

## COMMUNICABLE DISEASES

### High risk HPV persistence among HIV-infected young women in South Africa

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**Background:** High-risk Human papillomaviruses (HR-HPV) cause cervical cancer. While most infections with HR-HPV are transient some may persist for six months or longer. Persistence of infection with HR-HPV is associated with increased incidence of precancerous squamous intraepithelial lesions (SILs) of the cervix, decreased rates of regression of SILs, increased rates of progression of SILs, and increased risk of invasive cervical cancer. Infection with HIV significantly impacts the natural history of HPV infection. Among HIV-infected women rates of persistent HR-HPV infection are increased multifold. HIV-infected young women are physiologically and behaviorally different than adults and the impact of HIV on persistence of HR-HPV infections in this group is understudied.

**Methods:** Between October 2012 and January 2014 we enrolled 50 HIV-uninfected and 33 HIV-infected sexually active South African females age 17-21 into a longitudinal study in which self-collected vaginal swabs for HPV DNA analysis were obtained at six-month intervals. Participants were enrolled through the Masiphumelele Youth Centre in a township outside of Cape Town, South Africa. HR-HPV infections were assessed for type-specific persistence of any of the 13 HR-HPV genotypes. Chi-square tests for independence were used to examine overall and type-specific differences in persistence between HIV-uninfected and HIV-infected women.

**Findings:** Eighty-three prevalent (upon baseline testing) and incident (upon subsequent testing) individual HR-HPV infections were identified among 43 members of the cohort (23 HIV-uninfected and 20 HIV-infected). Overall, 27% of these infections were persistent at six months (21% among HIV-uninfected and 33% among HIV-infected,  $p > 0.10$ ). At twelve months 19% of HR-HPV infections continued to be present with a statistically significant difference between HIV-uninfected and HIV-infected participants (4% versus 31%;  $p < 0.05$ ). At baseline types 16, 52, and 58 were most commonly identified. At six months types 16, 39, and 45 were most likely to be persistent, and at 12 months types 16 and 52 were most likely found to be persistent. Due to inadequate power we did not identify statistically significant differences in type-specific persistence between groups.

**Interpretation:** HIV-infected women in our cohort had a seven-fold increased rate of persistence of HR-HPV overall at 12 months. Non-vaccine types were more often persistent than vaccine types among all participants. HIV-infected young women are more likely to have persistent infections with HR-HPV, increasing their risk for incident and progressive precancerous lesions. HPV DNA testing may contribute to optimal cervical cancer screening among this population. Follow-up of this cohort with additional serial HPV DNA testing and cervical cytology testing will provide greater insight into the relationship between HR-HPV persistence and the incidence and progression of SILs.

**Funding:** This work was supported by the National Institute of Allergy and Infectious Diseases at the National Institutes of Health (5 K23AI07759 to David Adler).

Abstract #: 01CD001

### Antibiotic susceptibility patterns in an intensive care unit at a tertiary hospital in New Delhi, India

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**Background:** Antibiotic resistance is increasing worldwide and fewer antimicrobials are being developed to treat these resistant organisms. In order to decrease the deleterious effects of drug resistant organisms effective control programs are increasingly being recognized as an essential element for health care institutions. Surveillance programs which can assist in understanding and controlling resistance problems are essential in combating this challenge.

**Methods:** This study was a retrospective, single center study conducted at a tertiary hospital in New Delhi, India. The aim of the study was to identify bacteria isolated from intensive care unit (ICU) patients and to determine their in vitro susceptibility patterns. The study utilized the records of the microbiology laboratory to include bacteria isolated from respiratory, blood, pleural fluid and miscellaneous cultures from ICU patients. Data was obtained from the records of the microbiology laboratory from September 2012 to August 2013.

**Findings:** A total of 534 positive cultures were identified the majority of which were gram negative organisms. *Pseudomonas aeruginosa* (*P. aeruginosa*) (145/534) was the most commonly isolated organism followed by *Staphylococcus aureus* (*S.aureus*) (106/534). Linezolid resistance among *S.aureus* isolates was as high as 19%. *P. aeruginosa* had high rates of resistance to the commonly used anti-Pseudomonal antibiotics. *S.aureus* was the most commonly isolated pathogen from blood cultures (7/22). Most of the positive cultures were from respiratory specimens where *P.aeruginosa* (124/390), *K.pneumoniae* (64/390), *E.coli* (57/390), *Acinetobacter* sp (44/390) and *S.aureus* (40/390) were the dominant pathogens isolated.

**Interpretation:** In this study methicillin resistant *Staphylococcus aureus* (MRSA) was more common than linezolid resistant *Staphylococcus aureus* (LRSA); however, resistance to linezolid among *S.aureus* isolates was significant. The susceptibility pattern of the gram negatives in our study suggest that many of these organisms may be extended spectrum beta lactamases (ESBL) producers, a fact that correlates with findings from other studies indicating that ESBL producing organisms are more common in Asia than North America. Gram negatives displayed high rates of resistance to commonly used antibiotics such as cephalosporins, aminoglycosides, ciprofloxacin and Piperacillin/Tazobactam. The high rate of resistance to linezolid among *S.aureus* isolates may occur as linezolid is relatively inexpensive in India. The widespread availability of antibiotics prior to hospitalization is contributing to the development of drug resistant isolates. Strategies to prevent overuse of antibiotics are needed which should be balanced with timely administration of antimicrobials to treat severe infections. Surveillance and control programs are urgently needed not only for the sake of health care in India but globally since

international travel leads to the spread of drug resistant organisms. The information from this project will be used to drive infection prevention efforts.

**Funding:** Funding was received from the institutions performing the study.

**Abstract #:** 01CD002

### Studying pulmonary function in HIV positive tanzanian youth

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**Program/Project Purpose:** Survival into childhood with an untreated HIV infection was once considered unusual, but has increased in recent years. This has spurred further interest in studying the health of adolescents living with HIV. There have been two major reports from Zimbabwe (Ferrand et al., 2007) and Malawi (Zverez et al., 2001) of a decrease in pulmonary function in HIV positive youth, especially if they had delayed onset of treatment. The purpose of this study is to investigate the pulmonary function of HIV positive Tanzanian children. This study will help determine the importance of monitoring lung function in HIV patients and if a pulmonary treatment regimen should be instituted.

**Structure/Method/Design:** A cohort of 250 Tanzanian children between the ages of 8 and 18 with a diagnosis of HIV currently being treated at the DarDar Pediatric Program in Dar es Salaam, Tanzania will take part in the study. Pulmonary function (PFT) was assessed using spirometry to measure forced expiratory volume at one second (FEV1), forced vital capacity (FVC), FVC/FEV1 ratio, and forced expiratory flow 25% to 75% (FEF25-75) as well as pulse oximetry. Each participant was evaluated at rest. If recorded values for FVC and FEV 1 were > 70% of predicted, they were re-evaluated after moderate exercise and after administration of a bronchodilator. Normative data from healthy Malawian youth were used. The PFT data were analyzed in correlation with age of diagnosis and age at initiation of antiretroviral therapy.

**Outcomes & Evaluation:** A preliminary analysis of the first 50 subjects has not shown any significant degree of pulmonary dysfunction nor any correlation with a delayed ART regimen. Of the 50 subjects, three were excluded for inconsistent PFT efforts. The remaining 47 subjects consisted of 17 females/30 males. Only 3 subjects had FEV 1

**Going Forward:** Ongoing challenges include obtaining consistent data from younger subjects as well as timely patient acquisition. We anticipate meeting our goal of 250 subjects by late spring 2015.

**Funding:** This project is supported by internal funds available through the Medical Schools at Muhimbili University and Dartmouth. Funding for the author's participation was provided by the DIHG-DICKEY International Health Fellowship and Helen's Fund for pediatric research at the Children's Hospital at Dartmouth.

**Abstract #:** 01CD003

### Comparing the syndromic approach with point-of-care testing in treatment of STIs at St. Paul's Hospital in Addis Ababa, Ethiopia

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**Background:** The purpose of this project was to determine if the point-of-care (POC) rapid testing at St. Paul's Hospital Millennium

Medical College (SPHMMC) in Addis Ababa, Ethiopia, was more effective at diagnosing sexually transmitted infections than the current standard of care, syndromic approach, which does not use laboratory testing and is solely based on visual and patient-reported symptoms.

**Methods:** This twelve week pilot study was conducted at SPHMMC among female patients aged 18-45 with vaginal discharge. All patients completed a questionnaire asking about their demographics and current and prior clinical gynecologic treatment. Patients underwent speculum exam and vaginal and cervical swabs were collected. These swabs were used for POC and molecular-based testing (a confirmatory test for the POC testing). Women were treated per standard of care at SPHMMC and treatment was augmented when additional diagnoses were made outside of the clinical exam. After the speculum exam was complete, the resident treating the patient completed a short questionnaire to record his or her observations and treatment plan.

**Findings:** We recruited 47 participants for our study. Of these women, zero patients had a positive chlamydia test, four had a positive trichomonas vaginalis POC test, and one had a positive wet mount test for trichomonas vaginalis. Overall, 21% (10/47) of the patients were given antibiotics immediately by the resident and another 26% (12/47) were prescribed antibiotics at a later appointment with the resident. Another 38% (18/47) of patients were prescribed doxycycline, an antibiotic recommended by the syndromic approach for treatment of chlamydia and 34% (16/47) of patients received metronidazole, an antibiotic that targets trichomonas vaginalis. Confirmatory molecular analysis for chlamydia and trichomonas vaginalis is pending at this time.

**Interpretation:** The physicians at SPHMMC do not have the resources to quickly and accurately diagnose their patients' sexual health. We found that the residents at SPHMMC follow the prescription-based model promoted by the syndromic approach, though our results suggest that this may be leading to the overtreatment of patients.

**Funding:** University of Michigan Summer Biomedical Research Program, Minority Health and Health Disparities International Research Training, National Institutes of Health K12HD065057.

**Abstract #:** 01CD004

### Concentrated livestock production in Illinois: Spatial analysis of the impacts on human health and the environment

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**Background:** Individuals living near and working in concentrated animal feeding operations (CAFOs), defined in U.S. environmental regulations as confining the equivalent of at least 1000 cattle and identifying a point-source method of waste discharge, may be at increased risk for adverse health outcomes due to occupational exposures and the movement of contaminants and pathogens in animal waste from facilities to the surrounding environment via runoff, atmospheric deposition of particulate matter, or leaching into groundwater. Although increased risk of respiratory illness and enteric infections have been linked to CAFOs, many studies observing community outcomes have used facility-specific approaches, rather than attempting to understand health patterns at a broader spatial scale. Additionally, there are potential zoonotic pathogens, such as bacterial pneumonias or Hepatitis E, that have not been thoroughly examined in this context.