Africa seminar at the Faculty of Medicine, 21.st of November 2017

Africa is an expansive region with strong growth. The population is young and growing, and there is a great potential for higher education and research in the countries. Africa and Europe have a lot to learn from each other, not the least when it comes to education and research. This is something that the Faculty of Medicine is keen to be part of. In 2013, the Faculty of Medicine therefore launched an initiative to encourage and support collaboration with Africa concerning research and education. Since then, previous collaboration projects have been strengthened and expanded, and new projects and have developed.

In the faculty management, we are delighted to see how the collaboration with partners in Africa has expanded. The collaboration in research has not only led to new and important research projects, but has also paved the way for collaboration in education. An increasing number of students have had the opportunity to do clinical placements in Africa and to do theses based on research conducted in African settings. We hope that this seminar will provide the opportunity for participants to learn more about ongoing efforts, to engage in discussions and to form new networks.

Welcome!

Gunilla Westergren-Thorsson    Lars Dahlin
Dean                        Pro-Dean
Presentations by researchers, teachers and students

Lars Hagander, Department of Clinical Sciences in Lund, Pediatrics
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COLLABORATION WITH UNIVERSITY OF ZIMBABWE

(1). A five-week course for final-semester medical students was developed with financial support from STINT, involving visiting teachers and students from Harvard Medical School and University of Zimbabwe. The course is an advanced course in clinical pediatrics and operative specialties, and serves as an introduction to global public health.

(2). Lund University was awarded SIDA-funding through the Linnaeus-Palme partnership program for bilateral exchange with University of Zimbabwe, supporting two professors and four medical students from each institution every year.

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GLOBAL REHABILITATION – THE NEED FOR EARLY, SAFE, CONTINUOUS AND WIDESPREAD REHABILITATION AFTER UPPER EXTREMITY SURGICAL PROCEDURES

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Scaling-up surgical care in the world’s poorest regions has been recognized as one of the most important goals in improving global health and long-term development. However, relatively little attention has been paid to rehabilitation after injuries and surgery for various conditions. Methods: To meet the needs for higher education and early initiation of rehabilitation after acute hand injuries, Lund University, Sweden and the University of Zimbabwe developed a course for hand therapists and orthopaedic surgeons in Harare, Zimbabwe with the long-term intention to develop rehabilitation from a global perspective. Findings: A course, focusing on treatment strategies of hand injuries consisting of lectures, discussions in small groups and practical lessons how to produce orthosis, was organized with emphasis on the close collaboration between hand surgeons and hand therapists as well as the crucial timing of the initiation of treatments. Challenges and lessons made are described. Interpretation: Safe, efficient and widespread rehabilitation plays an important role in the outcome after hand injuries and surgery. Creating academic partnerships between universities can be of mutual benefit and
may be a model for spreading knowledge and strengthen health care systems. We also propose a new term - Global Rehabilitation.

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**LABORATORY INVESTIGATIONS OF MALARIA IN UGANDA**

We have a collaborative project with Makerere University in Uganda. Currently we are starting a new study of children and adults to understand immunity against malaria. We are doing laboratory investigations of malaria-specific B-cells and different immunological markers in the blood. These studies are a step towards making a functional vaccine against malaria, which is a major killer in Uganda. The project has during the last year included sending Swedish undergraduate students to Uganda, and post-doc visits from Uganda to Lund, as well as inclusion of several local students in Uganda who will get training in research.

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**IMPROVING HEALTH AND CARE FOR CHILDREN AND ADOLESCENTS LIVING WITH LONG-TERM ILLNESS IN ETHIOPIA - A KNOWLEDGE TRANSLATION THROUGH COMPLEX INTERVENTIONS**

We continue a fruitful collaboration established through two three-year Research Link grants for the years 2013 – 2015 and 2017 – 2020 between Addis Ababa University and Lund University. We continue our collaboration in children with HIV but expand to an overall area – namely to develop and evaluate models of complex interventions to improve the health of children and adolescents with long term illness in Ethiopia. The future collaboration has two components; a postgraduate course in complex interventions especially designed to involve children and adolescents with HIV and their families; and two research studies focusing on improving adherence to ART using e-Health for children and adolescents with HIV in ten care settings in Ethiopia. The two interrelated studies follow a framework for developing complex interventions in health care is based on family system theory, and it is a part of an integrative synthesis of previous and ongoing research.
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STRENGTHENING HEALTH SYSTEMS FOR MATERNAL CARE IN LIMPOPO PROVINCE: A MULTISECTORAL APPROACH

Maternal and child health is regarded as one of the determinants of a country’s health status. Sub-Saharan countries, including South Africa, still struggle to reduce both child and maternal mortality rate. The Limpopo province has the highest rates of mothers who die due to pregnancy and childbirth related complications, stillborn babies and infants who die in their first month of life in South Africa (2015). The goals of this project are to investigate and contribute to the strengthening of the health system in the Limpopo Province by linking: 1. Decreasing maternal and child mortality 2. Strengthening health-care effectiveness The project starts its intervention phase November 2017. Strategies to improve maternal and child outcomes will be developed building on results from workshops and from training of nurses and doctors in rural healthcare facilities on the main causes of maternal death outlined in the Saving Mothers Report. 1. Non-pregnancy –related infections, 2. Obstetric haemorrhage and hypertension, 3. Ante-natal care, 4. HIV and AIDS. It is anticipated that strengthening of the health system which includes improved access to quality reproductive health services, trained healthcare personnel and community integration will help improve maternal and child health outcomes, therefore addressing Sustainable Developmental Goal 3. Funded by: Collaborative Research Programme, SAMRC/FORTE-RFA-01-2016 Coordinated by Linda Skaal, Professor in Public Health, Limpopo University, South Africa Vanja Berggren, Associate Professor, Lund University, Sweden

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COLLABORATION WITHIN THE NURSING PROGRAMME

Due to national regulations, international mobility can be a challenge for students in educational programmes in health sciences. Few students are willing to miss any of the compulsory programme placements. A solution to this problem was to develop the course “Nursing/Radiography in an International Perspective”, 15 credits, a summer course abroad, where students are guided and supervised to perform clinical work that broadens their professional experience and cross-cultural understanding. The majority of the students who participate in the summer course select a hospital in Africa as their first choice. During the last years, we have sent around 20-25 students each summer to hospitals in Uganda, Zimbabwe, South Africa and Tanzania. Since 2015, Lund University and University of Johannesburg have joined in a collaboration concerning education, teaching and learning culture in a virtual module regarding Professional Nursing Leadership. This is also a way to implement internationalization at home for students who do not go abroad during their studies.
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EXPERIENCES OF FAMILY CAREGIVERS OF ELDERLY PERSONS AT OUTPATIENT CONSULTATIONS IN A DISTRICT HOSPITAL IN CAMEROON

Background: With 13 years of clinical experience as a Nurse, it is clear that elderly people in this locality hardly go to hospitals and when they do, there is hardly no follow up. Aim: To understand the experiences of caregivers at outpatient consultations with elderly persons. Methodology of Relevance: A qualitative approach using focus group interviews. Methodological considerations: Study to be conducted in 4 villages in Obala. A sample of 30 family caregivers who have taken elderly persons above 56 to hospital will be recruited, using a professional nurse and with ethical considerations. Application of Methodology: Data Collection: group interviews will be recorded, transcribed and translated. Data analysis: an inductive 4 step process using transcribed texts, codes sub and predominant themes for credibility. For Action: To secure Swedish investment in the Health Sector in Cameroon (through an Educational program which will empower caregivers of elderly persons) in addition to their investment in utilities.

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RISKY SEXUAL BEHAVIOR AND RELATED FACTORS ASSOCIATED WITH HIV INFECTION AMONG FEMALE SEX WORKERS IN ETHIOPIA: A RESPONDENT-DRIVEN SAMPLING STUDY ACROSS ELEVEN REGIONAL CAPITALS AND TOWNS

In Ethiopia, the main mode of HIV transition is unprotected heterosexual sex and is assumed to be fueled by some groups, which have high-risk behaviors. This suggests that these key groups (vulnerable populations) may play a key role in the epidemic. Female sex workers have often been described as a ‘core group’, namely, a small group in which the infection is endemic and from whom it spreads to the population at large. Nevertheless, information on these key groups in Ethiopia is extremely limited. Therefore, a bio-behavioral study using respondent driven sampling technique was conducted in 11 major towns of the country to come up with relevant information for the program. Both quantitative and qualitative data were collected to assess the socio demographic characteristics and HIV related risk behaviors. In this study, a total of 4882 FSWs participated and whole blood was collected for lab testing including HIV testing, CD4 count and viral load level determination. To return test results on the spot, participants were tested using rapid test as per the national testing algorism, counselled and were linked to services. The overall objective of this study is to generate evidence regarding factors contributing to HIV infection among female sex workers using the data collected across selected sites.
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USING PHARMACISTS AND DRUGSTORE WORKERS AS SEXUAL HEALTHCARE GIVERS: A QUALITATIVE STUDY OF MEN WHO HAVE SEX WITH MEN IN DAR ES SALAAM, TANZANIA
(published in Global Health Action, Nov 2017)

Previous research has shown that men who have sex with men (MSM) avoid formal healthcare services due to fear of discrimination in Tanzania. Instead, self-treatment by medications obtained directly from pharmacies or drugstores may be common when MSM experience symptoms of suspected sexually transmitted infections (STIs) related to sexual activity with men. The objective of this study was to explore MSM’s perceptions and experiences of seeking treatment and advice from pharmacists and drugstore workers in Dar es Salaam, Tanzania, with regards to their sexual health and STI-related problems. Fifteen in-depth interviews were conducted with MSM with experience of seeking assistance relating to their sexual health at pharmacies and drugstores in Dar es Salaam in 2016. A qualitative manifest and latent content analysis was applied to the data. Results and conclusions: The analysis revealed that MSM perceived the barriers for accessing assistance for STI and sexual health problems at pharmacies and drugstores as low, thereby facilitating their access to potential treatment. The results further revealed that MSM at times received inadequate drugs and consequently inadequate treatment. Multi-facetted approaches are needed among MSM and drugstore, pharmacy, and healthcare workers, to improve knowledge of MSM sexual health, STI treatment, and risks of antibiotic resistance.

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STRUGGLING TO ENSURE PROPER CLINICAL TREATMENT: A QUALITATIVE STUDY OF THE CHALLENGES EXPERIENCED BY TANZANIAN PHARMACY WORKERS WHEN PROVIDING TREATMENT FOR SEXUALLY TRANSMITTED INFECTIONS AMONG MEN WHO HAVE SEX WITH MEN
(in submission to PLoS one)

Men who have sex with men (MSM) comprise a high-risk population regarding the prevalence of HIV and other sexually transmitted infections (STIs) in Tanzania. Previous research has shown that laws criminalizing same-sex practice, stigma and discrimination often discourage these men to access public healthcare services, and that they instead tend to turn to pharmacies when faced with symptoms of STIs. Few studies have examined the experiences of workers at private pharmacies and drugstores when providing treatment to this population in Tanzania. Therefore,
the objective of our study was to explore the challenges that workers at private pharmacies and drugstores experience when providing treatment for sexually transmitted infections to MSM clients in Dar es Salaam, Tanzania. In-depth interviews were conducted with sixteen workers at private pharmacies and drugstores in Dar es Salaam, Tanzania. Data from the interviews was interpreted following the qualitative content analysis procedure as described by Graneheim and Lundman (2004). Findings revealed that workers at private pharmacies and drugstores were faced with challenges that consisted of practical difficulties ensuring correct treatment, in addition to themselves being personally affected when providing services to MSM. Thus, it is crucial to develop an improved collaboration between MSM-friendly doctors and pharmacy workers to facilitate proper treatment of STIs, and provide practical and emotional support to pharmacy workers to motivate them to continue treating this population.

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SEXUAL AND REPRODUCTIVE HEALTH AND RIGHTS AMONG YOUNG PEOPLE IN GHANA

Sexual and reproductive health and rights among young people is a vital aspect of global sustainable development, not least in sub-Saharan Africa, including Ghana. We have previously looked into “Inequality trends in maternal health services for young Ghanaian women with childbirth history between 2003 and 2014” (Asamoah BO & Agardh A, 2017), as well as the influence of HIV/AIDS knowledge and exposure to mass media on stigmatizing behaviours among young women aged 15–24 years in Ghana (Asamoah CK, Asamoah BO & Agardh A, 2017). Currently, we have a research collaboration with researchers from the University of Ghana, School of Public Health, that focuses on continuation of our research on young people’s sexual and reproductive health and rights in Ghana. Four studies are in process with focus on 1) HIV/AIDS stigma among young people, 2) predictors of sexual risk-taking behaviour, 3) gender and sexual risk-taking, and 4) transactional sex, violence and coercion; all among youth and young adults in Ghana. Aside these studies, we are also planning to map sexual risk-taking and access to SRHR services among young University/College students in Ghana. This would be a country-wide study. Currently, we have another collaborative project with the Presbyterian University College in Ghana, aiming to look into healthy living among young people living with HIV in rural communities in Ghana. This project is just starting and there is a PhD student linked to it.
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SHARE TO THRIVE

How an international effort to build a global medical education community can benefit teachers, learners, and communities. A novel international collaboration on flexible pedagogy in medical education can build communities of learners and educators. We face the same digital trends, pedagogic tools and learning environment globally – by pooling our pedagogical resources we can meet the demands of our students in an open educational environment. Flexible digital learning tools can benefit all students. Each student can use their own learning method of choice, whenever and wherever they choose. Particularly, this benefits students facing barriers, economic, physical or psychological, allowing more control over the pacing and timing of their learning –thereby facilitating broadened recruitment and democratization of knowledge. In this project, we are producing a common repository of digital learning material, quality assured by our Universities for use in a global context. These modular learning units can then be tailored for the specific context of individual curricula. We have also started to explore ways that students can interact with each other directly, co-creating resources such as study questions. This project was presented at the SANORD conference in Windhoek, Namibia in December 2015.

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HIV AND TUBERCULOSIS COINFECTION AT ETHIOPIAN HEALTH CENTERS

This research project started in 2010 in Ethiopia with the aim of investigating different aspects of HIV and Tuberculosis coinfection (TB) at the primary health care level. Originally the research station was small in scale but has grown over the years to include several well-established connections to health organizations and universities in Ethiopia; Oromia Regional Health Bureau (ORHB), Amauer Hansen Research Institute (AHRI), Ethiopian Public Health Institute (EPHI) and Addis Ababa University. Two cohorts were started from two different clinical scenarios; a TB-cohort in 2010 from TB-clinics and an HIV cohort in 2011 from HIV-clinics. Participants in both cohorts were followed for several years. From these patient materials, different aspects have been investigated, such as immunosuppression caused by TB, TB-diagnostics and antiretroviral treatment at health centers in Ethiopia. So far three dissertations have been defended at Lund University and 16 original articles have been published from this material. From the HIV-cohort, a large plasma biobank was collected and transported to Sweden for further analysis. In a collaborative effort with Lund-immunologists, my research focuses on blood biomarker combinations for the detection of tuberculosis. The study has shown promising results in combining two markers for inflammation, CRP and suPAR, for the presence of TB. Another study is ongoing about the role of micro-RNAs in TB-detection in HIV positive patients.
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**TUBERCULOSIS IN ASSOCIATION TO PREGNANCY IN ETHIOPIA**

Tuberculosis accounts for a large proportion of maternal mortality globally. Relative immunosuppression is needed to tolerate the fetus to the price of increased susceptibility to certain infections, the interaction between tuberculosis and pregnancy is incompletely understood.  
**Aims:** We aim to determine the incidence, clinical manifestations, biomarker accuracy and clinical consequences on maternal- and child health of active and latent tuberculosis in association to pregnancy.  
**Method:** A large (n=2200) prospective cohort of Ethiopian pregnant women included from antenatal care without exclusion criteria is being recruited. Follow-up continues until 4.5 years after delivery and is focused on symptoms and clinical manifestations of tuberculosis. Study participants reporting symptoms consistent with tuberculosis are evaluated using PCR and liquid culture in parallel with clinical evaluation according to local guidelines, and will be associated to other aspects of health including medical and socioeconomic history, testing for latent tuberculosis and HIV, maternal anthropometric measurements, delivery outcome, child health and growth pattern.

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**HYPERTENSION IN AFRICA RESEARCH TEAM (HEART)**

Collaboration between the Department of Clinical Sciences, Malmö, Lund University and the Hypertension in Africa Research Team (HART), Noordwes University, Potchefstroom campus, South Africa. Ass. Prof. Martin Magnusson and Prof. Olle Melander. We have been collaborating with professor Leone Malan and professor Nico Malan (Pls of the HART team) at the Noordwes University, Potchefstroom campus in South Africa since November 2015. The HART team have conducted one of very few prospective populations cohort studies in Africa; the SABPA study 1. The baseline sample included 409 teachers representing a bi-ethnic sex cohort from South Africa. The SABPA study, that was conducted in 2008–09, and repeated after 3-year follow-up in 2011–12, represents a unique highly phenotyped cohort that can address the role of a hyperactive sympathetic nervous system and neural response pathways contributing to the burden of cardiometabolic diseases in Africa. In total 102 peer reviewed articles and 7 books have been published from the SABPH cohort. I myself have coauthored so far three articles together with the HEART team (one published 2 and two manuscripts). We (me and Professor Olle Melander) were also in May 2017 invited to give talks at the Potchefstroom campus. We are currently conducting analysis of different biomarkers (e.g. copeptin (already analyzed) and planning a multiplex proteomic analysis) on blood samples from the SABPA cohort. It is my firm opinion that this scientific collaboration will benefit both Universities a great deal in the future to come.
The following co-workers at the Department of Clinical Sciences, Malmö are also part of this collaboration: Amra Jujic (post doc, BMA), Ass. Prof Artur Fedorowski, Dr. Sofia Enhörning (post. doc), Prof. Peter Nilsson and Widet Gallo (post doc, BMA).

http://news.nwu.ac.za/healthy-brain-protects-your-heart

Picture: Ass. Prof Martin Magnusson, Prof Roland von Känel, Prof Leoné Malan, Prof Susan Visser (Vice Rector: Research and Planning), Prof Olle Melander and Dr Johan Smuts


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ASSESSING THE IMPACT OF INTERNATIONAL TRAINING PROGRAMME (ITP) IN SEXUAL AND REPRODUCTIVE HEALTH AND RIGHTS (SRHR)

Globally, health care practitioners (HCP) are a crucial gateway to accessibility of health services. Their attitudes and behaviors have been reported to influence uptake of services, especially in low-income countries. ITP envisions HCP’s as potential change agents if they espoused values of equality and rights based approached in SRHR. ITP hypothesizes that training will positively impact on HCP’s attitudes and their health care systems to achieve this goal. A number of studies have been designed to; (i) Gain deeper understanding into HCP’s attitudes and values towards gender, equity and rights in SRHR (ii) Assess the impact of ITP on the HCP attitudes towards gender, equity and rights in SRHR after training (iii) Assess the role of different actors, contexts and content in the implementation of change in different participating systems (iv) Assess implementation success: sustainability and dissemination of the changes achieved.

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STUDIES ON HIV-1 AND HIV-2 IN WEST AFRICA

Decreasing the epidemic spread of HIV is still an urgent matter. Since HIV infection cannot be cured, a protective vaccine is thought to have the greatest impact on the spread. However, up until today such a vaccine has not yet been achieved. Together with scientist at Lund University and the National Laboratory for Public Health in Guinea-Bissau, my research group studies immune responses during infections with HIV-1 and HIV-2. These viruses can both cause AIDS, but HIV-1, which has spread globally, is the more aggressive and infectious virus. The more benign virus, HIV-2, is endemic in West Africa. The reason for the difference in pathogenesis between HIV-1 and HIV-2 is not yet clear, but knowledge on mechanisms, related to the immune response, may help in the development of effective interventions against both types of HIV. We are analyzing cells and antibodies from HIV-1 and HIV-2 infected individuals living in Guinea-Bissau. We also study the interaction by in vitro infection models. Taken together, in
addition to basic knowledge on HIV pathogenesis, we anticipate that our studies may contribute to optimized treatment and provide clues to how an effective HIV vaccine should work.

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HIV AND OTHER SEXUALLY TRANSMITTED INFECTIONS IN FEMALE SEX WORKERS IN GUINEA-BISSAU

Female sex workers (FSW) are a well-known key group for transmission of HIV and other sexually transmitted infections (STIs) in sub-Saharan Africa but the epidemiology not been detailed in this key population in Guinea-Bissau. From 2014 to 2017, we used venue based sampling to include FSW in 8 cities in Guinea-Bissau. At inclusion blood samples were collected from all consenting participants and screened on site for HIV. Confirmation and HIV type discrimination was performed at the National public health laboratory. Vaginal swabs were collected from all FSW and screened for N. gonorrhoeae, C. trachomatis and T. vaginalis. Syndromic treatment of STIs and free condoms were given and all HIV-positive participants were referred to the national treatment programme. 388 FSW have been included. The overall HIV seroprevalence was 26% (HIV-1 19.6%, HIV-2 3.1% and HIV-dual infection 3.4%). The prevalence of N. gonorrhoeae, C. trachomatis and T. vaginalis was 8.3%, 11.1% and 27.8% respectively. The prevalence of HIV is higher in FSW compared to the general population in Guinea-Bissau. Effective interventions such as education emphasizing increased condom use, treatment of STIs and antiretroviral treatment for HIV-positive individuals must be prioritized in this group to reduce the transmission of HIV in FSW.

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HIV-1, HIV-2 AND OTHER STIs IN GUINEA-BISSAU

The Guinea-Bissau project for HIV-1, HIV-2 and other sexually transmitted infections has been running since 1990, mainly following a national cohort of police officers and surveillance screenings among pregnant women. The research network consists of physicians, bacteriologists, virologists, immunologists, phylogeneticists and other staff at the National Public Health Laboratory in Guinea-Bissau and at Lund University, with research partners in other Swedish and European Universities. Some research findings to be highlighted are: • Steady decline of HIV-2 prevalence, from the globally highest prevalence of 9% to less than 1%. • The impact of the civil war 1998-1999 on HIV transmission. • Lower HIV viral setpoint in HIV-2 than in HIV-1 infections. • Characterisation of clinical picture of HIV-2 infection. • Challenge of previous assumption of only 25% disease progression in HIV-2 infection, showing that it is rather closer to 50% with long-term follow-up. • The impact of previous HIV-2 infection, mitigating disease
progression in subsequent HIV-1 infection. The research network is a continuous effort to bring clarity to especially questions regarding the biology of HIV-2 infection and its potential to give deeper insight to possibilities of fighting the more prevalent and aggressive HIV-1 infection.

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A NEW COHORT OF PREGNANT WOMEN IN HEALTH CENTERS IN BISSAU

More than 10 million people in low- and middle-income countries (LMIC) have started anti-retroviral treatment (ART). Unfortunately, standardized regimes have a low genetic barrier for development of resistance, and the number of people in LMIC with acquired drug resistance (ADR) during ART, as well as the number of treatment-naïve people with resistant HIV strains (transmitted drug resistance: TDR), have increased. Due to poor access to drug resistance tests in many LMIC, TDR is of particular importance because newly HIV infected people risk being given a non-effective treatment. Since the national ART program started in Guinea-Bissau in 2005 high numbers of loss to follow-up, mortality and ADR have been reported. In this context, and to evaluate the effectiveness of contemporary treatments, we decided to estimate the level of TDR for the first time in the country. A total of 47 antiretroviral-naïve HIV-1 infected pregnant women from four health centers in Bissau, the capital of Guinea-Bissau, were prospectively enrolled from October 2016 to October 2017. If low numbers of TDR are found, this type of study should be repeated in a few years. Moderate or high numbers of TDR would however indicate a benefit in a change of treatment regimens.

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MEETING THE GLOBAL CHALLENGE OF SEXUAL AND REPRODUCTIVE HEALTH AND RIGHTS

Achieving good sexual and reproductive health for all is integral for meeting the commitments of a shared global agenda for sustainable development. As a fundamental human right, all individuals should have the ability to decide on their own sexuality and reproduction in an environment free from sexual coercion and violence and without risk of stigma, discrimination, or criminalization. Sadly, however, this is not always the case, and many individuals and vulnerable groups around the world are denied these rights on a regular basis. Through long-term engagement with a variety of research and capacity development projects in Uganda, Tanzania, and Ethiopia, our work aims to provide a greater understanding of these issues and to support the search for solutions. The focus of our research has been primarily on vulnerable groups such as youth, the LGBT community, and sex workers, with particular
emphasis on factors influencing sexual-risk taking behavior, the presence and impact of sexual coercion and violence, circumstances surrounding transactional sex, and experiences of stigma and discrimination.

Through collaboration with local universities and partners, these multi-faceted research and implementation efforts continue to develop, bringing new insights and hope for a future free from sexual and reproductive inequities.

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**THE ROLE OF AIR POLLUTION AS A PREGNANCY RISK FACTOR**

Preeclampsia (PE) is a severe pregnancy-related syndrome that annually affects at least 8.5 million women worldwide. With its etiology still largely unknown, diagnosis of PE is based on maternal clinical symptoms; high blood pressure (BP) and proteinuria manifesting after 20 weeks of gestation. Currently, symptomatic BP treatment is the only available treatment for PE and delivery is the only known cure. In addition, early disease diagnosis is challenging and there are still no reliable biomarkers for clinical prediction or diagnosis. A growing body of evidence supports the view that PE begins in the utero-placental unit, is amplified by oxidative stress and inflammation, and as it progresses gives rise to general maternal endothelial damage causing the clinical manifestations. Recent findings have demonstrated that exposure to a large amount of air pollution significantly increase the risk of developing PE, however the cellular mechanisms are not known. Air pollution in low and middle-income (LMIC) countries is a tremendous health problem. The overarching purpose of this project is to systematically investigate exogenous factors in air pollution and to study how they induce oxidative stress and inflammation in PE. Increased insight into how PE develops is crucial to enabling effective management of the disease.

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**THE HIV EPIDEMIC IN ETHIOPIA –DYNAMICS OF VIRAL TRANSMISSIONS AND PREVALENCE OF TRANSMITTED DRUG RESISTANCE**

In Ethiopia, free ART was rolled-out in 2005 and has since then expanded on a large scale and has substantially decreased AIDS related morbidity and mortality. However, the access to treatment is not supported by viral load monitoring to diagnose and confirm treatment failure. Patients with failing ART will be accompanied by the accumulation of drug resistance mutations, and could also become reservoirs for onwards transmission of such viruses which may have serious consequences, not just for the individual patient but also for the community
at large. Currently, there is limited information on the treatment failure and the prevalence of HIVDR. The purpose of this research project is to investigate the HIV epidemic in Ethiopia, with specific focus on HIV-1 genetic diversity, transmission dynamics and antiretroviral drug resistance. Most-at-risk-populations (MARPs) are a core group and pool for spread into the general population, and for this reason close surveillance of such populations are critical in order to address the epidemic in an effective way. A nation-wide monitoring of the HIV epidemic, through genetic characterization of HIV drug resistance prevalence and the dynamics of the molecular epidemiology will be instrumental for designing new public health policies, which will be important in prevention and treatment interventions.

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HIV DRUG RESISTANCE IN SUB SAHARAN AFRICA: NEW STRATEGIES AND TOOLS FOR FIGHTING TRANSMISSION OF DRUG RESISTANCE

The global expansion of antiretroviral treatment (ART) is considered to be one of the greatest public health interventions ever undertaken. However, the emergence of drug-resistant viral variants constitutes a continuous threat to the global roll-out of ART. This project is based on large representative cohorts from different parts of Ethiopia, the second most populous nation in sub-Saharan Africa, and includes both HIV-positive subjects and individuals at high risk of HIV acquisition. Longitudinal follow-up and access to epidemiological and clinical data, as well as genetic information of the virus, will allow for new and relevant information on the patterns and consequences of antiretroviral drug resistance. The new knowledge will explain new mechanisms of drug resistance development and will be of direct use for the modification of ART programs. In addition, the characterization of HIV transmission in the general population and high-risk groups will provide new understanding of how HIV continues to disseminate and this information will be of particular value since it can be linked to detailed data on drug resistance. The results of this project will be of obvious and direct importance for ART programs in Ethiopia and surrounding countries, where HIV-1 subtype C is dominant. Since the prevalence of this subtype is increasing in other world regions, it is also expected to yield knowledge that is of clinical importance globally.
A faculty of medicine that understands, explains and improves our world and human health