

# **Occupational Exposures to Bloodborne Pathogens in Sub-Saharan Africa**

## **Bibliography of Country-Specific & Regional Needlestick, Surveillance, and Exposure Risk Studies**

### **REGIONAL DATA/POLICY**

Baggaley RF, Boily M-C, White RG, Alary M. Risk of HIV-1 transmission for parenteral exposure and blood transfusion: a systematic review and meta-analysis. *AIDS* 2006;20:805-12.

**ABSTRACT-** Background: The role of iatrogenic transmission within the HIV/AIDS pandemic remains contentious. Estimates of the risk of HIV transmission from injections and blood transfusions are required to inform appropriate prevention policy. Objectives: Systematic review and meta-analysis of the literature on HIV-1 infectivity for parenteral transmission and blood transfusion. Review methods: All identified studies with relevant transmission probability estimates up to May 2005 were included. Statistical methods: When appropriate, summary estimates for accidental percutaneous and blood product exposures were derived. Results: Infectivity estimates following a needlestick exposure ranged from 0.00 to 2.38% [weighted mean, 0.23%; 95% confidence interval (CI), 0.00-0.46%; n = 21]. Three estimates of infectivity per intravenous drug injection ranged from 0.63 to 2.4% (median, 0.8%); a summary estimate could not be calculated. The quality of the only estimate of infectivity per contaminated medical injection (1.9-6.9%) was assessed. Instead we propose a range of 0.24-0.65%. Infectivity estimates for confirmed contaminated blood transfusions range from 88.3 to 100.0% (weighted mean, 92.5%; 95% CI, 89.0-96.1%; n = 6). Conclusions: Infectivity estimates for infected blood transfusions are larger than for other modes of HIV transmission. Few studies on transmission risk per contaminated injection were found. However, transmission risk per needlestick injury, where needles are more likely to be rinsed or disinfected between recipients (especially for medical injections), may be representative of non-intravenous medical injections and lower than the risk from intravenous injections, which are likely to be deeper and to involve more fluids. Further work is needed to better estimate transmission probability related to contaminated injections and its likely contribution to overall HIV transmission.

Berkley S. Parenteral transmission of HIV in Africa. *AIDS* 1991;5:S87-S92.

**ABSTRACT-** HIV is known to be transmitted sexually, perinatally, and parenterally. Parenteral transmission is defined as that which occurs outside of the alimentary tract, such as in subcutaneous, intravenous, intramuscular, and intrasternal injections. The relative percentage of HIV infection caused by each of these routes depends upon the prevalence of infection among particular groups of the population and on their shared behaviors. Although heterosexual transmission is the primary mode of HIV infection in Africa, health care providers and traditional healers both in and out of the health care setting in Africa administer a large number of injections. As such, parenteral transmission could be contributing significantly to HIV infection in the region. This paper reviews

what is known about the parenteral transmission of HIV in Africa. The biology of parenteral transmission in blood and in interstitial fluid is described, then sections follow on HIV transmission by injection, occupational transmission, transmission by scarification, and transmission by immunization. Available data suggest that while HIV may be occasionally transmitted in Africa through injections, it is most likely not a major route of infection in the region. Sterilizing needles and syringes, and using injections as last resort therapy will greatly reduce the risk of parenteral HIV transmission.

De Baets AJ, Sifovo S, Pazvakavambwa IE. Access to occupational postexposure prophylaxis for primary health care workers in rural Africa: a cross-sectional study. *American Journal of Infection Control* 2007;35:545-51.

**ABSTRACT-** Background: For many primary health care workers in developing countries, the limited availability and cost of public transport hinders timely access to occupational postexposure prophylaxis (PEP) at referral hospitals. Adapted PEP training and a starter's kit (for human immunodeficiency virus, hepatitis B virus, and syphilis prophylaxis) could improve access. Methods: The evaluation method, based on the 12 steps of the decentralized phase of PEP management, calculated different scores from the responses for 51 anonymous surveys and allowed comparison among different groups. Listed obstacles and clinic visits provided further information. Results: Respondents who received in-service PEP training had significantly higher mean knowledge and confidence scores but no different mean attitude scores than those who did not. The mean total score for those who received the adapted PEP training (10.7 of 12) was significantly higher ( $P = .008$ ) than for those who did not (8.8 of 12). Conclusion: Decentralizing the first phase of PEP management for primary health care workers in rural Zimbabwe attends to an unmet need. The evaluation facilitates checking completeness of course contents, stresses the need to pay equal attention to attitudes toward the referral and reporting system, and identifies specific challenges for delivering PEP in rural settings. The finding may inspire to improve access to PEP for other health care workers and phlebotomists employed in remote areas.

de Graaf R, Houweling H, van Zessen G. Occupational risk of HIV infection among western health care professionals posted in AIDS endemic areas. *AIDS Care* 1998; 10:441-52.

**ABSTRACT-** In this study on occupational risks of HIV infection among 99 Dutch medics working in AIDS endemic areas, 61% reported percutaneous exposures during an average stay of 21 months. The mean number of injuries was lower among physicians (2.0 versus 3.9 per year) and higher among nurses (1.9 versus 1.2) than in previous research conducted in 1987-1990 among Dutch medics returning from Africa. But the reduction of exposures among physicians might be explained by the fact that the number of procedures they carried out was less in the later study. Also among nurses a shift of tasks was seen. On the basis of an estimated HIV prevalence in the patient population of 19%, a chance of transmission per accident of 0.3%, and 1.9 percutaneous exposures per year, the mean occupational risk of HIV infection per year can be estimated at 0.11% per person. Besides length of stay and number of activities, characteristics of the work setting were associated with the frequency of different kinds of injuries. From the analysis of 109 extensive descriptions of recent accidents, it appeared that the majority of the injuries

occurred during routine activities and were self-inflicted. Injuries with hollow needles usually occurred after the actual medical act (e.g. during recapping). Carelessness (e.g. due to fatigue) or being in a hurry (e.g. because of an emergency) were also often the cause of percutaneous injuries, as were the poor quality of the equipment, lack of professional skills, or a combination of these factors. Prevention activities are still important to reduce the frequency of occupational exposures. But they will not eliminate them totally; from the descriptions of recent exposures it was clear that some of the injuries occurred in spite of precautions.

Ekwueme DU, Weniger BG, Chen RT. Model-based estimates of risks of disease transmission and economic costs of seven injection devices in sub-Saharan Africa.

Bulletin of the World Health Organization 2002;80(11):859-70.

**ABSTRACT-** Objective: To investigate and compare seven types of injection devices for their risks of iatrogenic transmission of bloodborne pathogens and their economic costs in sub-Saharan Africa. Methods: Risk assumptions for each device and cost models were constructed to estimate the number of new hepatitis B virus (HBV) and human immunodeficiency virus (HIV) infections resulting from patient-to-patient, patient-to-health care worker, and patient-to-community transmission. Costs of device purchase and usage were derived from the literature, while costs of direct medical care and lost productivity from HBV and HIV disease were based on data collected in 1999 in Cote d'Ivoire, Ghana, and Uganda. Multivariate sensitivity analyses using Monte Carlo simulation characterized uncertainties in model parameters. Costs were summed from both the societal and health care system payer's perspectives. Findings: Resterilizable and disposable needles and syringes had the highest overall costs for device purchase, usage, and iatrogenic disease: median US\$ 26.77 and US\$ 25.29, respectively, per injection from the societal perspective. Disposable-cartridge jet injectors and automatic needle-shielding syringes had the lowest costs, US\$ 0.36 and US\$ 0.80, respectively. Reusable-nozzle jet injectors and auto-disable needle and syringes were intermediate, at US\$ 0.80 and US\$ 0.91, respectively, per injection. Conclusion: Despite their nominal purchase and usage costs, conventional needles and syringes carry a hidden but huge burden of iatrogenic disease. Alternative injection devices for the millions of injections administered annually in sub-Saharan Africa would be of value and should be considered by policy-makers in procurement decisions.

Newman MJ. Infection control in Africa south of the Sahara [letter]. Infection Control and Hospital Epidemiology 2001;22:68-9.

No abstract; first paragraph: The translation of US-style infection control practices into healthcare provision in Africa, especially for the extremely poor African countries, is not an easy program to envisage. Procedures that are standard practices in the United States may be practically impossible to implement in most African countries. This letter discusses some of the universal problems associated with infection control in the African context. There are also problems due to ignorance, poverty, and the resulting lack of even the most basic resources for health care. Solutions to some of these problems are suggested.

Phillips EK, Owusu-Ofori A, Jagger J. Bloodborne pathogen exposure risk among surgeons in sub-Saharan Africa. *Infection Control and Hospital Epidemiology* 2007;28:1334-6.

**ABSTRACT-** To document the frequency and circumstances of bloodborne pathogen exposures among surgeons in sub-Saharan Africa, we surveyed surgeons attending the 2006 Pan-African Association of Surgeons conference. During the previous year, surgeons sustained a mean of 3.1 percutaneous injuries, which were typically caused by suture needles. They sustained a mean of 4.1 exposures to blood and body fluid, predominantly from blood splashes to the eyes. Fewer than half of the respondents reported completion of hepatitis B vaccination, and postexposure prophylaxis for human immunodeficiency virus was widely available. Surgeons reported using hands-free passing and blunt suture needles. Non-fluid-resistant cotton gowns and masks were the barrier garments worn most frequently.

Sagoe-Moses C, Pearson RD, Perry J, Jagger J. Risks to health-care workers in developing countries [Sounding Board]. *New England Journal of Medicine* 2001;345:538-41.

**ABSTRACT-** The authors describe the increased risks and substantial costs of occupational exposures to bloodborne pathogens in developing countries, particularly in sub-Saharan Africa, and recommend specific policy actions to help protect the lives of healthcare workers in these regions.

#### **BURUNDI:**

Le Pont F, Hatungimana V, Guiguet M, Ndayiragije A, Ndoricimpa J, Niyongabo T et al. Assessment of occupational exposure to human immunodeficiency virus and hepatitis C virus in a referral hospital in Burundi, Central Africa [letter]. *Infection Control and Hospital Epidemiology* 2003;24:717-18.

**ABSTRACT-** The occupational risk of viral infection among healthcare workers (HCWs) is well documented. Although universal precautions were established many years ago, their application is difficult in developing countries, owing to organizational problems and a lack of necessary materials such as gloves and proper needle-disposal facilities. Data on the frequency and circumstances of occupational exposures in developing countries are sparse. We report data from Burundi, a country with high rates of human immunodeficiency virus (HIV) and hepatitis C virus (HCV) seroprevalence, based on a questionnaire that surveyed HCWs and auxiliary staff regarding perceptions of occupational exposure, frequency of exposures as defined by Centers for Disease Control and Prevention criteria, circumstances of exposures, and postexposure practices. We also estimated a cumulative risk for seroconversion to HIV and HCV due to parenteral exposure based on data from the survey.

#### **COTE D'IVOIRE:**

Tarantola A, Koumare A, Rachline A, Sow PS, Diallo MB, Doumbia S, Aka C, Ehui E, Brucker G, Bouvet E. Groupe d'Etude des Risques d'Exposition des Soignants aux agents infectieux (GERES). A descriptive, retrospective study of 567 accidental blood exposures in healthcare workers in three West African countries [Cote d'Ivoire, Mali, Senegal]. *Journal of Hospital Infection*. 2005;60:276-82.

**ABSTRACT-** We conducted a multi-centre study in West African hospital wards to document accidental blood exposure (ABE) risks in these settings, and assessed the incidence of ABE in participating healthcare workers (HCWs) retrospectively. In total, 1241 HCWs participated in the survey from 43 hospital wards. Among them, 567 (45.7%) had sustained at least one ABE with an estimated incidence of 0.33 percutaneous injuries (PCIs) and 0.04 mucocutaneous contacts (MCCs)/HCW/year in medical or intensive care personnel and 1.8 PCIs/HCW/year in surgeons. The ABE was a needlestick in 454 (80.1%) of 567 cases, a cut in 19 cases (3.4%), a splash or contact with non-intact skin in 87 cases (15.3%), and was undocumented in seven cases (1.2%). The source patient's human immunodeficiency virus (HIV) serostatus was positive in 74 cases (13.1%), negative in 65 cases (11.5%), and unknown in 416 cases (73.4%). The ABE was not notified in the ward in 392 cases (69.1%). Healthcare structures can improve HCWs' safety and reduce the stigma against HIV-infected patients by improving access to training, information, primary prevention (ABE prevention equipment) and secondary prevention (postexposure prophylaxis) of occupational infection risks.

### **DEMOCRATIC REPUBLIC OF THE CONGO**

Borchert M, Mulangu S, Lefevre P, Tshomba A, Libande ML, Kulidri A, et al. Use of protective gear and the occurrence of occupational Marburg Hemorrhagic Fever in health workers from Watsa Health Zone, Democratic Republic of the Congo. *Journal of Infectious Diseases* 2007;15(196 Suppl 2):S168-75.

**ABSTRACT- BACKGROUND:** Occupational transmission to health workers (HWs) has been a typical feature of Marburg hemorrhagic fever (MHF) outbreaks. The goal of this study was to identify cases of occupational MHF in HWs from Durba and Watsa, Democratic Republic of the Congo; to assess levels of exposure and protection; and to explore reasons for inconsistent use of protective gear. **METHODS:** A serosurvey of 48 HWs who cared for patients with MHF was performed. In addition, HWs were given a questionnaire on types of exposure, use of protective gear, and symptoms after contact. Informal and in-depth interviews with HWs were also performed. **RESULTS:** We found 1 HW who was seropositive for MHF, in addition to 5 cases of occupational MHF known beforehand; 4 infections had occurred after the introduction of infection control. HWs protected themselves better during invasive procedures (injections, venipuncture, and surgery) than during noninvasive procedures, but the overall level of protection in the hospital remained insufficient, particularly outside of isolation wards. The reasons for inconsistent use of protective gear included insufficient availability of the gear, adherence to traditional explanatory models of the origin of disease, and peer bonding with sick colleagues. **CONCLUSIONS:** Infection control must not focus too exclusively on the establishment of isolation wards but should aim at improving overall hospital hygiene. Training of HWs should allow them to voice and discuss their doubts and prepare them for the peculiarities of caring for ill colleagues.

### **KENYA:**

M'ikanatha NM, Imunya SG, Fisman DN, Julian KG. Sharp-device injuries and perceived risk of infection with bloodborne pathogens among healthcare workers in rural Kenya [letter]. *Infection Control and Hospital Epidemiology* 2007;28:761-3.

ABSTRACT- [W]e documented HCWs' concerns about and exposure to bloodborne pathogens in a rural Kenyan setting where HIV and viral hepatitis may be prevalent. Although there is a need for improvement, some measures are being taken to prevent and respond to occupational exposure to bloodborne pathogens. To support much-needed occupational safety among HCWs in rural Kenya, it is hoped that coverage for HBV vaccination will be expanded, access to sharps safety devices will be increased, and postexposure prophylaxis will be offered for HIV exposure. So that hospitals are not operating in isolation in regard to this important public health activity, there is a need for national campaigns to address cultural perceptions leading to the overuse of injections and to support broader training for and implementation of occupational safety measures to protect HCWs against bloodborne pathogens.

Taegtmeier M, Suckling RM, Nguku PM, Meredith C, Kibaru J, Chakaya JM, Muchela H, Gilks CF. Working with risk: Occupational safety issues among healthcare workers in Kenya. *AIDS Care*. 2008;20(3):304-10.

ABSTRACT- The objective of this study was to explore knowledge of, attitudes towards and practice of post-exposure prophylaxis (PEP) among healthcare workers (HCWs) in the Thika district, Kenya. We used site and population-based surveys, qualitative interviews and operational research with 650 staff at risk of needlestick injuries (NSIs). Research was conducted over a 5-year period in five phases: (1) a bio-safety assessment; (2) a staff survey: serum drawn for anonymous HIV testing; (3) interventions: biosafety measures, antiretrovirals for PEP and hepatitis B vaccine; (4) a repeat survey to assess uptake and acceptability of interventions; in-depth group and individual interviews were conducted; and (5) health system monitoring outside a research setting. The main outcome measures were bio-safety standards in clinical areas, knowledge, attitudes and practice as regards to PEP, HIV-sero-prevalence in healthcare workers, uptake of interventions, reasons for poor uptake elucidated and sustainability indicators. Results showed that HCWs had the same HIV sero-prevalence as the general population but were at risk from poor bio-safety. The incidence of NSIs was 0.97 per healthcare worker per year. Twenty-one percent had had an HIV test in the last year. After one year there was a significant drop in the number of NSIs (OR: 0.4; CI: 0.3-0.6;  $p < 0.001$ ) and a significant increase in the number of HCWs accessing HIV testing (OR: 1.55; CI: 1.2-2.1;  $p = 0.003$ ). In comparison to uptake of hepatitis B vaccination (88% of those requiring vaccine) the uptake of PEP was low (4% of those who had NSIs). In-depth interviews revealed this was due to HCWs fear of HIV testing and their perception of NSIs as low risk. We concluded that Bio-safety remains the most significant intervention through reducing the number of NSIs. Post-exposure prophylaxis can be made readily available in a Kenyan district. However, where HIV testing remains stigmatised uptake will be limited - particularly in the initial phases of a programme.

**MALI:**

See above – Cote d'Ivoire.

**NIGERIA:**

Adebamowo CA, Ezeome ER, Ajuwon JA, Ogundiran TO. Survey of the knowledge, attitude and practice of Nigerian surgery trainees to HIV-infected persons and AIDS patients. *BMC Surgery* 2002;2:7.

**ABSTRACT-** Background: The incidence of HIV infection and AIDS is rising in Nigeria. Surgeons are at risk of occupationally acquired infection as a result of intimate contact with the blood and body fluids of patients. This study set out to determine the knowledge, attitude and risk perception of Nigerian surgery residents to HIV infection and AIDS. Methods: A self-administered postal questionnaire was sent to all surgery trainees in Nigeria in 1997. Results: Parenteral exposure to patients' blood was reported as occurring 92.5% times, and most respondents assessed their risk of becoming infected with HIV as being moderate at 1–5%. The majority of the respondents were not aware of the CDC guidelines on universal precautions against blood-borne pathogens. Most support a policy of routinely testing all surgical patients for HIV infection but 76.8% work in centers where there is no policy on parenteral exposure to patients' blood and body fluids. Most (85.6%) do not routinely use all the protective measures advocated for the reduction of transmission of blood borne pathogens during surgery, with the majority ascribing this to non-availability. Most want surgeons to be the primary formulators of policy on HIV and surgery while not completely excluding other stakeholders. Conclusions: The study demonstrates the level of knowledge, attitude and practice of Nigerian surgery trainees in 1997 and the need for policy guidelines to manage all aspects of the healthcare worker (HCW), patients, and HIV/AIDS interaction.

Adegboye AA, Moss GB, Soyinka F, Kreiss JK. The epidemiology of needlestick and sharp instrument accidents in a Nigerian hospital. *Infection Control and Hospital Epidemiology* 1994;15:27-31.

**ABSTRACT-** Objectives: To characterize the epidemiology of percutaneous injuries of healthcare workers (HCWs) in Ile-Ife, Nigeria. Design: A cross-sectional survey of a random sample of HCWs regarding details of needlestick and sharp instrument injuries within the previous year. Setting: University hospital and clinics in Ile-Ife, Nigeria. Participants: Hospital personnel with potential occupational exposure to patients' blood. Results: Needlestick accidents during the previous year were reported by 27% of 474 HCWs, including 100% of dentists, 81% of surgeons, 32% of nonsurgical physicians, and 31% of nursing staff. The rate of needlestick injuries was 0.6 per person-year overall: 2.3 for dentists, 2.3 for surgeons, 0.4 for nonsurgical physicians, and 0.6 for nursing staff. Circumstances associated with needlestick injuries included unexpected patient movement in 29%, handling or disposal of used needles in 23%, needle recapping in 18%, accidental stick by a colleague in 18%, and needle disassembly in 10%. Sharp instrument injuries were reported by 15% of HCWs and most commonly involved broken glass patient specimen containers (39%). Almost all HCWs were aware of the potential risk of HIV transmission through percutaneous injuries, and 91% considered themselves very concerned about their occupational risk of HIV acquisition. Conclusions: The high frequency of percutaneous exposure to blood among HCWs in this Nigerian hospital potentially could be reduced by simple interventions at modest cost.

Adesunkanmi AK, Badmus TA, Ogunlusi JO. Accidental injuries and cutaneous contaminations during general surgical operations in a Nigerian teaching hospital. *East African Medical Journal* 2003;80(5):227-34.

**ABSTRACT-** Objective: To determine the prevalence of accidental injuries and body contaminations among the operating personnel during general surgical operation, those involved, the circumstances surrounding the injuries or body contaminations and the factors affecting the prevalence in a unit of a teaching hospital in Nigeria. Design: Patients operated for general surgical conditions in a unit of a Teaching Hospital Complex during a period of two years (1997-1998) were studied. A proforma was designed to enter personal biodata, preoperative and intra-postoperative clinical information of all the patients. Setting: Wesley Guild Hospital a unit of teaching hospital complex serving the large agrarian rural and semi-urban Nigerians. Patients: Five hundred and eighty nine consecutive general surgical patients. All types of general surgical operations were included, emergency or elective, major or minor, carried out during the day or at night. Intervention: All the patients were operated and operating personnel observed for sharp injuries and body contamination. Main outcome measures: Incidence of sharp injuries and cutaneous contamination and personnel at risk determined. Results: Operating personnel sustained 62 sharp injuries (10.5%), these were caused by suture needle in 57 cases (92.0%), towel clips in three (4.8%), knife cut in two (3.2%). Operating physicians sustained 56 cases of sharp injuries (90.3%) and Scrub Nurses in six (9.7 %). Self-inflicted sharp injuries in 49 (79 %) and in 12 cases (21%) injuries were inflicted by the surgeons or their assistants. Left hand was injured in 39 cases (63%) and right in 23 (37%). Cutaneous or mucosa membrane contamination with blood or body fluid occurred in 232 cases (39.4 %). These were made up of wet gown contamination in 124(53.5 %), glove failure in 72(31%) and splashing of blood or fluids into the face or eyes in 36 cases (15.5 %). Contamination occurred in more than one operating personnel in more than half of the cases. Operating surgeons were affected in 211 cases (91%). The risks of accidental injuries and blood and body fluid contamination were significant, if the duration of the operation was more than one hour, among the operating surgeons and if the operation was major ( $p < 0.05$ ). Conclusion: This study has demonstrated that cutaneous, percutaneous, and mucous membrane exposure to patients blood and body fluids are common events during general surgical operations. Most accidental injuries were due to solid suture needle-sticks, mostly injured personnel were the primary operating surgeons, injuries occurred predominantly on the left hand. This may poses a significant risk of infection with blood borne pathogens when operating on infected patients.

Ansa VO, Udoma EJ, Umoh MS, Anah MU. Occupational risk of infection by human immunodeficiency and hepatitis B viruses among health workers in south-eastern Nigeria. *East African Medical Journal* 2002;79(5):254-6.

**ABSTRACT-** Objective: To assess the occupational risk of infection by human immunodeficiency virus (HIV) as well as hepatitis B virus (HBV) among healthcare workers in south-eastern Nigeria. Design: Cross-sectional study. Setting: Three tertiary health institutions in south-eastern Nigeria. Subjects: Doctors, nurses, laboratory staff and cleaners. Main outcome measures: Observation of the availability and use of protective equipment and materials in the various departments of the hospitals. Results: Materials

and equipments needed for protective and hygienic practices (adequate water supply, protective clothing and availability of disinfectants) were inadequate in all hospitals. Where available, they were found to be inconsistently used. Health workers in the three institutions were thus constantly exposed unnecessarily to blood and other body fluids which might be potentially infectious as well as injury from used sharps. Conclusion: The risk of acquiring HIV and HBV infections by health workers in this region of Nigeria in the course of performing their duties is therefore still apparently high. Though distinct viruses, they share similar mode of transmission and risk factors. Use of personal protective equipment and adoption of standard hygienic practices among health workers must be encouraged. Supply of protective materials and equipment should be greatly improved. It is recommended that reduction of occupational risks among health workers using this approach should form part of control strategies for both infections in the country.

Arotiba JT, Odaibo GN, Fasola AO, Obiechina AE, Ajagbe HA, Olaleye OD. Human immuno-deficiency virus (HIV) infection among oral surgery patients at the University College Hospital, Ibadan, Nigeria. *African Journal of Medicine and Medical Science* 2003;32(3):253-5.

**ABSTRACT-** The human immunodeficiency virus is a world-wide epidemic and evidence abound that the infection is spreading rapidly in sub-Saharan Africa with little or no control. Nosocomial transmission of HIV in the Dental Surgery has been documented. This study was undertaken to determine the prevalence of HIV among dental patients undergoing extraction at the University College Hospital, Ibadan. Three hundred patients requiring dental extraction at the dental clinic, UCH, Ibadan who consented were enrolled for the study. Blood samples from these individuals were tested for the presence of HIV antibodies using commercially available ELISA (Monolisa Sanofi, Pasteur, France). All initially reactive samples were confirmed by a commercial western immunoblot assay (Bio-Rad Norapath HIV kit). A prevalence of 2.3% (7/300) was obtained among individuals tested for this study. Four (2.8%) of the 143 males and 3 (1.9%) of 157 females were positive for HIV antibodies. All the seropositive patients except one were within the age range 20-39 years and most of them (6 out of 7) do not use condom during intercourse. More than half (57%) of the patients had more than one sexual partner. This study shows that the risk of transmitting HIV to DHCW during treatment is also a potential hazard in this environment. Hence, adequate preventive measure should be observed always.

Belo AC. Prevalence of hepatitis B virus markers in surgeons in Lagos, Nigeria. *East African Medical Journal* 2000;77(5):283-5.

**ABSTRACT-** Objective: To determine the prevalence of hepatitis B virus (HBV) markers in surgeons in a major city in Nigeria. DESIGN: A cross-sectional, descriptive study. Setting: Three major hospitals in Lagos, Nigeria. Subjects: One hundred and sixty seven surgeons (study group) and 193 administrative staff (controls). Interventions: Blood samples were taken from subjects and analysed for hepatitis B virus markers (HBsAg, antiHBs and antiHBc) using the ELISA technique. Main outcome measures: Hepatitis B virus marker sero-positivity. Results: The prevalence of hepatitis B surface antigen (HBsAg) in the surgeons was found to be 25.7% as compared to 15% in the

control group ( $p=0.01$ ). The frequency of antibody to the surface antigen (antiHBs) was 22.2% among the surgeons and 4.1% in the control group ( $p<0.001$ ) and that of antibody to the core antigen (antiHBc) was 61.7% in the surgeons as compared to 53.4% in the control ( $p=0.11$ ). At least one HBV marker was found in 76.6% of the surgeons as compared to 57% in the control group ( $p=0.0009$ ). Conclusion: Health care workers should be immunised against HBV. In Nigeria, HBV immunisation should be considered for inclusion in the EPI.

Fasunloro A, Owotade FJ. Occupational Hazards among clinical dental staff. *Journal of Contemporary Dental Practice* 2004;5(2):134-52.

**ABSTRACT-** Although identification of risks to dental healthcare workers has been explored in several industrialized nations, very little data is available from developing countries. This paper examines the occupational hazards present in the dental environment and reports survey results concerning attitudes and activities of a group of Nigerian dental care providers. A survey on occupational hazards was conducted among the clinical dental staff at the Dental Hospital of the Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife in Osun State, Nigeria. Thirty eight of the forty staff responded, yielding a response rate of 95%. Subject ages ranged from 26 to 56 years with approximately 25% in the 31-46 year old bracket. All of the staff were aware of the occupational exposure to hazards, and the majority had attended seminars/workshops on the subject. Only five staff members (13.2%) owned a health insurance policy and 26 (68.4%) had been vaccinated against Hepatitis B infection. All dentists (24) had been vaccinated compared with only two non-dentists; this relationship was significant ( $p=30.07$ ,  $\chi^2=0.000$ ). Fourteen members of the clinical staff (36.8%) could recall a sharp injury in the past six months, and the majority (71.1%) had regular contact with dental amalgam. Wearing protective eye goggles was the least employed cross infection control measure, while backache was the most frequently experienced hazard in 47% of the subjects. The need for Hepatitis B vaccinations for all members of the staff was emphasized, and the enforcement of strict cross infection control measures was recommended. The physical activities and body positions that predispose workers to backaches were identified and staff education on the prevention of backaches was provided.

Halim NK, Madukwe U, Saheeb BD, Airauhi LU. Hepatitis B surface antigen and antibody to hepatitis C virus among accident and emergency patients. *East African Medical Journal* 2001;78(9):480-3.

**ABSTRACT-** Objective: To determine the sero-prevalence and epidemiology of antibody to hepatitis C virus (anti-HCV) and hepatitis B surface antigen in accident and emergency patients. Design: A descriptive study was performed on 150 accident and emergency patients. Sera was screened for anti-HCV and HbsAg, using enzyme linked immunosorbent assay. Personal information and risk factors involved were obtained using a questionnaire. Setting: Haematology laboratory of the University of Benin Teaching Hospital, Nigeria. Subjects: One hundred and fifty adults consisting of 122 males and 28 females who were above the age of 21 years. Patients were randomly selected from all adults including dental patients attending the emergency department for both surgical, dental and medical emergencies. The age range was between 21-58 years.

In order to ascertain the epidemiology of both viruses a questionnaire was used detailing the possible risk factors for transmission. These included history of previous blood transfusion; history of life time occurrence of multiple sexually transmitted diseases; history of heterosexual exposure to partners at risk (for example prostitutes); history involving the use of unsterilized blades; presence of scarification marks and tattooing; low socio-economic status (low annual income or unemployed): history of intravenous drug use and heterosexual activity. Anti-HCV and HBsAg were both assayed using different assay kits, based on the enzyme linked immuno absorbent assay (ELISA) tests from different manufacturers. Results: The sero-prevalence of anti-HCV was 14% and 29.3% for HBsAg. Anti-HCV positivity was significantly associated with a past history of blood transfusion and heterosexual exposure to partners at risk. The study also revealed a significant association between HBsAg positivity and all the risk factors. Conclusion: The high prevalence rate for anti-HCV and HbsAg in accident and emergency patients increases the likelihood of further spread from patients to health care providers especially if adequate precautions are not observed.

Kushimo OT, Akpan SG, Desalu I, Merah NA, Ilori IU. Knowledge, attitude and practices of Nigerian anaesthetists in HIV infected surgical patients: a survey. *Nigerian Postgraduate Medical Journal* 2007;14:261-5.

**ABSTRACT-** In the light of increasing prevalence of the human immunodeficiency virus (HIV), anaesthetists are likely to see more patients with this virus in their practice. This study evaluated, using a questionnaire format, the knowledge, attitude and practices of anaesthetists in the management of HIV infected surgical patients. The questionnaire sought demographic information, the knowledge of risks involved as well as attitude and practices. One hundred (66.7%) out of 150 questionnaires distributed amongst members of the Nigerian Society of Anaesthetists were completed and returned. Fifty-five per cent (55%) of the respondents confirmed their willingness to be screened but only 45% had had a personal HIV screening test. Even though 23% of all the respondents will transfuse unscreened blood in an emergency, only 1(8.3%) of the consultants will do so. This trend was also reflected in gloving behaviour as 11(91.6%) of consultants will routinely wear gloves whilst only 12(70.5%) of the senior house officers will routinely glove for venepuncture despite the availability of gloves. Other precautionary facilities such as goggles, sharp disposal bins, routine screening of all surgical patients were more available in private than in government hospitals. Ninety- six per-cent of all respondents will initiate an action after a needle stick injury whilst 4% will ignore. General Anaesthesia was the choice of anaesthetic in an HIV/AIDS infected patient by 43% of respondents whilst 22% of respondents would choose regional technique. However, only 85% of respondents were willing to anaesthetise an infected patient. This study suggested a dearth of knowledge and perception of risks of HIV/AIDS amongst Nigerian Anaesthetists. Appropriate training and greater education is highly recommended. Rigorous infection control policy is imperative and hospital authorities must ensure availability of protective facilities.

Odusanya OO, Meurice FP, Hoet B. Nigerian medical students are at risk for hepatitis B infection. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 2007;101:465-8.

**ABSTRACT-** Medical students are exposed to blood and body fluids. This study was conducted to estimate the prevalence of hepatitis B virus (HBV) infection amongst medical students of the Lagos State University College of Medicine, Ikeja, Nigeria. Data were collected through a self-administered questionnaire and through blood analysis for hepatitis B surface antigen (HBsAg), hepatitis B 'e' antigen (HBeAg) as well as antibodies to the core (anti-HBc), surface (anti-HBs) and 'e' (anti-HBe) antigens. Three hundred and thirteen of 325 students (96%) participated. The mean age was 24.3+/-3.98 years; 231 (74%) were pre-clinical students and 82 (26%) were in the clinical years of study. Only 8 (2.6%) had received three doses of vaccination against HBV. Eighty-one (26%) tested positive for anti-HBc, 10 (3.2%) were positive for HBsAg and 56 (17.9%) had anti-HBs antibodies. A significant relationship was found between students who had a positive history of hepatitis B in the family and anti-HBc ( $P=0.03$ ). Age was also significantly associated with HBsAg ( $P=0.012$ ). Two hundred and twenty-five (72%) students were susceptible to the infection and required vaccination. Most students at this medical school are susceptible to HBV infection and should be vaccinated.

Olubuyide IO, Ola SO, Aliyu B, Dosumu OO, Arotiba JT, Olaleye OA, Odaibo GN, Odemuyiwa SO, Olawuyi F. Prevalence and epidemiological characteristics of hepatitis B and C infections among doctors and dentists in Nigeria. *East African Medical Journal* 1997;74(6):357-61.

**ABSTRACT-** A random sample of seventy five doctors and dentists at the University College Hospital, Ibadan, Nigeria, was surveyed. They were offered anonymous testing for hepatitis B surface antigen (HBsAg), hepatitis B e antigen (HBeAg), antibodies to hepatitis B core antigen (anti-HBc) and to hepatitis C virus (anti-HCV) by enzyme immunoassay. The results suggest a high prevalence of hepatitis B virus (HBV) with a high potential of transmissibility, as well as a high prevalence of HCV infection. Most of the doctors and dentists use universal precaution for protection against viral hepatitis less than 50% of the occasions when they carry out procedures on their patients. Infection with HBV was associated with type of specialty (surgeons and dentists) and lack of HBV vaccination ( $p < 0.05$ ). After logistic regression, these factors were independently associated with HBV infection ( $p < 0.05$ ). Sixty (80%) of these health care workers had not received prior HBV vaccination. The unvaccinated personnel were more likely to be surgeons, dentists, less than 37 years of age and have fewer years of professional activity ( $p < 0.05$ ). After logistic regression, only the fewer years of professional activity remained independently associated with lack of vaccination ( $p < 0.05$ ). We conclude that to reduce the occupational exposure of HBV, universal precautions must be rigorously adhered to when doctors and dentists carry out procedures on their patients. It is necessary that these health care workers are vaccinated with HBV vaccine and the currently anticipated HCV vaccination, if not immune. No recent study exists that exclusively addresses this problem in health care workers in tropical Africa.

Sofola OO, Folayan MO, Denloye OO, Okeigbemen SA. Occupational exposure to bloodborne pathogens and management of exposure incidents in Nigerian dental schools. *Journal of Dental Education* 2007;71(6):832-7.

**ABSTRACT-** The goal of this study was to determine the frequency of occupational exposures to bloodborne pathogens amongst Nigerian clinical dental students, their HBV

vaccination status, and reporting practices. A cross-sectional study of all clinical dental students in the four Nigerian dental schools was carried out by means of an anonymous self-administered questionnaire that asked questions on demography, number and type of exposure, management of the exposures, personal protection against cross infection, and the reporting of such exposures. One hundred and fifty-three students responded (response rate of 84.5 percent). Only thirty-three (37.9 percent) were fully vaccinated against HBV. Ninety (58.8 percent) of the students have had at least one occupational exposure. There was no significantly associated difference between sex, age, location of school, and exposure. Most of the exposures (44.4 percent) occurred in association with manual tooth cleaning. There was inadequate protection of the eyes. None of the exposures were formally reported. It is the responsibility of training institutions to ensure the safety of the students by mandatory HBV vaccination prior to exposure and adequate training in work safety. Written policies and procedures should be developed and made easily accessible to all workers to facilitate prompt reporting and management of all occupational exposures.

Utomi IL. Occupational exposures and infection control among students in Nigerian dental schools. *Odonto-stomatologie tropicale [Tropical Dental Journal]* 2006;29(116):35-40.

**ABSTRACT-** Objective: To assess the incidence of occupational exposures to body fluids and infection control practices among students in Nigerian dental schools. Materials and methods: A self-administered questionnaire survey of 112 students from three Nigerian dental schools. Results: 57 (50.9%) of the students had experienced one or more occupational exposures in the previous six months. There was no statistically significant association between year group and reported number of exposures ( $p > 0,05$ ). There was also no statistically significant association between sex and reported number of exposures ( $p > 0.05$ ). 50.7% of the exposures were percutaneous injuries, 26.1% splatter of saliva and 23.2% splatter of aerosol. Percutaneous injuries were most frequently caused by scalers (42.9%) and needlesticks (37.1%) Most incidents occurred during scaling (37.7%), use of dental handpiece (21.7%) and cleaning of instruments (18.8%). 96.4% of the exposures were not reported. Only 36.6% of the students were immunized against Hepatitis B. None of those immunized had been post-screened for seroconversion. The routine use of gloves, masks and protective eyewear was reported by 87.5%, 65.5% and 17% of students respectively. Conclusions: This study indicates a high rate of exposure to body fluids and low compliance with infection control guidelines. There is a need for interventions to improve safe work practices, hepatitis B vaccination, HBV post-immunization serology and use of protective barriers. Also appropriate policies and procedures are needed for reporting and managing exposures.

#### **RWANDA:**

Habimana P, Bulterys M, Usabuwera P, Chao A, Saah AJ. A survey of occupational blood contact and HIV infection among traditional birth attendants in Rwanda. *AIDS* 1994; 8:701-4.

**ABSTRACT-** Objective: To investigate the risk of occupationally acquired HIV infection among traditional birth attendants (TBA) in Rwanda, Africa. Design and methods: A survey was conducted among 219 TBA practicing in a rural but densely populated area in

southern Rwanda. Each TBA was interviewed about sociodemographic information, work-related habits and practices, and presence of nonoccupational risk factors for HIV infection. The frequency of skin exposure to HIV-infected blood was estimated for each TBA from HIV seroprevalence data collected previously from pregnant women stratified by the geographic zones in which the TBA practiced. Results: Four TBA (1.8%) tested HIV-1-antibody-positive; all four had reported nonoccupational risk factors for HIV infection. We estimated that the 215 HIV-negative TBA had 2234 potentially infectious blood-skin contacts out of a total of approximately 35,000 deliveries assisted in the past 5 years. However, we found no evidence of HIV infection caused by occupational blood contact (none out of 2234; upper limit of the 95% confidence interval because of one potentially infectious blood-skin contact = 0.2%). Conclusion: Although these findings may not be universal to all TBA in Africa, the risk of occupationally acquired HIV infection among TBA appears small. The high frequency of blood-skin contact among TBA in Rwanda highlights the need to include infection control precautions in the training of TBA.

#### **SENEGAL:**

See above – Cote d'Ivoire.

#### **SOUTH AFRICA:**

DeVilliers HC, Nel M, Prinsloo EAM. Occupational exposure to bloodborne viruses amongst medical practitioners in Bloemfontein, South Africa. *South African Family Practice* 2007;49(3):14.

**ABSTRACT** - Background: The possibility of occupational exposure to bloodborne viruses such as HIV, hepatitis B virus (HBV) and hepatitis C virus (HCV) is an everyday reality for healthcare workers. This study reports on the extent and outcome of doctors' exposure to bloodborne viruses in Bloemfontein. Methods: A descriptive study was done. Doctors (n=441) actively involved in public and/or private medical practice were requested to anonymously complete a questionnaire regarding occupational exposure to bloodborne viruses (HIV, HBV and HCV). Results: A response rate of 51.7% was obtained. More than half (54.2%, 95% CI [47.7%; 60.5%]) of the respondents were exposed to bloodborne viruses. Of these cases, 48.3% occurred with HIV-positive patients and 4.3% with known HBV-positive patients. No cases involved positive HCV patients. After the exposure had occurred, 68.9% of the patients were tested for HIV, 10.9% for HBV and only 4.2% for HCV infection. The frequency of serological testing for doctors immediately after exposure was 65.3% for HIV, 21.7% for HBV and 8.2% for HCV. No seroconversion to HIV or HCV was reported, while two seroconversions to HBV were reported. Most of the exposures occurred as a result of needlestick injury (85%), often in the operating theatre during procedures (59.3%). The majority (59.8%) of exposed doctors did not take any prophylactic treatment and those who did, did not always complete the treatment. Conclusion: The risk of seroconversion to HIV after occupational exposure was as expected, while seroconversion to HBV was less than expected. The lack of adequate follow-up serological testing after occupational exposure is alarming. It is the responsibility of the occupationally exposed doctor to adequately comply with prophylactic measures and undergo serological testing to ensure the least possible risk of contracting infection from a bloodborne virus.

Gounden YP, Moodley J. Exposure to human immunodeficiency virus among healthcare workers in South Africa. *International Journal of Gynaecology and Obstetrics* 2000;69(3):265-70.

**ABSTRACT-** There have been no reports in the literature on occupational hazards of HIV in developing countries. The aim of this study was to evaluate occupational exposure to HIV in healthcare workers in Durban, South Africa. Individuals with occupational exposure to HIV were interviewed. 13% of the staff reported injuries with HIV positive patients. Registrars in training were the highest risk group (60%). Of the injuries, 94% were percutaneous and 65% occurred during emergency surgery. The commonest place of injury was the operating theater (46%) and the commonest procedure associated with accidental exposure was cesarean section (57%). 51% were not wearing eye protection during procedures and although 83% initiated post-exposure prophylaxis, 48% discontinued treatment due to side effects of the drugs. Occupational exposure to HIV is common in the developing world. Rectifiable factors identified in this study that contributes to the milieu of occupational acquisition of HIV include less than proper adherence to universal precaution; inadequate documentation procedures and failure of a large percentage of respondents to complete post-exposure prophylaxis.

Karstaedt AS, Pantanowitz L. Occupational exposure of interns to blood in an area of high HIV seroprevalence. *South African Medical Journal* 2001;91:57-61.

**ABSTRACT-** Objective: To determine the epidemiology of work-related exposure to blood among interns. Design: Interns were invited to complete anonymously a questionnaire concerning their past percutaneous and mucocutaneous exposures to blood. Setting: Chris Hani Baragwanath Hospital, Soweto, and Johannesburg Hospital, Gauteng, where HIV infection is common among patients. Results: Ninety-eight interns (96%) were surveyed. Sixty-nine per cent of interns reported one or more percutaneous exposures to blood during the intern year, and 33% of interns recalled accidental percutaneous exposure to HIV-infected blood. Forty-five per cent recalled a mucocutaneous exposure to HIV-positive blood. Only 28 (64%) of 44 percutaneous injuries from HIV-infected patients were reported. During their student clinical training, 56% of interns had suffered a penetrating injury, and 18% recollected needlestick injuries involving HIV-infected patients. The most common mechanisms of injury included unexpected patient movement (23%), needle recapping (17%), and withdrawal of the needle (17%). Half of the injuries occurred during the first 4 months of internship. Only 22% of intern percutaneous exposures could have been avoided by following universal precautions. Conclusions: Intern and medical student exposure to blood is extremely common, but is markedly underreported. Strict compliance with universal precautions will not prevent the majority of exposures. Priorities should be the introduction of safer techniques and equipment, skills training and methods of reporting blood exposures.

Mahomed O, Jinabhai CC, Taylor M, Yancey A. The preparedness of emergency medical services against occupationally acquired communicable diseases in the prehospital environment in South Africa. *Emergency Medicine Journal* 2007;24:497-500.

**ABSTRACT-** Background: Emergency medical care is performed in an uncontrolled environment and involves invasive procedures and life support measures.

The performance of these duties places emergency care practitioners (ECPs) at risk of occupationally acquired injuries and communicable diseases. Although legislative guidelines exist for the protection of healthcare workers, little is known about the protective measures available for and utilised by ECPs in the pre-hospital environment in South Africa. Objectives: To review the availability and implementation of emergency medical services (EMS)-specific infection control policies and standard operating procedures in the pre-hospital environment. Methods: Interviews with key informants were used to collect data concerning policies on communicable diseases and infection control in the EMS, the operational aspects of these policies, and educational programmes on communicable diseases and infection control for ECPs. Results: There is no national policy on communicable diseases and infection control in EMS. Only KwaZulu-Natal, Eastern Cape and Gauteng have EMS-specific standard operating procedures for communicable diseases and infection control. Formal education and in-service training is limited. Conclusions: A national communicable disease and infection control policy specific to the EMS needs to be developed together with an accredited training module on communicable diseases and infection control for EMS in the pre-hospital environment.

Mosweu E, Sebitloane HM, Moodley J. Occupational exposure to HIV amongst health care workers in the maternity unit at King Edward VIII hospital, Durban, South Africa. *Obstetrics & Gynaecology Forum* 2005;15:5-7.

**ABSTRACT-** The increasing HIV sero-prevalence amongst pregnant women places health care workers in busy labour wards at high risk of occupational exposure to HIV. **Aim:** The aim of this study was to determine whether there has been a change in the prevalence of needle-stick and sharps injuries at King Edward VIII Hospital, Durban, South Africa, since the first study done on the issue in 1999, and if so – the reasons. **Design:** A cross-sectional retrospective survey assessing the prevalence of needle-stick and sharps injuries which occurred from January 2003 to December 2003. **Setting:** The study was conducted at the Department of Obstetrics and Gynaecology, King Edward VIII Hospital, Durban, South Africa. **Method:** Staff members in the labour ward, including doctors, nurses, student nurses, and supportive staff, i.e. cleaners, porters, and messengers were interviewed and asked to fill in a structured questionnaire. **Results:** Healthcare workers (114) were interviewed over a period of 1 year, from January to December 2003. 49 of the 90 (54%) who agreed to participate reported an incident of exposure to patients' body fluids, 19 of who were through sharp injuries (21%); forty percent of exposures occurred with known HIV infected patients, whereas at least 28% of patients sero-status was unknown at the time of the exposure. Only 61% of the sharps injuries were reported, and of these, only a third of the health workers completed the prescribed 4 week course of prophylactic antiretroviral treatment. **Conclusion:** This study showed an increase in the number of HIV exposures amongst health workers, and most of these are as a result of lack of adherence with preventative measures. Improved reporting mechanisms which ensure confidentiality may assist health workers to deal with this.

Nemutandani MS, Yengopal V, Rudolph MJ, Tsotsi NM. Occupational exposures among dental assistants in public health care facilities, Limpopo Province. *SADJ: Journal of the South African Dental Association* 2007;62:348,352-5.

**ABSTRACT-** The risk of dental assistants acquiring injury and infections from the dental clinics has received little attention, especially in South Africa. **OBJECTIVES:** To determine the prevalence of occupational exposures among dental assistants working in public health care facilities in Limpopo Province. **METHODS:** A cross-section study on infection control practice and occupational exposures was conducted among 73 dental assistants. **RESULTS:** The sample was predominantly female (95%) with a mean age of 40.2 years (age range 23-54 years). Almost half the respondents (49.1%) had no formal training for their occupation, 22% were nursing assistants and only 10.2% had qualified at a technical college (Technicon). The mean number of clinicians assisted by each participant was 3.8 (SD +/- 1.9). Nearly half of the dental assistants (n = 26) reported an occupational exposure, half of which in turn occurred while handling instruments and 42.3% while assisting. The most common type of injury was a direct puncture (65.3%). Treatment included antiretroviral therapy (19.2%) and wound-cleaning (38.4%), while 42.3% reported that they had had no treatment at all. About 23% of incidents were not reported. Eighty percent changed gloves routinely between patients but 67% did not use protective eye glasses; 62.7% were not vaccinated against HBV. **CONCLUSION:** Occupational exposure was found to be unacceptably high and compliance of infection control guidelines was low.

Rabbits JA. Occupational exposure to blood in medical students. *South Africa Medical Journal* 2003;93(8):617-20.

**ABSTRACT-** Objective: To determine the extent of occupational exposure to blood in medical students, details of the circumstances surrounding the incidents and the subsequent experiences of the student. Design: Prospective cohort study. Setting: Tygerberg Hospital, the Health Sciences Faculty of the University of Stellenbosch during a 15-week period from 4 February to 19 May 2002. Subjects: One hundred and thirty-six student interns (Sis), i.e. final year medical students. Method: All Sis received a questionnaire and a letter motivating them to participate in the study and explaining the procedure. Regular class meetings enabled continuous motivation and ongoing updates. In the case of an incident during the 15-week period, the SI filled in the form and placed it in a sealed drop-off box. Outcome measures: Specific focus on the preceding events and the situation in which the incidents occurred (department, time of day, procedure performed, and whether the student was on call), exposure to HIV (patient's retroviral status), use of post-exposure prophylaxis (PEP) (whether used, when initiated), and the consequences of the exposure (emotional, on sexual behaviour during the window period, and on career choice). Results: During the 15-week period, 19 incidents were reported; the majority occurred while students were on call, almost half occurred after hours, and a disproportionate number occurred in three departments. Conclusions: Occupational blood exposure is a very real problem and poses a significant risk. SI suggestions should be considered in improving the prevention and management of such incidents.

#### **TANZANIA:**

Gumodoka B, Favot I, Berege ZA, Dolmans WM. Occupational exposure to the risk of HIV infection among health care workers in Mwanza Region, United Republic of Tanzania. *Bulletin of the World Health Organization* 1997;75:133-40.

**ABSTRACT-** During 1993, we collected data on knowledge of human immunodeficiency virus (HIV) transmission, availability of equipment, protective practices and the occurrence of prick and splash incidents in nine hospitals in the Mwanza Region in the north-west of the United Republic of Tanzania. Such incidents were common, with the average health worker being pricked five times and being splashed nine times per year. The annual occupational risk of HIV transmission was estimated at 0.27% for health workers. Among surgeons, the risk was 0.7% (i.e. more than twice as high) if no special protective measures were taken. Health workers' knowledge and personal protective practices must therefore be improved and the supply of protective equipment supported. Reduction of occupational risk of HIV infection among health workers should be an integral part of acquired immunodeficiency syndrome (AIDS) control strategies.

Manyele SV, Anicetus H. Management of medical waste in Tanzanian hospitals. Tanzania Health Research Bulletin 2006;8:177-82.

**ABSTRACT-** A survey was conducted to study the existing medical waste management (MWM) systems in Tanzanian hospitals during a nationwide health-care waste management-training programme conducted from 2003 to 2005. The aim of the programme was to enable health workers to establish MWM systems in their health facilities aimed at improving infection prevention and control and occupational health aspects. During the training sessions, a questionnaire was prepared and circulated to collect information on the MWM practices existing in hospitals in eight regions of the Tanzania. The analysis showed that increased population and poor MWM systems as well as expanded use of disposables were the main reasons for increased medical wastes in hospitals. The main disposal methods comprised of open pit burning (50%) and burying (30%) of the waste. A large proportion (71%) of the hospitals used dust bins for transporting waste from generation points to incinerator without plastic bags. Most hospitals had low incineration capacity, with few of them having fire brick incinerators. Most of the respondents preferred on-site versus off-site waste incineration. Some hospitals were using untrained casual labourers in medical waste management and general cleanliness. The knowledge level in MWM issues was low among the health workers. It is concluded that hospital waste management in Tanzania is poor. There is need for proper training and management regarding awareness and practices of medical waste management to cover all carders of health workers in the country.

#### **UGANDA:**

Brakaa F, Nanyunjaa M, Makumbib I, Mbabazia W, Kasasac S, Lewisa RF. Hepatitis B infection among health workers in Uganda: Evidence of the need for health worker protection. Vaccine 2006;24:6930-7.

**ABSTRACT-** Hepatitis B exposure was assessed in 311 health workers in Uganda, a highly endemic country. Health workers were selected by random sampling from a categorized list of health workers at district level, proportionate to the population of each district. Whereas 60.1% of health workers have evidence of hepatitis B infection, with 8.7% being chronic carriers and one (0.3%) acutely infected, 36.3% are still susceptible and could benefit from vaccination. Only 5.1% reported having had at least one dose of hepatitis B vaccine and 3.5% were apparently immune through vaccination. Needle stick

injuries reported by 77% of health workers were the most common mode of exposure to blood and body fluids. Trends suggested duration of service as a predictor while age and history of blood transfusion remained significant independent risk factors for hepatitis B infection. 98% of health workers are willing to be vaccinated. These results confirm the need for protection and vaccination of health workers in Uganda against hepatitis B.

Kanyama I, Mmiro F, Mirembe F, Kaona F, Bagenda D, Siziya S. International Conference on AIDS 1993 Jun 6-11;9:93 (abstract no. WS-C12-2).

**ABSTRACT- Objectives:** To compare the prevalence of HIV infection among nurse-midwives (NMs), other professional women including hospital nurses (HNs), office workers and teachers (OW/Ts) in the same communities; to compare the prevalence of HIV infection among traditional birth attendants (TBAs) and other women (VLs) in the same villages; and to identify risk behaviours and/or practices that may be associated with HIV infection. **Methods:** A cross sectional study was done in Uganda and Zambia among NMs and HNs, OW/Ts; among TBAs and age-matched VLs. Socio-demographic data, information on sex behaviour, hospital/traditional practices including skin-piercing injuries, was obtained. **Results:** Preliminary results at one centre show an HIV seroprevalence significantly higher among the NMs than the HNs (21% vs 12%,  $p = 0.005$ ) but similar to the OW/T (21% vs 18%). HIV seroprevalence among TBAs and VLs were similar (5% vs 8%). Final results and correlation of HIV infection with practices and risk factors will be presented.

Newsom DH, Kiwanuka JP. Needle-stick injuries in a Ugandan teaching hospital. *Annals of Tropical Medicine and Parasitology* 2002;96:517-22.

**ABSTRACT-** The on-going HIV epidemic has generally increased fear of needle-stick injuries (NSI) and renewed interest in the problem such injuries pose in Africa. The aims of the present study were to evaluate the frequency of NSI, explore the circumstances surrounding each injury and estimate the corresponding infection risk, among healthcare workers (HCW) in Uganda. Questionnaires, asking the recipients how many NSI they had suffered in the past year, how each of these NSI had occurred, what (perceived) risk of infection was associated with each injury, and what their practical and psychological reactions were, were sent to the HCW associated with the Mbarara Teaching Hospital in Uganda. Of the 280 individuals who received questionnaires, 180 (64%) responded and 100 (55% of the respondents) each reported suffering at least one NSI in the previous year. The total number of NSI reported (336) represented an incidence of 1.86 NSI/HCW-year. Interns suffered more NSI (annual mean=4.8) than any other occupational group. Most NSI occurred when patients moved during procedures, when HCW re-sheathed needles, or during suturing (each reported by 55 HCW--30% of those responding). Following NSI, 60 HCW said they squeezed the site of the injury and washed it with bleach, 43 believed they had a 10% risk of HIV infection, 87 felt anxious, 54 felt depressed, 40 prayed, 24 had an HIV test, and four were counselled. To estimate actual infection risk, 435 patients were screened for antibody to HIV (1 and 2) and for the surface antigen of the hepatitis B virus (HBSAg); 26% and 2.8% were found seropositive, respectively. These seroprevalences were multiplied by previously determined probabilities of transmission to give estimated risks of infection (following a single NSI) of 0.08% for HIV and 0.135% for hepatitis B. During 3 years of training as a clinician

(i.e. 2 years as a medical student and 1 year as an intern), more than six in 1000 individuals would be infected with HIV as a result of NSI and almost 10 in 1000 would be infected with hepatitis B virus by the same route. NSI are common, preventable sources of infection and stress for HCW in Africa.

Nsubuga FM, Jaakkola MS. Needle stick injuries among nurses in sub-Saharan Africa. *Tropical Medicine and International Health* 2005;10(8):773-81. [Data is from one hospital in Kampala, Uganda]

**ABSTRACT-** Objectives: Despite a heavy burden of HIV/AIDS and other blood borne infections, few studies have investigated needle stick injuries in sub-Saharan Africa. We conducted a cross-sectional study at Mulago national referral hospital in Kampala, Uganda, to assess the occurrence and risk factors of needle stick injuries among nurses and midwives. Methods: A total of 526 nurses and midwives involved in the direct day-to-day management of patients answered a questionnaire inquiring about occurrence of needle stick injuries and about potential predictors, including work experience, work load, working habits, training, and risk behaviour. Results: A 57% of the nurses and midwives had experienced at least one needle stick injury in the last year. Only 18% had not experienced any such injury in their entire career. The rate of needle stick injuries was 4.2 per person-year. Multiple logistic regression analysis showed that the most important risk factor for needle stick injuries was lack of training on such injuries (OR 5.72, 95% CI 3.41-9.62). Other important risk factors included working for more than 40 h/week (OR 1.90, 95% CI 1.20-3.31), recapping needles most of the time (OR 1.78, 95% CI 1.11-2.86), and not using gloves when handling needles (OR 1.91, 95% CI 1.10-3.32). Conclusions: The study showed a high rate of needle stick injuries among nurses and midwives working in Uganda. The strongest predictor for needle stick injuries was lack of training. Other important risk factors were related to long working hours, working habits, and experience.

#### **ZAIRE:**

Mann JM, Francis H, Quinn TC, Bila K, Asila PK, Bosenge N et al. HIV seroprevalence among hospital workers in Kinshasa, Zaire. Lack of association with occupational exposure. *Journal of the American Medical Association* 1986;256(22):3099-102.

**ABSTRACT-** A study of seroprevalence of the human immunodeficiency virus involving 2384 (96%) of Mama Yemo Hospital's (Kinshasa, Zaire) 2492 personnel found 152 (6.4%) to be seropositive. Prevalence was higher among women than among men (8.1% vs 5.2%); in women peak seroprevalence (13.9%) occurred in 20- to 29-year-olds.

Workers most likely to be seropositive were those who were relatively young, those who were unmarried, those reporting a blood transfusion or hospitalization during the previous ten years, and those receiving medical injections during the previous three years. Medical, administrative, and manual workers had similar seroprevalence (6.5%, 6.4%, and 6.0%, respectively), and seropositivity was not associated with any measure of patient, blood, or needle contact. These findings are consistent with other hospital-based studies indicating low risks for occupational transmission of human immunodeficiency virus.

N'Galy B, Ryder RW, Bila K, Mwandagalirwa K, Colebunders RL, Francis H, Mann JM, Quinn TC. Human immunodeficiency virus infection among employees in an African hospital [Zaire]. *New England Journal of Medicine* 1988;319(17):1123-7.

**ABSTRACT-** To define the prevalence and course of human immunodeficiency virus (HIV) infection, we examined prospectively a cohort of 2002 adult hospital workers in Kinshasa, Zaire. From 1984 to 1986 the prevalence of HIV infection increased from 6.4 percent to 8.7 percent. Over the two years there was a cumulative incidence of new HIV infection of 3.2 percent. The prevalence was higher among women (16.9 percent) and men (9.3 percent) under the age of 30 than among women (9.0 percent) and men (6.2 percent) over 30. Prevalence rates were similar among physicians (5.6 percent), laboratory workers (2.9 percent), and clerical workers (7.9 percent), but they were higher among female nurses (11.4 percent) and manual workers (11.8 percent). Despite marked differences in the intensity of nosocomial exposure, female nurses had similar infection rates on the female internal medicine ward (9.9 percent), in pediatrics (10.8 percent), and in the delivery room (10.7 percent). The attributable risk of HIV infection from a transfusion was 5.9 percent. Neither medical injections nor scarification was a risk factor for HIV infection. Of the 101 seropositive asymptomatic employees in the 1984 survey, 16 percent had AIDS-related complex, 3 percent had AIDS, and 12 percent had died of AIDS by 1986. Previous studies have revealed a seroprevalence of 8.4 percent among women attending an antenatal clinic near the hospital in 1984 and 1986, and of 5.8 percent (in 1984) and 6.5 percent (in 1986) among men donating blood at the hospital's blood bank. We conclude that there is a continuing high prevalence of HIV infection among hospital workers in Kinshasa, Zaire, which appears to be representative of that in the community and not nosocomial.

**ZAMBIA:**

Consten EC, van Lanschot JJ, Henny PC, Tinnemans JG, van der Meer JT. A prospective study on the risk of exposure to HIV during surgery in Zambia. *AIDS* 1995; 9(6):585-8.

**ABSTRACT-** Objective: To investigate the relative risk of occupational HIV transmission for surgeons practising in tropical Africa compared with their western colleagues. Design and setting: From June to November 1993, a prospective study was performed at St Francis' Hospital, Katete, Zambia (350-bed hospital which serves a community of 300,000 people). Methods: The HIV seroprevalence among consecutive surgical patients and the incidence of occupational parenteral exposures to blood during surgery were prospectively studied in a Zambian district hospital. HIV seroprevalence was determined by taking blood from the surgical patients on admission into the operating theatre. Serum was stored at -20 degrees C and transported to the Academic Medical Centre of the University of Amsterdam, where the presence of HIV antibodies was tested by enzyme immunoassay and seropositive samples confirmed by Western blot. Number of parenteral exposures during the study period was scored by interviewing the seven surgeons and their personnel after each surgical procedure about accidental parenteral exposures to blood. The total number of parenteral exposures per surgeon per year was obtained by extrapolation. The cumulated risk of seroconversion due to parenteral blood exposure can be calculated as:  $1-(1-fp)^{ny}$ , where f is the population seroprevalence, p the chance of transmission per incident (estimated to be 0.46%), n the number of parenteral exposures per year and y the years of practice. Results: HIV

seroprevalence in the surgical patient group was 22.3%. Twelve parenteral exposures to blood (surgeons,  $n = 8$ ; other personnel,  $n = 4$ ) took place in 1161 operations. Number of parenteral exposures per surgeon was extrapolated to three per year. The non-dominant index finger was exposed in 10 out of the 12 parenteral exposures. Based on these data, the risk of contracting HIV infection for a surgeon practising in Zambia for 5 years is 1.5%. The risk for a surgeon working in a western hospital when  $f = 0.23\%$ ,  $n = 20$  per year (5.6% of 350 operations) and  $y = 5$  is estimated at 0.1%. Conclusions: Although occupational exposure rate was relatively low, the HIV seroprevalence was so high that the relative cumulated seroconversion risk for surgeons in tropical Africa is estimated to be 15 times higher than in western countries. This implies that health-care organizations should bear in mind that each year one out of 300 employees working in tropical Africa may become occupationally infected with HIV.

Kanyama I, Mmiro F, Mirembe F, Kaona F, Bagenda D, Siziya S. International Conference on AIDS 1993 Jun 6-11;9:93 (abstract no. WS-C12-2).

ABSTRACT- Objectives: To compare the prevalence of HIV infection among nurse-midwives (NMs), other professional women including hospital nurses (HNs), office workers and teachers (OW/Ts) in the same communities; to compare the prevalence of HIV infection among traditional birth attendants (TBAs) and other women (VLs) in the same villages; and to identify risk behaviours and/or practices that may be associated with HIV infection. Methods: A cross sectional study was done in Uganda and Zambia among NMs and HNs, OW/Ts; among TBAs and age-matched VLs. Socio-demographic data, information on sex behaviour, hospital/traditional practices including skin-piercing injuries, was obtained. Results: Preliminary results at one centre show an HIV seroprevalence significantly higher among the NMs than the HNs (21% vs 12%,  $p = 0.005$ ) but similar to the OW/T (21% vs 18%). HIV seroprevalence among TBAs and VLs were similar (5% vs 8%). Final results and correlation of HIV infection with practices and risk factors will be presented.

Watters DAK. Surgery, surgical pathology and HIV infection: lessons learned in Zambia. Papua New Guinea Medical Journal 1994;37:29-39.

ABSTRACT- In Zambia, 10-15% of urban adults are reported HIV positive, as are over 80% of prostitutes. The HIV seroprevalence rate in a Lusaka hospital's intensive care unit was 21% (27% for surgical and 18% for trauma admissions). HIV-infected patients could be clinically recognized by risk factors or symptoms and signs: weight loss, chronic cough, chronic diarrhea, sepsis, septic arthritis, subacute hematogenous osteomyelitis, a history of sexually transmitted diseases (STDs), death of a spouse or of a child under age 2, recent pregnancy unable to go to term, poor quality or thin hair, appearance of aging beyond years, mental slowness, persistent or unexplained fever, lymphadenopathy, aggressive atypical Kaposi's sarcoma, oral thrush, hairy leukoplakia of the tongue, shingles scars, and scars of maculopapular dermatitis. Common sites for HIV-related sepsis are the female genital tract, anorectum, pleural cavity, soft tissues (e.g., necrotizing fasciitis), and bone and joints. Autologous blood transfusion and use of donor blood screened for HIV antibodies, preferably limited to emergencies, would reduce the likelihood of iatrogenic HIV transmission. Surgeons should wear two pairs of gloves, a waterproof gown, and goggles to protect themselves from HIV transmission. If they have

skin rashes, cuts, or abrasions on the hands or arms, they should not perform operations. Proper cleaning and disinfection of endoscopes are required. The risk of infection from a needle stick is small (< 0.4%).

### **ZIMBABWE**

De Baets AJ, Sifovo S, Pazvakavambwa IE. Access to occupational postexposure prophylaxis for primary health care workers in rural Africa: a cross-sectional study. *American Journal of Infection Control* 2007;35:545-51.

**ABSTRACT-** Background: For many primary health care workers in developing countries, the limited availability and cost of public transport hinders timely access to occupational postexposure prophylaxis (PEP) at referral hospitals. Adapted PEP training and a starter's kit (for human immunodeficiency virus, hepatitis B virus, and syphilis prophylaxis) could improve access. Methods: The evaluation method, based on the 12 steps of the decentralized phase of PEP management, calculated different scores from the responses for 51 anonymous surveys and allowed comparison among different groups. Listed obstacles and clinic visits provided further information. Results: Respondents who received in-service PEP training had significantly higher mean knowledge and confidence scores but no different mean attitude scores than those who did not. The mean total score for those who received the adapted PEP training (10.7 of 12) was significantly higher ( $P = .008$ ) than for those who did not (8.8 of 12). Conclusion: Decentralizing the first phase of PEP management for primary health care workers in rural Zimbabwe attends to an unmet need. The evaluation facilitates checking completeness of course contents, stresses the need to pay equal attention to attitudes toward the referral and reporting system, and identifies specific challenges for delivering PEP in rural settings. The finding may inspire to improve access to PEP for other health care workers and phlebotomists employed in remote areas.