel Paediatrician, Critical Care Specialist and fellow in Paediatric Anaesthesia** with College and Professional training from the USA and United Kingdom. Dr Reel has served on a voluntary basis at the KNH ICU and now takes a substantive appointment in the department from 1st April 2013
- **Associate Professor**

[2009-2012 Department of Paediatrics and Child Health Report]

- Prof Francis Onyango 4th Chairman of the Department of Paediatrics and Child Health back on faculty after a 10 year stint at World Health Organization AFRO office in HARARE Child Health department. Prof Onyango is leading the Child Health training for the undergraduate and postgraduate student in the Department of Paediatrics and Child Health.
- **RESEARCH ASSOCIATES**
 - **Dr Minnie Kibore** a paediatrician and our own graduate of the MMED Paediatrics and Child Health program is employed by the University of Washington as a program officer in PRIME-K. She is currently spending 20% of her time providing consultant clinical services at KNH and clinical mentorship of undergraduate and postgraduate students.
 - **Dr Jalemba Aluvala** – a Paediatrician also a graduate of our MMED Paediatrics and Child Health program is on seconded from the Ministry of Medical Services to the KEMRI-WT under the SIRCLE project provides similar teaching and clinical services.

STAFF TRANSITIONS

- **DEATH**
 - Prof Julius Meme 3rd Chairperson of the Department of Paediatrics and Child health, past Director of Medical Services and Permanent Secretary in the Ministry of Health made his final bow after a spirited fight with cancer. Prof Meme was a graduate of the 2nd class of the MBCHB of the University of Nairobi and in the first class of MMED Paediatrics and Child Health. He has made phenomenal contributions into the field of health and his death is a great loss to the fraternity of Paediatricians and Kenya as a whole.
- **RESIGNATION**
 - Prof William Macharia is now Chairman of the Department of Paediatrics and Child Health at the Aga Khan University Teaching hospital, Nairobi.
 - Dr James Nyikal after nearly 20 years away on leave of absence as he served in various capacities in Government – Director Medical Services and Permanent Secretary Ministry of Medical Services and more recently Ministry of Gender and Children affairs. Dr Nyikal has finally retired from the University and is now an Honourable Member of the Kenya Parliament representing Seme Constituency.
- **LEAVE OF ABSENCE**
 - Prof Dorothy Mbori-Ngacha 7th Chairperson of the Department of Paediatrics and Child Health is on leave of absence serving in the UNICEF East South Africa Regional Officer (ESARO) as a Paediatric HIV and PMCT advisor.
- **STUDY LEAVE**
 - Dr Grace Irimu has returned after a two years of study during which she completed her PhD with Open University UK. Her work is already published in PLOS Medicine in July 2012.

- Currently Dr Oyatsi is away on study leave working on his PhD. His study subject is Epilepsy.

C. ACADEMIC PROGRAMS

1. CAPACITY BUILDING FOR UTILIZATION OF LIBRARY AND E-RESOURCES

Through interactions with MMED and undergraduate students we identified as significant gap in the use of Library resources. At the same time the majority of students especially module 1 undergraduate students are unable to purchase textbooks relying on classroom notes. To address this problem it is now a requirement for the students to have

- (i) One library lesson taught by the Medical School Library staff on the resources in the library and how to access them eg. PUBMED, HINARI,
- (ii) Through the Prime-K activities we have compiled e-textbooks and clinical care guidelines which the students are encouraged to pick on a phone chip or on their lap-tops.
- (iii) Graduate students are encouraged to enroll onto e-based CME's eg. MEDSCAPE as a way of enabling them to be current in their knowledge.

The University of Nairobi has embraced ICT and after several years of cataloging its libraries, the material is available on-line. Students and staff can access the Library on off-campus sites.

2. INTRODUCTION/STRENGTHENING OF A DISTRICT HOSPITAL ROTATION FOR THE UNDER GRADUATES AND POST-GRADUATE STUDENTS.

Both the undergraduate and postgraduate paediatrics and child health curriculum requires students to be exposed to child health activities. The delivery of this component of the curriculum for both undergraduate and postgraduate students has been improved as follows.

- (i) The undergraduate child health rotation was increased from one week to two weeks to increase student exposure to Paediatrics and Child Health in a District hospital setting an environment which most doctors in the public sector will work in given the large number of rural based internship sites.
- (ii) Clinical rotation in a District hospital - PG students rotate in Mbagathi, Kissi District hospital (in collaboration with Seattle Children's Hospital) or in the hospitals supported by the Prime-K grant.

During the rotation the SHO's have provided

- clinical service at the facilities,
- followed patients into the community and

[2009-2012 Department of Paediatrics and Child Health Report]

- conducted research studies of questions relevant to these institutions but also meet the requirements of the MMED Paediatrics and Child Health degree.
- (iii) The MMED students have also rotated for 2 weeks within Ministry of health programs to have hands on experience on program management.

3. INCREASED TAUGHT CONTENT IN THE PART 2 OF MMED PAEDIATRICS AND CHILD HEALTH

In the past Part 2 of the MMED Paediatrics and Child Health was largely devoted to hospital medicine. Once in the work place the postgraduate doctors will be expected to provide leadership and may even end up in policy positions. In order to provide the requisite skills; a series of seminars were introduced into the second and third year of the program to improve clinical competence and skills in program leadership. The seminars are open to Paediatricians in practice and especially from hospitals that are currently being developed towards a status of University teaching facilities. The seminars are multidisciplinary to increase the skills for working in teams as required in health care provision. The seminar series are;

- Infant and young child nutrition utilizing the WHO standard course materials.
- Leadership in Maternal Newborn and Child health – taught as an integrated course with students in other disciplines to develop skills in integration and team work
- Project management – taught by faculty from the Business School of the University of Nairobi
- Implementation Science – taught by faculty from various disciplines including school of engineering
- Vaccinology – utilizing standard WHO course materials
- Growth in practice – strengthens skills in screening growth failure from nutrition and endocrine disorders among others.
- Paediatric HIV – this course was developed by Faculty of this Department and then adapted as a regional course through the ANECCA network.

4. STRENGTHENED TEACHING OF RESEARCH METHODS AND SCIENTIFIC COMMUNICATION

Evidence based practice is a requirement of modern medical practice. Practicing doctors are expected to evaluate evidence and disseminate the same. A dissertation based on original research is a key requirement for the MMED Paediatrics and Child Health degree at the University of Nairobi. In the department we had noted that students were delaying to complete studies because of challenges in completing their dissertation. The other problem was the need to present the proposal and the results to the department was creating challenges in time allocation as the number of postgraduate students increased in number. To address these challenges we introduced specific timelines for key milestones;

- (i) Workshop format for proposal presentation 6 months after successful completion of part 1 exams. This provides the student with opportunity to develop oral

presentation skills. Listening to the discussion on different proposals also improves skills in critical appraisal and proposal writing.

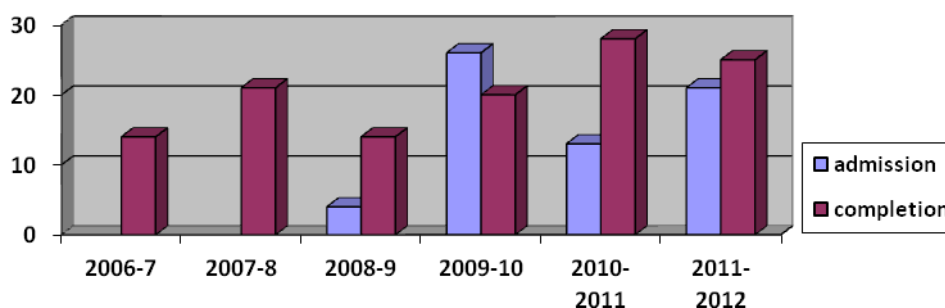
- (ii) Poster presentation for results dissemination 6-8 months before planned dates of sitting part 2 exams. This approach trains the student on data presentation and summation of research findings into a precise format.

This innovation has reduced the some of the delays encountered in completing part 2 of the MMED degrees.

IMPROVED COMPLETION RATES FOR MMED PAEDIATRICS AND CHILD HEALTH DEGREE PROGRAM

Due to the programs discussed there has been a notable improvement in the MMED completion during this time. Below is chart showing the enrollment and completion rates of MMEDs in the program during this time period. The higher number of completions compared to enrolment is contributed by students who were assisted by the research mentorship programs to complete their studies. In the 3 years (academic year 2006-2007 through to 2008-2009) the mean number of students completing the MMED Paediatrics course was 16. In the 3 years (academic years 2009-2010 through to 2011-2012) the mean number was 24, a 50% increase in the output of qualified Paediatricians.

Fig 3: MMED Paediatrics - Admission and completion



5. DELIBERATELY INCREASED USE OF IT IN TRACKING STUDENTS AND COLLATION OF CONTINUOUS ASSESSMENTS AND EXAMINATION MARKS.

The department developed two separate Excel spread sheets for tracking student follow-up, one for the Post Graduate students and the other for the Undergraduates. These tracking tools have since successfully transferred to the examination panel, co-ordinators of the two programs and the department data clerk. We have used these tools over the three years with great success. We have been able to complete exam process and collate marks of the large undergraduate classes within a day of completing all the clinical examinations.

6. ESTABLISHMENT OF A DEPARTMENTAL EXAMINATION PANEL.

Following the medical education training, it was clear that evaluation and the management of examinations requires certain competencies. An examination panel

led by Prof Fred Were was established. This exam panel has led in the organization of the exams over the two years and gained in expertise to the point other departments in the school are requesting technical support from the team.

7. TRANSFORMATION OF THE SUMMATIVE CLINICAL EXAMINATION FROM THE TRADITIONAL LONG CASE AND SHORT CASE TO OBJECTIVELY STRUCTURED CLINICAL EXAMINATION- (OSCE'S).

The OSCE exam provides a standard method of examining since every student has the same experience and marking is based on a standard mark sheet. We have gained success in the conduct of this exam and developed systems for efficient execution of the exam such that in the last exam season we completed clinical examinations in 3 days for the just over 200 students compared to 6 days in the sister departments. Currently the undergraduate students do a Long case as part of formative evaluation, and 6 and 10 stations OSCEs at end term and end year – a total of 17 different clinical examination scenarios. The postgraduates 16 OSCE's for the summative exam at the end of the course. Compared to the previous system of one Long case and 2-3 short cases, the OSCE exam has allowed us also to test more widely with stations testing, history taking, physical examination of all systems, emergency scenarios, counseling, interpretation of laboratory and radiological investigations as well prescription practice.

8. REVIEW OF EXAMINATIONS

We have regularly reviewed the performance of the students in written and clinical areas as a process of self evaluation and reflection on our performance as teachers. We have been able to make important improvements in the delivery of our curriculum based on the results of this evaluation. The reviews have enabled us to make the following observations:

- There was very poor performance in essay/Short answer questions – we have now introduced a one hour lecture on how to write an essay/short answer questions and a CAT on the same to give students opportunity to practice.
- Weak performance on clinical examination skills in UG and PG has led us to introduce formal sessions on physical examination of children for both levels of learning.
- The most recent activity that was not fully completed was to evaluate each exam question based on student performance as a process of further refining our question bank.
- We have also implemented the recommendations made by external examiner and especially in the area of ensuring that we evaluate all areas we teach.

D. RESEARCH AND COLLABORATIONS

Mentorship collaboration with Department of Paediatric Nephrology St John's Medical College – Education Ambassador's program

Dr Phadke a Paediatric Nephrologist was scheduled to come and spend a week training on the same in oct 2012. This was postponed to January 2013 because of the SHO strike. The lead for this activity is Dr Bashir. St John's Christian Medical College has the largest paediatric renal transplant program in India. This mentorship is part of tripartite arrangement with our two units and Montreal Children's hospital funded by International

Nephrology Association. Currently there are only two paediatric nephrologists in public service – Dr A Bashir in the Department of Paediatrics and Child Health, and his recent student Dr Okelo at Kenyatta National Hospital. This arrangement will contribute to the strengthening of care of children suffering from various kidney disorders.

Research Infrastructure

In collaboration with colleagues from the University of Washington we have established a **specimen repository** for samples collected from various studies conducted in the department of Paediatrics and Child Health. A KEMRI researcher Dr Rose Bosire from the Centre of Public Health Researcher is currently working on her PhD based on samples from the Kesho Bora study.

Research Programs

- a. **Collaboration between department of Paediatrics and Child Health and KEMRI-WT –**
 - i. **SIRCLE Collaboration** – this collaboration is providing scholarship to some of the Ministry of Health employees in the MMED program and strengthening implementation science research. Within the Department the initiative is led by Prof Mike English, Prof A Wasunna and Prof Fred Were.
 - ii. **ETAT training** – This is an emergency course that is offered to the MMED vs and undergraduate students. The best MMEDS are then trained to be trainers. These trainers have then been used to train Ministry of Health staff and have even gone further and trained teams in Uganda and Rwanda. The activity is led by Dr Florence Murila, Dr Grace Irimu and Dr Mike English.
- b. **PRIME-K**
 - i. **Linked Award** – this grant led by Dr Dalton Wamalwa it provided research support and grants to 33 MMED students working in multi-disciplinary teams in the past year.
 - ii. **Programmatic Award** – Aim 2 of this award is led by Prof Ruth Nduati. Over the past 2 years provided 129 students with elective term placing in government hospitals around Kenya as a pilot for decentralized medical education.
- c. **Measles study** – this is a series of studies evaluating immunity and response to immunization in the HIV infected child as a collaborative study with the University of Washington
- d. **OPH study** – An NIH funded research led by DR Dalton Wamalwa focused on optimizing treatment of HIV infected children.
- e. **PUSH study** – newly NIH funded study led by Dr Dalton Wamalwa continues on the theme of optimizing HIV treatment and care of children.
- f. **Use of stable isotope techniques to monitor and improve infant and young child nutrition interventions in afra countries** Project code raf/6/039 - Through this grant the department is in receipt of an FTIR – this equipment will enable the department carry out nutrition studies looking at body composition using isotope techniques.
- g. **Application for a Fogarty Planning grant to develop a Physician Research Program within the School of Medicine, College of Health Sciences at the University of**

[2009-2012 Department of Paediatrics and Child Health Report]

Nairobi. We have received a score of 38 and comments back from the NIH. The program office at the NIH has indicated that we are in the Grey area of possible funding and has requested from some response to comments raised by the reviewers.

This is a list of the current faculty driven research. The MMED Paediatrics and Child health student have studies under close mentorship of the faculty and are listed as Student Projects in Paediatrics and Child health on this website.

3. **Research Publications** – the department continues to be a leader in research publications. At the end of this report is a list of publications during the period I have been in office.

E. SYSTEMS STRENGTHENING

- (i) **ISO:** The department is compliant with the ISO requirements and has passed internal audit all the time we have been audited.
- (ii) **Department received a new coat of paint** and minor repairs and thus improving the working environment of the staff.
- (iii) **Renovations of the ACTS classroom** mean that we can run two sessions in the same areas.
- (iv) **Strengthening of the laboratories through**
 - a. Placement of high end thorough put biochemistry and haematology equipment, thus improving out-put.
 - b. External and internal quality assurance for the laboratory and adoption of the Good Laboratory Practice standards.

F. INCOME GENERATION

1. INCOME GENERATION

There are three streams of income generation in the department;

- a. **Training** - Module 2 MBCHB and MMED programs

Approximately KSH 5million is distributed to the staff members per year. There is over KSH 2million held by UNES accumulated from the PG program over a period of years. There is need for the department to develop plans for its utilization.

b. **Service delivery – Laboratory**

The table below shows income and expenditure from the laboratory over the three year period. The laboratory services research projects and acts as a back-up clinical laboratory when the hospital labs are out of service.

Table 1: Income and Expenditure of the Department of Paediatrics and Child Health Laboratory

Duration	Income	Expenditure	Balance
----------	--------	-------------	---------

[2009-2012 Department of Paediatrics and Child Health Report]

			0.00
October -December 2009	3,029,000.00	877,162.55	2,151,837.45
January to March 2010	3,992,825.00	1,595,189.15	2,397,635.85
April to June 2010	4,815,786.00	1,057,299.92	3,758,486.08
July to September 2010	3,057,650.00	1,185,842.20	1,871,807.80
October to December 2010	5,265,350.00	1,077,022.10	4,188,327.90
January to March 2011	5,646,550.00	1,704,384.90	3,942,165.10
April to June 2011	3,837,300.00	1,642,684.79	2,194,615.21
July to September 2011	5,742,700.00	1,217,810.71	4,524,889.29
October to December 2011	4,571,120.00	1,243,230.00	3,327,890.00
January to March 2012	3,047,400.00	1,217,132.80	1,830,267.20
April to June 2012	2,166,750.00	456,647.00	1,710,103.00
July September 2012	2,221,600.00	309,854.60	1,911,745.40
TOTAL	47,394,031.00	13,584,260.72	33,809,770.28*

*Before distribution to service providers and others as per Kibera IV.

The Molecular laboratory and ACTS centre are additional minor IGA points which have of yet not achieved the status of funds distribution.

Of the revenue balance, 25% was remitted to the department allowing us to manage the academic activities as well as accumulate some reserves.

c. Grants – Research and development grants

- (i) In late 2011, the ACTS project remitted KSH7 million to the department making a total of KSH 21million held in the Department of Paediatrics and Child Health Research vote. This money is designated for physical infrastructure development. An additional KSH14million was remitted to central University administration and smaller amounts to the CHS.
- (ii) Jan 2011 the KEMRI-WT gave the Department of Paediatrics and Child Health KSH 200,000 to support MMED students attend the Asthma and Allergy course.
- (iii) In Nov 2012 – The Management Sciences for Health (MSH) spent KSH 1 Million to support a 4-day workshop on Leadership, Management and Curriculum development.
- (iv) IAEA through the AFRA RAF6039 project donated laboratory equipment (IR-AFFINITY Fourier transform infrared spectrophotometer and accessories worth Euro 22,233 and reagents worth Euro 1164 a total of KSH 2,643,861

2. **Corporate Responsibility** – In consultation with the Dean School of Medicine, the Department has provided work-study opportunities for MBCHB students experiencing extreme financial difficulties.

G. CURRICULUM DEVELOPMENT

MBCHB PAEDIATRICS AD CHILD HEALTH ROTATION

The MBCHB paediatrics curriculum was revised as part of the year 6 program the details are on the Dean of School of Medicine web page. Currently in the undergraduate program there are 11 weeks of training in Paediatrics of which;

- a) 1 week is introduction to pediatric history taking and examination, and 3 days of ETAT (emergency triage and treatment)
- b) 2 weeks on child health, (in Mbagathi District hospital and surrounding community)
- c) 2 weeks neonatology, (KNH newborn unit)
- d) 5 weeks in a general pediatric ward and (on level 3 paediatric wards of the KNH hospital)
- e) 1 week of examinations.

Students receive further exposure to Paediatrics and Child health during a 3 month rotation during internship.

Fellowship in Endocrinology:

A fellowship training has been ongoing in collaboration with the European Society of Pediatric endocrinology and Gertrude Gardens; Children's Hospital and Aga University Teaching hospital. The plan is to develop this into a UON Fellowship is to provide long-term sustainability for the program. A draft curriculum has been developed with the leadership of Dr Lucy Mungai Wainaina a paediatric endocrinologist.

Fellowship in Paediatric Haemato-Oncology

Development of a Fellowship in Haemato-Oncology began as an initiative of the Department of Academic Medicine. We now have a draft document that can be shared with stakeholders before being moved up the system. Leadership has been provided by Prof FE Onyango and Dr Nyambura Kariuki. The latter don is one of the only two paediatricians in Kenya trained in Paediatric Haemato-oncology and the only one in Public service currently.

BUILDING EXTENSIONS : The department had save KSH 21million with which we needed to improve the infrastructure. The cost of the planned building exceeded the amount of savings. The space is urgently needed to meet the needs of expanded program

H. DEPARTMENT OF PAEDIATRICS AND CHILD HEALTH PUBLICATIONS

The department has increased/sustained its leadership in publication in peer reviewed journals. The department has increased from 3.6% of the overall University of Nairobi published papers cited in Pubmed in 2010, to 12% in 2011 and 6% in 2012. Overall we contributed 7% of all University of Nairobi publication cited in PUBMED (a National Institute

[2009-2012 Department of Paediatrics and Child Health Report]

of medicine supported listing of publications in peer reviewed journals). Below the table is a listing of the publications.

Table2: Number of publications cited in Pubmed

	2010	2011	2012	Total
Department of Paediatrics and Child Health	9	28	25	62
University of Nairobi	250	234	405	889

2010

1. Nzou C, Kambarami RA, **Onyango FE**, Ndhlovu CE, Chikwasha V. Clinical predictors of low CD4 count among HIV infected pulmonary tuberculosis clients: a health facility-based survey. *S Afr Med J*. 2010 Sep 7;100(9):602-5. PubMed PMID:20822651.
2. Jonnalagadda S, Lohman Payne B, Brown E, **Wamalwa D**, **Maleche Obimbo E**, Majiwa M, Farquhar C, Otieno P, **Mbori-Ngacha D**, John-Stewart G. Latent tuberculosis detection by interferon γ release assay during pregnancy predicts active tuberculosis and mortality in human immunodeficiency virus type 1-infected women and their children. *J Infect Dis*. 2010 Dec 15;202(12):1826-35. Epub 2010 Nov 10. PubMed PMID: 21067370; PubMed Central PMCID: PMC3058232.
3. Marx G, John-Stewart G, Bosire R, **Wamalwa D**, Otieno P, Farquhar C. Diagnosis of sexually transmitted infections and bacterial vaginosis among HIV-1-infected pregnant women in Nairobi. *Int J STD AIDS*. 2010 Aug;21(8):549-52. PubMed PMID: 20975086; PubMed Central PMCID: MC3050991.
4. Mackelprang RD, Carrington M, John-Stewart G, Lohman-Payne B, Richardson BA, **Wamalwa D**, Gao X, Majiwa M, **Mbori-Ngacha D**, Farquhar C. Maternal human leukocyte antigen A*2301 is associated with increased mother-to-child HIV-1 transmission. *J Infect Dis*. 2010 Oct 15;202(8):1273-7. PubMed PMID: 20812845.
5. **Wamalwa DC**, Obimbo EM, Farquhar C, Richardson BA, **Mbori-Ngacha DA**, Inwani I, Benki-Nugent S, John-Stewart G. Predictors of mortality in HIV-1 infected children on antiretroviral therapy in Kenya: a prospective cohort. *BMC Pediatr*. 2010 May 18;10:33. PubMed PMID: 20482796; PubMed Central PMCID: PMC2887829.
6. Farquhar C, **Mbori-Ngacha D**, Overbaugh J, Wamalwa D, Harris J, Bosire R, John-Stewart G. Illness during pregnancy and bacterial vaginosis are associated with in-utero HIV-1 transmission. *AIDS*. 2010 Jan 2;24(1):153-5. PubMed PMID: 19952542; PubMed Central PMCID: PMC2788745.
7. Kinuthia J, Kiarie JN, Farquhar C, Richardson B, **Nduati R**, Mbori-Ngacha D, John-Stewart G. Cofactors for HIV-1 incidence during pregnancy and postpartum period. *Curr HIV Res*. 2010 Oct 1;8(7):510-4. PubMed PMID: 20946093.
8. Viljoen J, Gampini S, Danaviah S, Valéa D, Pillay S, Kania D, Méda N, Newell ML, Van de Perre P, Rouet F; World Health Organization/ANRS 1289 **Kesho Bora Study Group**. Dried blood spot HIV-1 RNA quantification using open real-time systems in South Africa and Burkina Faso. *J Acquir Immune Defic Syndr*. 2010 Nov;55(3):290-8. PubMed PMID: 20700058.
9. **Kesho Bora Study Group**. Eighteen-month follow-up of HIV-1-infected mothers and their children enrolled in the Kesho Bora study observational cohorts. *J Acquir Immune Defic Syndr*. 2010 Aug 15;54(5):533-41. PubMed PMID: 20543706.

2011

- 1) **Kesho Bora Study Group**. Safety and effectiveness of antiretroviral drugs during pregnancy, delivery and breastfeeding for prevention of mother-to-child transmission of HIV-1: the Kesho Bora Multicentre Collaborative Study rationale, design, and implementation challenges. *Contemp Clin Trials*. 2011 Jan;32(1):74-85. Epub 2010 Sep 17. PubMed PMID: 20854932.
- 2) Viljoen J, Gampini S, Danaviah S, Valéa D, Pillay S, Kania D, Méda N, Newell ML, Van de Perre P, Rouet F; World Health Organization/ANRS 1289 **Kesho Bora Study Group**. Dried blood spot HIV-1 RNA quantification using open real-time systems in South Africa and Burkina Faso. *J Acquir Immune Defic Syndr*. 2010 Nov 1;55(3):290-8. PubMed PMID: 20700058.
- 3) **Kesho Bora Study Group**. Eighteen-month follow-up of HIV-1-infected mothers and their children enrolled in the Kesho Bora study observational cohorts. *J Acquir Immune Defic Syndr*. 2010 Aug 15;54(5):533-41. PubMed PMID: 20543706.
- 4) Dagan R, Bhutta ZA, de Quadros CA, Garau J, Klugman KP, Khuri-Bulos N, Levine O, Saha SK, Sow S, **Were F**, Yang Y. The Remaining Challenge of Pneumonia: The Leading Killer of Children. *Pediatr Infect Dis J*. 2010 Nov 11. [Epub ahead of print] PubMed PMID: 21076365.
- 5) Ujiji OA, Rubenson B, Ilako F, Marrone G, **Wamalwa D**, Wangalwa G, Ekström AM. Is 'Opt-Out HIV Testing' a real option among pregnant women in rural districts in Kenya? *BMC Public Health*. 2011 Mar 8;11:151. PubMed PMID: 21385423; PubMed Central PMCID: PMC3061915.
- 6) Chohan BH, Emery S, **Wamalwa D**, John-Stewart G, Majiwa M, Ng'ayo M, Froggett S, Overbaugh J. Evaluation of a single round polymerase chain reaction assay using dried blood spots for diagnosis of HIV-1 infection in infants in an African setting. *BMC Pediatr*. 2011 Feb 18;11:18. PubMed PMID: 21332984; PubMed Central PMCID: PMC3050718.
- 7) Lynch JB, **Nduati R**, Blish CA, Richardson BA, Mabuka JM, Jalalian-Lechak Z, John-Stewart G, Overbaugh J. The breadth and potency of passively acquired human immunodeficiency virus type 1-specific neutralizing antibodies does not correlate with risk of infant infection. *J Virol*. 2011 Mar 16. [Epub ahead of print] PubMed PMID: 21411521.
- 8) Marston M, Becquet R, Zaba B, Moulton LH, Gray G, Coovadia H, Essex M, Ekouevi DK, Jackson D, Coutsoydis A, Kilewo C, Leroy V, Wiktor S, **Nduati R**, Msellati P, Dabis F, Newell ML, Ghys PD. Net survival of perinatally and postnatally HIV-infected children: a pooled analysis of individual data from sub-Saharan Africa. *Int J Epidemiol*. 2011 Jan 18. [Epub ahead of print] PubMed PMID: 21247884.
- 9) **Kesho Bora Study Group**. Safety and effectiveness of antiretroviral drugs during pregnancy, delivery and breastfeeding for prevention of mother-to-child transmission of HIV-1: the Kesho Bora Multicentre Collaborative Study rationale, design, and implementation challenges. *Contemp Clin Trials*. 2011 Jan;32(1):74-85. Epub 2010 Sep 17. PubMed PMID: 20854932.
- 10) Awiti Ujiji O, Ekstrom AM, Ilako F, Indalo D, **Wamalwa D**, Rubenson B. Reasoning and deciding PMTCT-adherence during pregnancy among women living with HIV in Kenya. *Cult Health Sex*. 2011 Jun 1:1-12. [Epub ahead of print] PMID: 21656411 [PubMed - as supplied by publisher]

- 11) Kinuthia J, Kiarie JN, Farquhar C, Richardson B, **Nduati R**, **Mbori-Ngacha D**, John-Stewart G. Cofactors for HIV-1 incidence during pregnancy and postpartum period. *Curr HIV Res.* 2010 Oct 1;8(7):510-4. PMID: 20946093 [PubMed - in process]
- 12) Ujiji OA, Rubenson B, Ilako F, Marrone G, **Wamalwa D**, Wangalwa G, Ekström AM. Is 'Opt-Out HIV Testing' a real option among pregnant women in rural districts in Kenya? *BMC Public Health.* 2011 Mar 8;11:151. PubMed PMID: 21385423; PubMed Central PMCID: PMC3061915.
- 13) Chohan BH, Emery S, **Wamalwa D**, John-Stewart G, Majiwa M, Ng'ayo M, Froggett S, Overbaugh J. Evaluation of a single round polymerase chain reaction assay using dried blood spots for diagnosis of HIV-1 infection in infants in an African setting. *BMC Pediatr.* 2011 Feb 18;11:18. PubMed PMID: 21332984; PubMed Central PMCID: PMC3050718.
- 14) Lynch JB, **Nduati R**, Blish CA, Richardson BA, Mabuka JM, Jalalian-Lechak Z, John-Stewart G, Overbaugh J. The breadth and potency of passively acquired human immunodeficiency virus type 1-specific neutralizing antibodies does not correlate with risk of infant infection. *J Virol.* 2011 Mar 16. [Epub ahead of print] PubMed PMID: 21411521.
- 15) Marston M, Becquet R, Zaba B, Moulton LH, Gray G, Coovadia H, Essex M, Ekouevi DK, Jackson D, Coutoudis A, Kilewo C, Leroy V, Wiktor S, **Nduati R**, Msellati P, Dabis F, Newell ML, Ghys PD. Net survival of perinatally and postnatally HIV-infected children: a pooled analysis of individual data from sub-Saharan Africa. *Int J Epidemiol.* 2011 Jan 18. [Epub ahead of print] PubMed PMID: 21247884.
- 16) Kesho Bora Study Group. Safety and effectiveness of antiretroviral drugs during pregnancy, delivery and breastfeeding for prevention of mother-to-child transmission of HIV-1: the Kesho Bora Multicentre Collaborative Study rationale, design, and implementation challenges. *Contemp Clin Trials.* 2011 Jan;32(1):74-85. Epub 2010 Sep 17. PubMed PMID: 20854932.
- 17) Awiti Ujiji O, Ekstrom AM, Ilako F, Indalo D, **Wamalwa D**, Rubenson B. Reasoning and deciding PMTCT-adherence during pregnancy among women living with HIV in Kenya. *Cult Health Sex.* 2011 Jun 1:1-12. [Epub ahead of print] PMID: 21656411 [PubMed - as supplied by publisher]
- 18) Osano BO, Wang'ombe JK, Kamenwa RW, **Wamalwa D**. Cost analysis of care for children admitted to Kenyatta National Hospital with rotavirus gastroenteritis. *Vaccine.* 2011 May 23;29(23):4019-24. Epub 2011 Apr 12. PMID: 21492742 [PubMed - in process]
- 19) Ayieko P, Ntoburi S, Wagai J, Opondo C, Opiyo N, Migiro S, Wamae A, Mogoia W, **Were F**, **Wasunna A**, Fegan G, **Irimu G**, English M. A multifaceted intervention to implement guidelines and improve admission paediatric care in Kenyan district hospitals: a cluster randomised trial. *PLoS Med.* 2011 Apr;8(4):e1001018. doi: 10.1371/journal.pmed.1001018. Epub 2011 Apr 5. PMID: 21483712 [PubMed - in process]
- 20) **Murila F**, Francis JV, Bland A, Kumbula S, Doherty R, Sehgal A. Interpreting positive cultures of endotracheal aspirates: Factors associated with treatment decisions in ventilated neonates. *J Paediatr Child Health.* 2011 Mar 30. doi: 10.1111/j.1440-1754.2011.02041.x. [Epub ahead of print] PMID: 21449902 [PubMed - as supplied by publisher]

- 21) Opwora AS, **Laving AM**, Nyabola LO, Olenja JM. Who is to blame? Perspectives of caregivers on barriers to accessing healthcare for the under-fives in Butere District, Western Kenya. *BMC Public Health*. 2011 May 3;11:272. PMID:21539746 [PubMed - in process]
- 22) Githinji N, **Maleche-Obimbo E**, Nderitu M, **Wamalwa DC**, Mbori-Ngacha D. Utility of total lymphocyte count as a surrogate marker for CD4 counts in HIV-1 infected children in Kenya. *BMC Infect Dis*. 2011 Sep 30;11:259.
- 23) John-Stewart G, **Nduati R** Should Women with HIV-1 Infection Breastfeed Their Infants? It Depends on the Setting. *Adv Exp Med Biol*. 2012;743:289-97. No abstract available.
- 24) English M, Nzinga J, Mbindyo P, Ayieko P, **Irimu G**, Mbaabu L. Explaining the effects of a multifaceted intervention to improve inpatient care in rural Kenyan hospitals--interpretation based on retrospective examination of data from participant observation, quantitative and qualitative studies. *Implement Sci*. 2011 Dec 2;6:124.
- 25) Opondo C, Ayieko P, Ntoburi S, Wagai J, Opiyo N, **Irimu G**, Allen E, Carpenter J, English M. Effect of a multi-faceted quality improvement intervention on inappropriate antibiotic use in children with non-bloody diarrhoea admitted to district hospitals in Kenya. *BMC Pediatr*. 2011 Nov 25;11:109.
- 26) Gathara D, Opiyo N, Wagai J, Ntoburi S, Ayieko P, Opondo C, Wamae A, Migiro S, Mogoia W, **Wasunna A**, **Were F**, **Irimu G**, English M. Quality of hospital care for sick newborns and severely malnourished children in Kenya: a two-year descriptive study in 8 hospitals. *BMC Health Serv Res*. 2011 Nov 11;11:307.
- 27) Kinuthia J, Kiarie JN, Farquhar C, Richardson BA, **Nduati R**, Mbori-Ngacha D, John-Stewart G. Uptake of prevention of mother to child transmission interventions in Kenya: health systems are more influential than stigma. *J Int AIDS Soc*. 2011 Dec 28;14:61.
- 28) **Murila F**, Francis JV, Bland A, Kumbla S, Doherty R, Sehgal A. Interpreting positive cultures of endotracheal aspirates: factors associated with treatment decisions in ventilated neonates. *J Paediatr Child Health*. 2011 Oct;47(10):728-33. doi: 10.1111/j.1440-1754.2011.02041.x. Epub 2011 Mar 30.

2012

- 1) Becquet R, Marston M, Dabis F, Moulton LH, Gray G, Coovadia HM, Essex M, Ekouevi DK, Jackson D, Coutoudis A, Kilewo C, Leroy V, Wiktor SZ, **Nduati R**, Msellati P, Zaba B, Ghys PD, Newell ML; the UNAIDS Child survival group. Children Who Acquire HIV Infection Perinatally Are at Higher Risk of Early Death than Those Acquiring Infection through Breastmilk: A Meta-Analysis. *PLoS One*. 2012;7(2):e28510. Epub 2012 Feb 23.
- 2) Odhiambo A, Rotich EC, Chindia ML, Macigo FG, Ndavi M, **Were F**. Craniofacial anomalies amongst births at two hospitals in Nairobi, Kenya. *Int J Oral Maxillofac Surg*. 2012 Mar 1. [Epub ahead of print]
- 3) McGrath CJ, **Nduati R**, Richardson BA, Kristal AR, Mbori-Ngacha D, Farquhar C, John-Stewart GC. The Prevalence of Stunting Is High in HIV-1-Exposed Uninfected Infants in Kenya. *J Nutr*. 2012 Apr;142(4):757-63. Epub 2012 Feb 29.
- 4) Murila F, Obimbo MM, Musoke R. Assessment of knowledge on neonatal resuscitation amongst health care providers in Kenya. *Pan Afr Med J*. 2012;11:78. Epub 2012 Apr 24.

- 5) John-Stewart G, **Nduati R**. Should women with HIV-1 infection breastfeed their infants? It depends on the setting. *Adv Exp Med Biol*. 2012;743:289-97. No abstract available.
- 6) **Were F**. The dengue situation in Africa. *Paediatr Int Child Health*. 2012 May;32 Suppl 1:18-21.
- 7) Were FH, Kamau GN, Shiundu PM, Wafula GA, Moturi CM. Air and blood lead levels in lead acid battery recycling and manufacturing plants in Kenya. *J Occup Environ Hyg*. 2012;9(5):340-4.
- 8) **Wamalwa D**, Benki-Nugent S, Langat A, Tapia K, Ngugi E, Slyker JA, Richardson BA, John-Stewart GC. Survival Benefit of Early Infant Antiretroviral Therapy is Compromised when Diagnosis is Delayed. *Pediatr Infect Dis J*. 2012 Apr 26. [Epub ahead of print]
- 9) Korir GK, Ochieng BO, Wambani JS, Korir IK, **Jowi CY**. RADIATION EXPOSURE IN INTERVENTIONAL PROCEDURES. *Radiat Prot Dosimetry*. 2012 May 17. [Epub ahead of print]
- 10) **Wamalwa D**, Lehman DA, Benki-Nugent S, Gasper M, Gichohi R, **Maleche-Obimbo E**, Farquhar C, John-Stewart G, Overbaugh J. Long-term Virologic Response and Genotypic Resistance Mutations in HIV-1 Infected Kenyan Children on Combination Antiretroviral Therapy. *J Acquir Immune Defic Syndr*. 2012 Nov 28. [Epub ahead of print]
- 11) **Wamalwa D**, Lehman DA, Benki-Nugent S, Gasper M, Gichohi R, **Maleche-Obimbo E**, Farquhar C, John-Stewart G, Overbaugh J. Long-term Virologic Response and Genotypic Resistance Mutations in HIV-1 Infected Kenyan Children on Combination Antiretroviral Therapy. *J Acquir Immune Defic Syndr*. 2012 Nov 28. [Epub ahead of print]
- 12) Nanjala M, **Wamalwa D**. Determinants of male partner involvement in promoting deliveries by skilled attendants in Busia, Kenya. *Glob J Health Sci*. 2012 Feb 29;4(2):60-7. doi: 10.5539/gjhs.v4n2p60.
- 13) Crispin N, Wamae A, Ndirangu M, **Wamalwa D**, Wangalwa G, Watako P, Mbiti E. Effects of selected socio-demographic characteristics of community health workers on performance of home visits during pregnancy: a cross-sectional study in Busia District, Kenya. *Glob J Health Sci*. 2012 Jul 26;4(5):78-90. doi: 10.5539/gjhs.v4n5p78.
- 14) Lohman-Payne B, Slyker JA, Moore S, **Maleche-Obimbo E**, **Wamalwa DC**, Richardson BA, Rowland-Jones S, Mbori-Ngacha D, Farquhar C, Overbaugh J, John-Stewart G. Breast milk cellular HIV-specific interferon γ responses are associated with protection from peripartum HIV transmission. *AIDS*. 2012 Oct 23;26(16):2007-16. doi: 10.1097/QAD.0b013e328359b7e0.
- 15) Diener LC, Slyker JA, Gichuhi C, Tapia KA, Richardson BA, **Wamalwa D**, Farquhar C, Overbaugh J, **Maleche-Obimbo E**, John-Stewart G. Performance of the integrated management of childhood illness algorithm for diagnosis of HIV-1 infection among African infants. *AIDS*. 2012 Sep 24;26(15):1935-41.
- 16) **Wamalwa D**, Benki-Nugent S, Langat A, Tapia K, Ngugi E, Slyker JA, Richardson BA, John-Stewart GC. Survival benefit of early infant antiretroviral therapy is compromised when diagnosis is delayed. *Pediatr Infect Dis J*. 2012 Jul;31(7):729-31. doi: 10.1097/INF.0b013e3182587796.
- 17) Lehman DA, **Wamalwa DC**, McCoy CO, Matsen FA, Langat A, Chohan BH, Benki-Nugent S, Custers-Allen R, Bushman FD, John-Stewart GC, Overbaugh J. Low-

- frequency nevirapine resistance at multiple sites may predict treatment failure in infants on nevirapine-based treatment. *J Acquir Immune Defic Syndr*. 2012 Jul 1;60(3):225-33. doi: 10.1097/QAI.0b013e3182515730.
- 18) Githinji N, Maleche-Obimbo E, Nderitu M, **Wamalwa DC**, Mbori-Ngacha D. Utility of total lymphocyte count as a surrogate marker for CD4 counts in HIV-1 infected children in Kenya. *BMC Infect Dis*. 2011 Sep 30;11:259. doi: 10.1186/1471-2334-11-259.
- 19) Jonnalagadda SR, Brown E, Lohman-Payne B, **Wamalwa D**, Farquhar C, Tapia K, Cranmer LM, John-Stewart GC. Consistency of Mycobacterium tuberculosis-specific interferon-gamma responses in HIV-1-infected women during pregnancy and postpartum. *Infect Dis Obstet Gynecol*. 2012;2012:950650. doi: 10.1155/2012/950650. Epub 2012 Mar 15.
- 20) **Irimu GW**, Gathara D, Zurovac D, Kihara H, Maina C, Mwangi J, Mbori-Ngacha D, Todd J, Greene A, English M. Performance of health workers in the management of seriously sick children at a Kenyan tertiary hospital: before and after a training intervention. *PLoS One*. 2012;7(7):e39964. doi: 10.1371/journal.pone.0039964. Epub 2012 Jul 31.
- 21) Ochola SA, Labadarios D, **Nduati RW**. Impact of counselling on exclusive breast-feeding practices in a poor urban setting in Kenya: a randomized controlled trial. *Public Health Nutr*. 2012 Oct 8:1-9. [Epub ahead of print]
- 22) Rositch AF, Cherutich P, Brentlinger P, Kiarie JN, **Nduati R**, Farquhar C. HIV infection and sexual partnerships and behaviour among adolescent girls in Nairobi, Kenya. *Int J STD AIDS*. 2012 Jul;23(7):468-74. doi: 10.1258/ijsa.2012.011361.
- 23) Goo L, Milligan C, Simonich CA, **Nduati R**, Overbaugh J. Neutralizing antibody escape during HIV-1 mother-to-child transmission involves conformational masking of distal epitopes in envelope. *J Virol*. 2012 Sep;86(18):9566-82. doi: 10.1128/JVI.00953-12. Epub 2012 Jun 27.
- 24) Mabuka J, **Nduati R**, Odem-Davis K, Peterson D, Overbaugh J. HIV-specific antibodies capable of ADCC are common in breastmilk and are associated with reduced risk of transmission in women with high viral loads. *PLoS Pathog*. 2012;8(6):e1002739. doi: 10.1371/journal.ppat.1002739. Epub 2012 Jun 14.
- 25) Kesho Bora Study Group. Maternal HIV-1 disease progression 18-24 months postdelivery according to antiretroviral prophylaxis regimen (triple-antiretroviral prophylaxis during pregnancy and breastfeeding vs zidovudine/single-dose nevirapine prophylaxis): The Kesho Bora randomized controlled trial. *Clin Infect Dis*. 2012 Aug;55(3):449-60. doi: 10.1093/cid/cis461. Epub 2012 May 9.