Community Dental and Maternal Health

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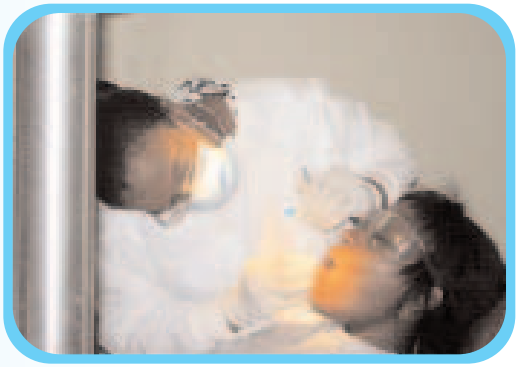
One possible aetiology of preterm/low birth weight (PTLBW) in low risk women could be oral infections, particularly periodontitis. The gum infection provides foci for the spread of bacteria and bacterial products from the mouth to the fetoplacental unit. The inflammatory response produces a by-product (prostaglandin E2) which may stimulate preterm labour and the premature delivery of a low birth weight baby. Treatment of periodontal disease has been associated with reduced incidence of preterm low birth weight in Chile, Venezuela, and the United States.

This study seeks to determine whether or not oral health care in pregnancy can reduce the incidences of preterm low birth weight in Jamaica, and also to document hospital costs incurred at delivery. The information gleaned from the research could guide the formulation of oral health policies for the care of pregnant women, and this action in turn could provide significant social, economic and health benefits for families and the society. This is especially significant as preterm infants consume medical services and are at risk of long term morbidity, as well as mortality.

One thousand (1,000) antenatal women are to be recruited at community health centres in the southeastern region of Jamaica, their periodontal status determined and the socio-demographic characteristics associated with their pregnancy outcome and periodontal status documented. This information will be used to help determine whether preventive care and treatment of periodontal disease can actually reduce PTLBW.

A block randomised intervention trial is in progress at seven health centres in Kingston, St. Andrew and St. Catherine. The women participating in the study will be assigned to either an intervention or non-intervention group, by health centre. All of the women will be interviewed and will undergo a dental examination. The intervention group will be given periodontal treatment and oral health instruction. The non-intervention group will have their dental care needs addressed after delivery. Dental care providers and public health nurses/midwives will screen all women and will provide the necessary care. The women will receive verbal and written information about the study and are required to give their informed consent before recruitment.



Dental health practitioners providing treatment for participants in the study who have been assigned to the “intervention” group.

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Table 1. Progress to date in Intervention and Non-intervention Health Centres

	Intervention	Non-intervention	Total
Expected Sample Size	500	500	**1,000**
Recruited	281	353	**634**
Oral Examinations	170	210	**380**
Already Delivered	116	102	**218**

Data collection commenced in November 2004 and is expected to continue for 18 months. After 10 months of project activity, over six hundred women have been recruited into the study. Of this number, 200 have delivered, with six delivering outside the study area. Oral examinations and treatment have been completed for 380 women (See table 1). St. Jago Park Health Centre in St. Catherine was added in June 2005, as the dental clinic at Duhaney Park Health Centre was closed for repairs in April 2005. ■

Participants being prepared for dental examination.

A Paediatric and Perinatal HIV/AIDS Leadership Initiative in Kingston, Jamaica

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Paediatric and Perinatal HIV/AIDS remain significant health challenges in some Caribbean countries. This completed research project sought to develop a collaborative approach to the prevention, treatment and care of HIV infected pregnant women and children in order to address the paediatric and perinatal HIV/AIDS epidemic in Jamaica. Work was carried out by a team of academic and government health care personnel, comprising paediatricians, obstetricians, public health practitioners, nurses, microbiologists, data management and information technology personnel. Through the use of this collaborative approach, it was shown that the mission to reduce mother-to-child transmission of HIV and improve the quality of life for those already living with and affected by HIV/AIDS could be achieved. Funding for this project was secured from several sources, namely, the International Leadership Award from the Elizabeth Glaser Paediatric AIDS Foundation and Pfizer Foundation, the University of the West Indies and the Jamaican Ministry of Health.

The project was implemented using a five-point plan over a three-year period, and involved directing and training a core group of paediatric/perinatal HIV professionals to serve Kingston and St. Catherine, the area that would be used as a model for the rest of Jamaica. One significant achievement of the project was the implementation of the "Prevention of Mother to Child" programme based on the use of a modified short course zidovudine regimen, which led to a significant reduction in perinatal transmission of HIV. A unified parallel programme for identifying and providing care for HIV-exposed and infected children, was also developed.

The multidisciplinary team approach of this project facilitated the building of research capacity with an emphasis on the development of a strong outcome-based research agenda and the implementation of clinical trials. The team has forged links with four paediatric HIV outreach clinics outside of the Kingston and St. Catherine region and participated in activities at several weekly clinics for women and children at six sites. The work of the team was recently published in a dedicated issue of the *West Indian Medical Journal* (Vol 53, No. 5:271-365; Oct., 2004).

Another positive outcome of the project has been the ongoing collaborative efforts with several institutions, namely, the University of the West Indies, the University Hospital of the West Indies, Kingston Paediatric and Perinatal HIV/AIDS (KPAIDS) Programme, the National AIDS Programme of the Ministry of Health, Victoria Jubilee Maternity Hospital, Spanish Town Hospital, Bustamante Hospital for Children, Comprehensive Health Centre, National Public Health Laboratory, South East Regional Health Authority, all from Jamaica. In addition, the KPAIDS programme has entered into negotiation with the United States' National Institutes of Health and the National Institutes of Child Health and Human Development (NIH/ NICHD) to become part of a regional and international paediatric and perinatal research cohort and established site for clinical trials of drugs and vaccines. ■

Antibiotic Resistance in Strains of Neisseria *Gonorrhoeae* Encountered in Jamaica

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Gonorrhoea is a common sexually transmitted infection and a major public health problem in Jamaica and the wider Caribbean. Antibiotic resistance in strains of Neisseria gonorrhoeae has changed dramatically in the past six decades and varies widely in different parts of the world. The aim of this research project is to evaluate the efficacy of various antibiotics against gonococci isolated from patients at the University Hospital of the West Indies, Jamaica. The data will be helpful in the effective management of patients with gonorrhoea in the hospital and the country.

Based on research findings to date, it has been found that the currently recommended antibiotic, ceftriaxone is highly effective against all gonococci studied so far. In addition, resistance to older antibiotics such as penicillin and tetracycline is decreasing compared to what they were some years ago.

Some of the preliminary findings were presented in the 11th International Congress on Infectious Diseases (11th ICID) held in Cancun, Mexico in March 2004, and the Abstract of the paper was published in the International Journal of Infectious Diseases (Intern J Infect Dis 8 (Suppl 1): S65 2004). ■

Bacterial Fc Receptors: Applications in Immunodiagnosis and Immunogenecity Studies

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There are very sensitive techniques, such as Enzyme-Linked ImmunoSorbent Assays (ELISA) and Western Blotting that are used in the estimation of specific antibodies against antigens, that may be helpful in the diagnosis of infectious diseases. In order to carry out these procedures, the preparation of specific conjugates that involve the immunization of laboratory animals with the antigen or antoglobulin, the immunoglobulin purification and conjugation to an enzyme are required. Bacterial Fc-receptors may be used as universal conjugates and so avoid the preparation of the specific conjugates. This is especially important when antiglobulin conjugates for wild and domestic species of an animal in a specific region or country are not commercially available and, if available, are expensive. *Salmonella and E coli* infections, as well as other bacterial and viral infections, affect the poultry and mammalian species in Caribbean and Central American countries. The completed research project sought to find appropriate markers among the Fc bacterial receptors for studying their binding affinity for immunoglobulins and also to apply them as immunodiagnostic tools in infectious diseases.

Under the project, several bacterial Fc-receptor conjugates were synthesised and used in the development of assays (ELISA) which could detect the presence of antibodies to various bacteria in egg yolks and human sera. Work was also carried out to document the presence of anti-salmonella antibodies in egg yolks from several avian species and in sera from humans. The research also entailed the production of antibodies (Ab1) to HIV virus coat proteins and protein A from *Staphylococcus aureus* by immunising six-month-old layer chickens. The findings showed that in the post-immunization period, the eggs that were collected from these chickens contained high titres of antibodies to these antigens. These antibodies (Ab1) could be purified from the entire egg but were present in larger amounts in the yolks. Feeding of these eggs - hyperimmune eggs - to cats, rats and chickens resulted in the production of antibodies (Ab2 and Ab3) capable of neutralising the original antigen and which could be purified from sera and egg yolks respectively.

The use of chickens to produce antibodies (Ab 1 or Ab 2 and Ab3) is particularly important as the use of eggs as a source of antibodies decreases the need for bleeding and sacrificing animals. The administering of egg and egg yolk preparations to animals (for experimental purposes) or to humans is also easier. The *hyperimmune* eggs which contain either Ab 1 or Ab2 and Ab3 can be considered as potential sources of therapeutic antibodies and their consumption by humans could be beneficial for the treatment of specific infections or in the maintenance of general good health. The delivery of antimicrobial therapy could thus be easier and more user friendly.

The use of hyperimmune eggs as oral vaccines could also be advantageous because of the large amount of antibodies produced, the relatively low cost of production and the reduction of antigenic variation, toxicity and danger implicit in the use of live vaccines. Additionally, in terms of safety, preparations of the antibodies to HIV virus coated proteins could also be used to replace positive human samples that are currently used as positive controls in routine assay procedures. ■

The Molecular Characterisation of Derbids and the Transmission of Phytoplasma associated with Lethal Yellowing Disease of Coconuts in Jamaica

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Phytoplasmas are associated with a number of plant diseases including the Lethal Yellowing (LY) Disease in coconuts. The insect (cixiid), Myndus crudus was shown to transmit LY phytoplasma in Florida and has been implicated as the vector in Jamaica, given its status as the island's most abundant plant hopper. However, extensive transmission trials have failed to confirm phytoplasma transmission in the island. Furthermore, the pathogen cannot be obtained in pure culture *in vitro* although years of research work have been undertaken. This has slowed the progress of their identification, detection, characterization and control. The objectives of this completed research project were therefore to identify alternate host plant(s) acting as reservoirs for phytoplasma associated with LY disease and also to undertake transmission studies of phytoplasma from insect vector(s) to host plants.

As part of the research (which was conducted in collaboration with the Coconut Industry Board), molecular tools such as nucleic acid hybridisation, polymerase chain reaction (PCR), followed by restriction fragment length polymorphism analysis (RFLP) were applied to the identification of potential phytoplasma vector species. Over 600 plants from 23 families and 46 species were tested for the presence of phytoplasma. Of the 46 species tested, 12 were found to be hosts of the LY phytoplasma. In addition, two different strains of the phytoplasma were identified and a new leafhopper species belonging to the genus Derbidae was identified as a potential host of the LY phytoplasma. The whitefly Bemesia tabaci was also found to be capable of acquiring and transmitting the LY phytoplasma to three different weeds.

These findings have been documented in the journal article of Brown, S. E., Been, B. O., Johnson, K., and McLaughlin, W. A. 2004a, in *"Identification of lethal yellowing group (16Sr IV) phytoplasmas in the weeds Stachytarpheta Jamaicensis, Macroptilium lathyroides and Cleome rutidosperma in Jamaica"* in *Plant Disease* which has been accepted for publication.

Information produced from the research on potential vector(s) and sources of LY can also be used to predict the risk of new infections in one crop or in multiple crops, to monitor disease progress, and to develop control methods. This information is extremely useful as the sudden emergence of the phytoplasma related disease in coconuts and their rapid spread is cause for concern, especially because they have reached such epidemic proportions. The study of epidemiological factors, especially the ability of phytoplasma to be vectored, is a prerequisite for understanding the emergence and spread of this disease, as well as devising control measures. ■

Impact of cockroach infestation on asthma symptoms in Jamaican children

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There are about 50 species of cockroaches in Jamaica. The main domestic cockroach species, *Periplaneta Americana and Blatella Germanica* produce several potent allergens. International studies have established the link between asthma, a common childhood condition in Jamaica, and the sensitization to indoor allergens including dust mite, moulds and cockroaches. However, the role of cockroach allergen as a trigger for asthma in Jamaican children has not been explored.

This research project aims to study the impact of cockroach infestation on asthma symptoms in children and its relationship to sensitization, domestic cockroach burden and parental knowledge and practices. The study has been carried out as a multidisciplinary collaborative project between the Departments of Obstetrics, Gynaecology & Child Health, Community Health & Psychiatry, and Life Sciences at the University of the West Indies, Mona Campus and the Faculty of Health & Applied Sciences at the University of Technology, Jamaica.

To date, two hundred and eighty seven (287) children residing in a low income suburban community have been recruited through their local health centre. Face-to-face interviews were conducted with parents and guardians regarding asthma and allergy history and household cockroach infestation. Skin testing to assess sensitization to indoor allergens was completed on two hundred and eighteen (218) children or 76% of the sample. Household evaluation for cockroach burden and indoor allergens are currently being undertaken.

Key findings from the study indicate that the reported prevalence of asthma was 23% and the lifetime prevalence of wheezing was 43%. The study also found that 59% of children were living in homes where cockroaches were reported seen in the previous month. However, 71% of guardians were unsure about the role of cockroaches as a trigger for asthma. The study also showed that there was a significant association between the perception of cockroaches as a trigger for asthma and having a child with asthma. It was also found that house dust mite and cockroach antigen sensitisation were both prevalent in this population.

On completion of fieldwork, the findings should provide further data for a more comprehensive evaluation of the impact of cockroach infestation and sensitisation on asthma symptoms in Jamaican children. ■

Asthma Cockroach Study

Gender Differences and Neuroendocrine Regulation of Cognition

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Improvement in health-care worldwide has given rise to an increase in the average life expectancy and an accompanying rise in senile dementia. Alzheimer's disease is the most common form of dementia among older people and is characterized by a progressive loss of cognitive ability, memory and mood. This disease is more likely to affect post-menopausal females than males of a similar cohort. Estrogen (the female hormone) has been reported to delay or reduce the severity of Alzheimer's disease in females. Research has shown that it provides neuroprotection against cognitive decline in females. However, very little is known about the role of estrogen in the aged male brain, and whether testosterone (the male hormone) has any neuroprotective effects.

The aim of this research project is therefore to investigate the effects of estrogen and testosterone on specific aspects of learning and memory in both aged male and female rats; and to assess whether testosterone provides any neuroprotection on learning and memory in the aged male brain. It is hoped that the findings of this study may help to clarify the mechanism of action of estrogen in the aetiology of senile dementia and provide a better understanding of the management of this disease in both males and females.

An important part of this research is the ability to assess minute quantities of gonadal hormones in the rats that were studied. The technique of chemiluminescence was utilized in order to achieve detectable physiological levels of these hormones in the rats. This technique utilizes a luminometer that is constructed to measure the maximum available light emitted from extremely small samples. Its superior sensitivity, low background and wide dynamic range distinguish it from other analytical techniques. Funding for the purchase of a luminometer for this study was secured through the Mona Research Fellowship Programmes' New Initiative Fund.

During the study, the rats were trained in an operant system, utilizing a complex discriminative learning task. Upon attainment of a high score on the correct performance rate, some of the rats underwent surgery to remove the influence of the gonadal hormones on the brain. Memory was then assessed in all of the animal groups. Results of the study to date have shown that estrogen provides significant enhancement of learning and memory in both aged male and female rats. Interestingly, testosterone appears to have no neuroprotective effects on cognition.

The findings have so far been presented at the 13th Annual Research Conference of the Faculty of Medical Sciences, held November 10-12, 2004; and at the 35th International Conference of the Society of Neuroscience, held November 12-16, 2005 in Washington, D.C., USA.

Publications emanating from the research include:

• "The Effect of Oestrogen on Discriminative Learning and Memory in Aged Male and Female Rats." *West Indian Medical Journal 2004*; 53 (Suppl. 5): 19.
• "Effects of Estrogen and Testosterone on Rate of Learning and Extinction Time in Negative Patterning Discrimination in Aged Male Rats." *Society for Neuroscience Abstracts Viewer* 2005; 417.10. ■