

**2002 Annual Report**

***Mission Statement:***

***Founded in 1994, WINDREF seeks to advance health and environmental development through multi-disciplinary research and education programs. WINDREF strives for program excellence by promoting collaborative relationships between internationally recognized scholars and regional scientists and by adhering to the highest ethical and academic standards in the design and conduct of research.***

***WINDREF'S primary goals include:***

- ***To provide a scientific resource center capable of coordinating international collaborative research of the highest caliber in the areas of medical and veterinary public health, anthropology, ecology, marine and terrestrial biology and ethics.***
- ***To provide a first rate academic opportunity to scientists from the Caribbean and around the world offering unique research opportunities to enhance the knowledge and welfare of local and international communities.***
- ***To conduct applied scientific research for the benefit of community and health development at the local, national and international levels.***
- ***To share relevant scientific information with local and international communities.***

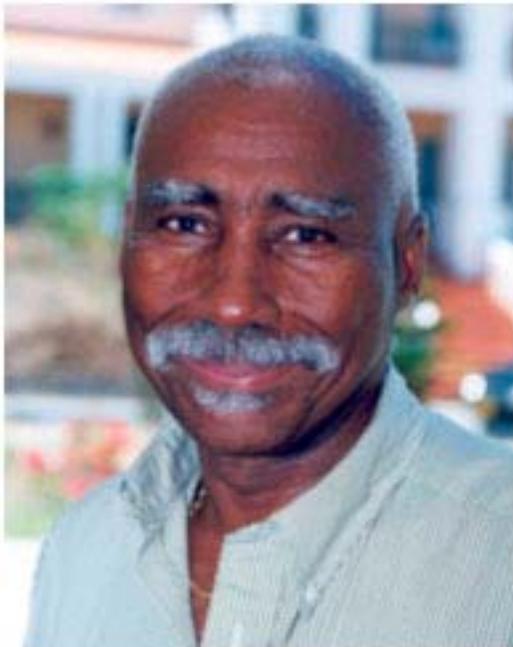
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## 1.0 Introduction

It is my great pleasure to present the 9<sup>th</sup> Annual Report of the research activities of the Windward Islands Research and Education Foundation (WINDREF). WINDREF was registered in the USA with the Internal Revenue Service 501 (C) (3) as an educational non-profit foundation in 1994. WINDREF is also registered in Grenada as an NGO and is registered in the UK as a charitable Trust. In 2001 WINDREF established an office in St Vincent. We congratulate the Associate Director of WINDREF (St Vincent), Sir Frederick Ballantyne, who received a knighthood in the 2003 New Year's honors list for his services to St Vincent. Sir Frederick Ballantyne also became the Governor General of St Vincent and the Grenadines.



**Sir Frederick Ballantyne, Governor General, St Vincent and the Grenadines.**

We also congratulate WINDREF's community health nurse, Mrs Perrott, who

was also recognized in the 2003 New Year's honors list and received an MBE for her services to Grenada.



**Nurse Perrott, MBE**

This has been another successful year for the WINDREF research institute. The core programs on rheumatic fever and dengue in Grenada, lymphatic filariasis in Guyana and cystic echinococcosis in Africa has continued. Funding for these activities has been generously donated by the Bill and Melinda Gates Foundation and DFID through the Liverpool Support Center, GlaxoSmithKline (Lymphatic filariasis), Fogarty (which covered 4 student scholarships to Guyana (LF), the Lounsbery Foundation (Rheumatic fever), RBTT (Grenada- RF), Charities Aid Foundation, Ambassador Lawson (New York Academy of Sciences visit) and a number of other individual donors. We would like to thank them all for their generous donations.

The generous donation from the Liverpool Support Center has enabled

WINDREF to provide graduate scholarships to Guyana to help strengthen the academic side of their Lymphatic Filariasis Elimination Program (LFEP). A Memorandum of Understanding has been agreed between St Georges University and the University of Guyana to recognize each others degrees. With this agreement in place the above funds have supported an MPH student Dr Shanti Singh, MD and a PhD candidate, Dr Shamdeo Persaud, MD, MPH (head of the Guyana LF task force). Tess McPherson, MB BS, a dermatologist received support for 16 months to work on the LFEP in Guyana from The Liverpool Support Center through WINDREF. Support from GlaxoSmithKlyne (GSK) facilitated visits by a number of WINDREF Research Fellows and scientists to Guyana in January to help prepare the groundwork for selection of the sentinel sites for the LFEP. Additional support from a Fogarty grant made available through collaboration with Texas A&M also facilitated visits to Guyana to help with mapping of the sentinel sites. WINDREF also provides a scholarship to Karen Scholer, a PhD candidate working on dengue in Grenada.

There were a number of significant changes made to the WINDREF boards in 2002. Lord Soulsby of Swaffam Prior assumed the chairmanship of WINDREF (UK).

We are fortunate indeed to have an individual of Lord Soulsby's stature to take over in the UK. His illustrious career in Veterinary Schools, on both sides of the Atlantic, and his global perspective on so many topics will serve WINDREF well.

A member of WINDREF's Board of Directors, the Hon Ambassador Bartholomew Lawson MD (Hon) was made Ambassador at Large for Grenada. Ambassador Lawson generously provided a

grant to WINDREF to help bring the Annual meeting of the New York Academy of Sciences to Grenada in April.

### **The Hon Ambassador Bartholomew Lawson, MD (Hon).**

During 2002, WINDREF's research scientists and fellows continued to work on the core programs of the Research Institute which include studies on dengue and rheumatic fever in Grenada, lymphatic filariasis (LF) in Guyana and cystic echinococcosis in Africa. In Grenada WINDREF's long standing association with studies on medicinal plants was continued with a project to examine their use in the treatment of diarrhea. Studies on HIV in rural areas of Botswana continued and the study on end of life care in Grenada was completed.

The third WINDREF lecture was presented by Lord Walton of Detchant. The title of his lecture was "*A Doctor in the house*".

*In closing, I would like to extend my thanks to our many donors, Board of Directors, Board of Trustees, Scientific Advisory Board, Senior Research Fellows, Research Scientists, Staff, St. George's University faculty and other collaborators. I also thank the Government Ministries in Grenada, St. Vincent, Guyana, Morocco and Botswana for their contributions to our research activities during We look forward to developing new links in 2003 and to strengthening the valued partnerships we have developed in the past*

*nine years. 2003 marks our 10<sup>th</sup> year of operations and we are hoping it will be yet another year to remember.*

*Calum N.L. Macpherson  
Director*

## 2.0 The WINDREF Research Institute

The WINDREF Research Institute is located on the strategically sited grounds of St. George's University at its True Blue campus in Grenada West Indies.



### *WINDREF Research Institute, Grenada*

A summary of the over forty different research projects, on a variety of different topics, has been completed at the Institute. They are listed at the back of the 2002 Annual Report.

### 2.1 The WINDREF Research Institute- Board of Directors

- Dr Keith B. Taylor, D.M., F.R.C.P. (President)
- Dr Calum N.L. Macpherson Ph.D. D.I.C. (Vice President)
- Ms Margaret Lambert M.A. (Secretary/Treasurer)
- Dr Allen Pensick, PhD
- Ambassador Bartholomew Lawson
- Ambassador Joseph Zappala.

### 2.2. *WINDREF St Vincent and the Grenadines Board of Directors*

- Dr Ed Johnson, M.D., Director
- Sir Fredrick Ballantyne, M.D., Associate Director

### 2.3 The WINDREF Research Institute

#### Scientific Advisory Board

- Sir Frederick Ballantyne M.D.
- John R. David, M.D.
- Edmond Fischer, DSc
- C. James Hospedales M.B., B.S, MSc
- Sir Malcolm MacNaughton M.D., L.L.D., F.R.C.P.G., F.R.A.C.
- Calum Macpherson Ph.D, DIC
- Thomas W. Meade C.B.E., D.M., F.R.C.P., F.R.S.
- Graham Serjeant, MD, FRCP, CMG
- Sir Kenneth Stuart M.D.,D.Sc. (Hon),
- MS Swaminathan D.Sc.
- Keith Taylor D.M.,F.R.C.P.
- Sir Gordon Wolstenholme O.B.E., M.D., L.L.B., F.R.C.P.
- **John B. Zabriskie, M.D.**

### 2.4 The WINDREF Research Institute-

#### Research Fellows

The following investigators have been appointed to the Windward Islands Research Institute as research fellows and are currently conducting collaborative research projects.

#### 2.4.1 Senior Research Fellows:

- Michael Fisher, Ph.D. - Merck Research Laboratories
- Paul Garner, Ph.D. - Liverpool School of Tropical Medicine
- Mary Glenn, Ph.D. - Humboldt State University

- Duane Gubler, Sc.D.-CDC Fort Collins
- Larry McCrorey Ph.D.-University of Vermont
- Ruth Milner M.Sc. - Vancouver Hospital
- Stephen Morse, Ph.D.-Columbia University
- Leslie Ramsammy, PhD – Minister of Health, Guyana
- Robert E. Sturrock Ph.D, DIC.-London School of Hygiene and Tropical Medicine
- Stanley Weiss, M.D.-University of Medicine and Dentistry, New Jersey
- Alan Kocan, Ph.D.-Oklahoma State University

#### 2.4.2 Research Fellows

- Glennis Andall, PhD
- Michael Anson, PhD
- Michael Bunbury, MB BS
- Orazio Giliberti, MD
- Svetlana Kotelnikova, PhD
- Theresa McCann, MPH, PhD
- Barrymore McBarnette, MD
- Craig McCarty, PhD
- Shamdeo Persaud, MD, MPH
- Shanti Singh, MD

#### 2.5 WINDREF Research Institute-Research Scientists

Research Scientists appointed to the Research Institute include: Sadiq Al-Tamini, Sumita Asthana, Yitzhack Asulin, Charles Avgeris, Bishara Baddour, Jean-Pierre Barakat, Keith Bensen, Matthew Boles, Karen Brennan, Ella Cameron, Mmakgomo Coangae, Rae Connolly, David Evans, Scott Forman, Vamsi Guntur, Anthony Junck, Sebastian Krietschitz, Erik Lacy, Setshidi Makwinja, Baher Maximos, John McCormack, Jessica Morlok, Trevor

Noel, Andrew Nagangast, Yolanda Ng, Andre Panagos, Sandeep Pulim, Sean Ramsammy, Tarek Refaie, Alan Rhoades, Laura Robinson, Karin Schioler, David Tortugal, Derrick Tlhoiwe, Sarah Treter, Nghia Truong, Frank Van Natta, Ru-Amir Walker, Colleen Wunderlich, Elliot Yung.

#### 2.6 The WINDREF Research Institute-Staff

Mrs. Isha English continues in her role as Executive Secretary, assisting scientists with all administrative aspects of their research projects. Mr Trevor Noel (research scientist) and Nurse Perrott complete the staff in Grenada.

### 3.0 WINDREF (USA)

WINDREF (USA) was established to facilitate coordination of the USA activities and to administer charitable donations from the United States to the WINDREF Research Institute. As a non-profit organization, its goal is to enhance the development of WINDREF's research and educational programs. The offices are located on Long Island in New York to provide administrative and logistical support for the WINDREF Research Institute. Ms Donna Damm is the program coordinator in the New York Office.

### 4.0 WINDREF (UK)

WINDREF (UK) was set-up in Winchester, England in 1999 to promote collaboration between WINDREF scientists and academic centers of research in the United Kingdom. It is

hoped that by reaching out to a larger scientific community, WINDREF will broaden its research opportunities by forming collaborations with scientists from the European community.

#### 4.1 WINDREF (UK) - Board of Trustees

*A Board of Trustees was appointed in 1999 to oversee the activities of WINDREF (UK). Our distinguished Board of Trustees members were selected for their scholarly academic accomplishments and international acclaim. Members include:*

- Lord Soulsby of Swaffam Prior M.A., Ph.D., D.Sc., D.V.M., F.R.C.V.S (Chairman)
- Sir Kenneth Calman K.C.B., F.R.C.S.E.
- Richard Summerfield M.B., B.Chir., M.A., F.R.C.A.
- Sir Kenneth Stuart M.D., D.Sc.
- Keith B. Taylor D.M., F.R.C.P.
- Calum Macpherson Ph.D, D.I.C. (Ex Officio)

#### 4.2 WINDREF (UK)-Staff

Ms. Sue Huntington continues as Executive Secretary. Ms. Huntington provides the administrative support and expertise that is central to WINDREF's (UK) fundraising, administrative and collaborative activities.

#### 5.0 Human Subjects Institutional Review Board (IRB)

Members:

- Sir Paul Scoon (Chairman)
- Cheryl Cox Macpherson (Secretary)
- Otto George
- Martin Baptiste
- Alister Antoine

- Sister Anastasia
- Doreen Murray
- Lloyd Noel
- Ann-Marie George
- Keith Taylor (*ex officio*).

#### 5.1 Protocols reviewed by the IRB in 2002

*For the first time since inception of the IRB, there were no new WINDREF protocols submitted for IRB review. There was a request for further expansion of Schioler's study on dengue, which was reviewed and approved by the IRB officers. This request included a letter to the officers, and a proposed consent form. The request was to do dengue tests on stored blood samples from the existing rheumatic fever project (currently coordinated by Trevor Noel at WINDREF).*

Researchers outside WINDREF submitted two proposals in December 2001 (after the 2001 annual report was written) and one was received in February 2002. Due to the erratic timing the Secretary gave expedited review and approval for each of these. One involved an unlinked, anonymous survey of students in local schools by G Bonaparte (supervised by Drs Prabhakar and McCann) that had no risk of harm. One aimed to enroll diabetes patients in setting up a database within Ministry of Health for prevention and treatment programs (proposed by B Braithwaite working with A Antoine). There was no risk to participants and the study was geared to improving both health services and individual patients well being. One involved one on one interviews of women in Botswana to examine attitudes about HIV, and the data was maintained

anonymously (proposed by T Thliowe and supervised by O Marshall and ZA Marshall).

In 2003, WINDREFs IRB will be folded into the new university wide SGU IRB Chaired by Dr Loren Nelson. Officers of WINDREFs IRB (Sir Paul Scoon and Dr C Cox Macpherson and Ann Marie George) will serve as officers of the SGU IRB, which will hold a training and orientation session in February 2003. Other WINDREF IRB members who wish to continue their roles have been invited to apply for membership on the SGU IRB. We are grateful to all members who have served in the inauguration of research ethics in Grenada, and who have given so much of their time and energy to protecting human research participants.

Submitted by Cheryl Cox  
Macpherson, PhD

IRB Secretary

disease burden but have only 10% of the global health care funds at their disposal.

Rheumatic fever (RF) and the heart damage that can follow were responsible for 3,600 deaths in the U.S. in 1999, which has a high standard of health care and therapy. RF is a non-suppurative, immune mediated disease affecting principally children between 5–15 years of age. RF generally follows an infection, usually pharyngeal in origin, by group A, Beta-hemolytic streptococci. The potential sequelae can be extremely disruptive and detrimental to the quality of everyday life. In spite of decades of research, the exact mechanisms whereby damage to the various organs, especially the heart, occurs is still unresolved. Cardiac involvement can lead, decades later, to permanent valvular deformity.

Five main objectives for the initial phase of the RF Eradication project (November

## 6.0 Current Research Projects

WINDREF's core research projects on dengue (1995), rheumatic fever (2000) in Grenada, lymphatic filariasis (1999) in Guyana and cystic echinococcosis (1999) in Africa continued through 2002 and several other projects continued during the year. The projects currently being undertaken are briefly reviewed below. No new WINDREF projects started in 2002.

### 6.1 Communicable Diseases

#### 6.1.1 Rheumatic Fever (A1)

People living in developing regions of the world experience 90% of the world's

2000 – October 2002) were instituted and successfully completed, viz:

- 1) Establishment of database of all old RF patients and documentation of all new cases. An important feature of this database was to identify the parishes or towns where most of these cases occurred.
- 2) Establishment of a rheumatic fever clinic where these patients could be followed on a monthly basis. The objective was not only to foster trust between physicians, patients and families but also to assure compliance of secondary prophylaxis to prevent recurrences of the disease.
- 3) Institution of a streptococcal surveillance in which 50 children in different age groups from 27 primary school (ages 5-14) were randomly selected and throat swabs and 5.0 ml of blood was collected from each child. All children whose throat cultures tested positive for beta hemolytic streptococci were treated with a full dose of penicillin, irrespective of which group of streptococci was isolated.
- 4) Institution of a social mobilization program was considered a very important feature of this program. Descriptions in newspapers, television and on radio were used to convey the importance of this disease in the country and how it could be eradicated.
- 5) Participation and ownership of the program locally was obtained by involving the Ministry of Health, public health personnel, physicians and nurses, teachers and principals. Their input was crucial to the success of the program.

The last year of the eradication program has allowed the education and awareness team to travel to both Carriacou and Petit

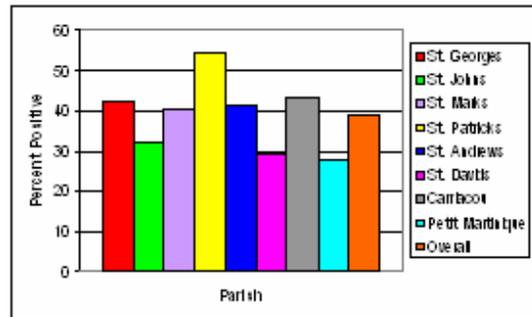
Martinique reaching the five target schools for those islands. Education messages have been introduced to the children, teachers and principals of 43 primary schools and is scheduled in the remaining 10 schools on the island of Grenada.



Education Team accompanied by principal and several students at St. Thomas Aquinas R.C. school in Petit Martinique.



Trevor Noel presenting RF eradication materials at Grand Anse R.C. School.



**Figure 1: Percent of positive ASO titers for the 1,377 blood samples taken from students aged between 5 and 15 years in 26 schools in the six parishes in Grenada, Carriacou and Petit Martinique.**

All children, screened through the target school surveillance, with positive ASO titers and throat swab samples have been treated at the RF clinic. Consultation and medication are free of cost through the clinic. Dr. Nelson (local pediatrician), Dr. Amador, and the WINDREF Community Nurse (Sr. Geraldina Perrotte) run the RF clinic every fourth Thursday of the month.



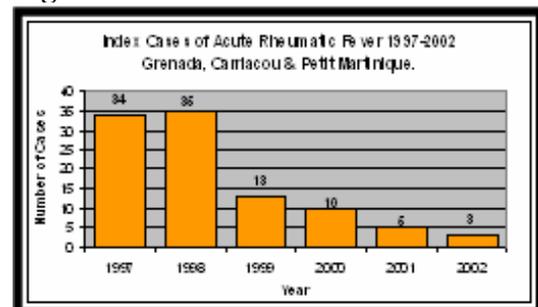
**Dr. Amador examines a patient's throat at the RF clinic in St. George's.**



**Dr. Nelson listens for sound of a heart murmur while examining a patient diagnosed with rheumatic fever.**

As can be seen in Figure 2 the annual incidence of cases of RF has been reduced from a high of 35 to a low of 3 identified to date for 2002. This rapid decline in incidence coincides with the onset of the current program (2000) and we feel can be attributed to the implementation of the various activities of the program. That RF is amenable to purturbation is evidenced from its disappearance from developed countries and its dramatic decline with the implementation of this program in Grenada. Similar success in developing countries has been recorded in Trinidad and Tobago.

**Figure 2.**



During the past year Nurse Geraldina Perrotte has undertaken contact tracing for all positive throat swab and ASOT students who were treated at the RF clinic. Contact tracing involves the testing of all persons that frequent the child's living environment (nuclear and extended family). It is extremely important in preventing recurring bouts of infection as well as identifying members of the family that could be potential carriers of streptococcal bacteria. Furthermore, contact tracing allows the RF team to monitor

compliance with treatment for streptococcal infections.

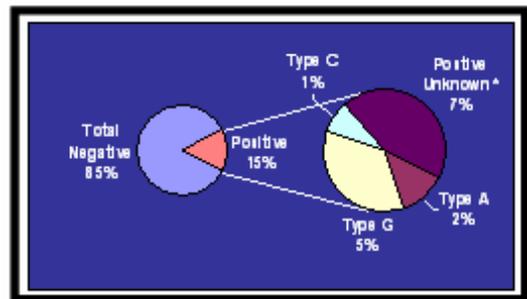


**Community Nurse Perrotte swabs a family members throat in her contact tracing.**

The preliminary results of the school surveillance revealed a low prevalence (%) of type A beta hemolytic streptococci but interestingly a quite large proportion of type G hemolytic streptococci (Figure 3). It has been noted that essentially identical findings in the Aboriginal population of the top of the northern territory in Australia. They also reported a low group A streptococcal recovery and a large number of type G streptococci isolated from throat swabs. These findings suggest that the whole question of the virulence of type A and G streptococci require reevaluation and this study is proposed for the second phase of this program.



**Trevor Noel viewing culture isolation at WINDREF.**



**Figure 3:** Distribution of streptococci strains. The positive unknown portion has yet to be confirmed by the University of Minnesota but it is hypothesized by primary testing that the distribution will closely resemble that seen previously.

#### Prospective WINDREF Plans.

- 1) To continue to evaluate the role of surveillance in the student population studied and to continue to monitor the extent of the decline of the incidence of RF in Grenada. Our aim is to reduce the number of new cases of RF to one or less per year.
- 2) To produce guidelines for the implementation of the RF eradication

- model developed in Grenada.
- 3) We will introduce the successful RF elimination model to a neighboring small island nation, St. Vincent, an island nation approximately 76 miles north of Grenada has been selected due to its close proximity to Grenada and its high prevalence of RF which appears to be similar to that of Grenada prior to the introduction of this program. (grant dependant)
  - 4) We intend to use the additional experience gained in St Vincent to construct a surveillance model, which could be implemented in any developing country where RF occurs. The comprehensive guidelines will be designed for implementation in larger developing countries such as in India, Latin America, Asia and Africa, where “islands” of RF infection still occur.
  - 5) We will explore the hypothesis that group G streptococci isolated in Grenada and not usually associated with RF have acquired “rheumatogenic” properties normally associated with group A streptococci. Specifically we will use gene probes for both group A streptococcal exotoxins and bacteriophage gene probes to determine whether group G and group A streptococcal strains isolated from Grenada’s school children share similar genes.
  - 6) The effectiveness of treating all streptococcal positive patients will be assessed for its overall contribution to the elimination program.

*Submitted by Trevor Paul Noel  
Research Scientist*

#### 6.1.2 Dengue in Grenada. (A2)

### Background

Dengue is a viral disease endemic to many

of the tropical and subtropical regions of the world. It is caused by one of four serotypes, termed DEN-1, DEN-2, DEN-3 and DEN-4. Symptomatic infection by any of the serotypes may manifest as a mild febrile syndrome, dengue fever (DF), or dengue hemorrhagic fever (DHF). Dengue fever is a self-limiting febrile condition estimated to affect 50 to 100 million people each year. Dengue hemorrhagic fever is less common but far more serious, as it can lead to dengue shock syndrome (DSS), a complication reported to cause more than 25,000 deaths annually. Sequential infections are possible as challenge by one serotype induces homotypic immunity but incomplete cross protection. Severe DHF/DSS is generally associated with secondary infections caused by certain strains of each serotype.

Dengue is widespread throughout South and Central America as well as the Caribbean basin. The disease activity in this region has intensified considerably during the past two decades, as epidemics of DF and DHF have become larger and more frequent. Despite the noticeable increase in disease activity, dengue remains grossly underreported as most of the affected countries lack active surveillance systems with adequate laboratory support.

### Aim

*The aim of this project has been to establish a dengue diagnostic laboratory, as the basis of an active disease surveillance system in Grenada. Secondly, to determine the strains of circulating serotypes, their geographic origin and possible virulence. Finally, to identify possible demographic and geo-*

***ecological determinants of disease distribution.***

***Following is a brief report of some of the preliminary results obtained since the implementation of the diagnostic laboratory service.***

***Introduction of the Dengue Diagnostic Laboratory***

Virological and serological diagnostic techniques were established at the WINDREF laboratories and tried on cases presented at the University clinic, during the year of 2000. Permission to extend the diagnostic service to the general medical community was obtained from the Chief Medical Officer by January 2001. Visits to the General Hospital, key medical stations, health centres and surveillance doctors were subsequently carried out in collaboration with the Division of Epidemiology, Ministry of Health (MOH). All visits included verbal introduction of the diagnostic service as well as dissemination of written guidelines, investigation forms and blood collection items. Letters of introduction were also submitted to all private clinics on the Island.

**Sample referral and test reporting**

A system for sample referral was established in collaboration with the General Hospital Laboratory.

Blood samples from patients who presented with symptoms of suspected dengue (as designated by WHO) were submitted to the Dengue Diagnostic Laboratory along with investigation forms specifying observed symptoms, disease phase, place of residence and recent travel activity.

Analyses were performed according to the sample status and results returned to the

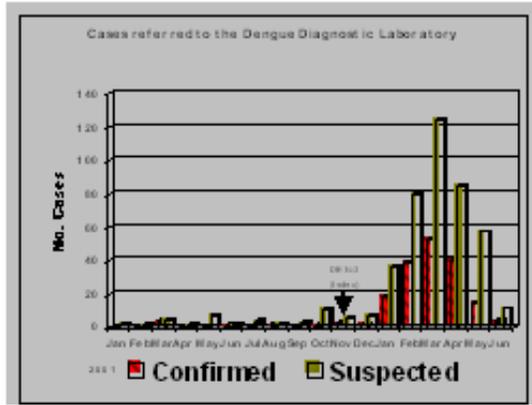
referring physician or nurse, generally within one week of sample referral. All test results were notified to the Division of Epidemiology as part of the active surveillance efforts.

**General Results**

The Dengue Diagnostic Laboratory was introduced to the general health community at the beginning of year 2001. By the end of that year the laboratory had received blood samples from a total of 54 suspected cases of which 12 were IgM positive (serotype unknown) and three tested positive for DEN-3 by RT-PCR and virus isolation. The three acute cases were identified within the same week of November and represented the first detection of DEN-3 transmission in Grenada.

During the surveillance period, January to July 2002, the Dengue Diagnostic Laboratory received a total of 394 cases of suspected dengue, of which 172 were confirmed as acute (126) or presumptive acute (46) (Figure 1). Serotype 3 was detected in 115 cases while three cases were identified as DEN-2 infections. One DEN-3 case was diagnosed as DHF while all other cases (suspected as well as confirmed) reported symptoms of classic DF. Eighty-six percent of the acute cases were identified as secondary infections including the DHF case. There was no significant difference in reported symptoms of primary and secondary infections, except for those of the DHF case.

**Figure 1**



support of these efforts St. George's University hosted a special session on dengue as part of the Continued Medical Education programme. Epidemic transmission of DEN-3 was not averted in 2002 despite the various prevention efforts undertaken by the health authorities. The two months gap between the first report of DEN-3 circulation and the subsequent implementation of response measures was possibly too wide, leaving the new serotype a comfortable head start. It is evident from this experience that active laboratory surveillance must be linked to a solid prevention system, which in times of increased activity prompts more aggressive and immediate response mechanisms.

Based on the experience of this project a permanent dengue laboratory service has now been established at WINDREF. The laboratory will provide diagnostic service for the entire medical community free of basic charges. The close collaboration between the Diagnostic Laboratory, the medical community and the Ministry of Health will hopefully ensure that future dengue epidemics will be recognized and averted in time.



*Submitted by Karin Schioler  
Research Scientist, PhD Candidate*

#### 6.1.3 HIV/AIDS in rural Botswana: knowledge, beliefs and practices (A3)

In Botswana the median HIV prevalence among pregnant women was 38.5% in 1997 and had risen to 44.9 by 2001. The adult prevalence of 39% was the highest in the world. Even though both urban and rural areas have been affected by the socio-economic impact of the HIV pandemic, rural areas are more likely to be severely affected. The Minister of Health in Botswana, Mrs. Joy Phumaphi recently said "indications are that the prevalence rates continue to be high in urban and peri-urban areas while the rural areas are fast catching up, with prevalence rates in double digits even in the remotest areas". The effects of the HIV epidemic in rural areas can be severe as it is not only the reduction in income due to illness among household members, but also because other members divert more time and effort away from income generating activities.

The government realizing the serious threat HIV/AIDS poses, initiated education and awareness campaigns to try and curb the spread of infection. However as studies have shown the infection rate continues to escalate. Consequently it is not sufficient to merely design educational programmes that merely inform but to design those that will also educate people about the nature of the HIV/AIDS. Those involved in HIV education therefore, must design programmes that are specific and relevant to the community. The latest estimates provided by 1998 Demographic Surveys indicate that the population growth rate has fallen from 3.5% in 1991 to 2.3 % in 1998 (despite this Botswana still has one of the fastest population growth rates in

the world). Total fertility rate has also declined from 4.2 in 1991 to 3.4 in 1998.

The objectives of this study were to:

- a) Survey the knowledge, beliefs and practices of rural people with regard to HIV transmission and prevention.
- b) Survey the activities of community leaders and health professionals that are

Proportion	10%	20%	30%	40%	50%
Confidence Interval limits at 95% level	0.015 2 to 0.057 1	0.038 9 to 0.095 5	0.064 5 to 0.132	0.089 3 to 0.162	0.11 7 to 0.19 7
Proportion	60%	70%	80%	90%	
Confidence Interval limits at 95% level	0.146 to 0.232	0.175 to 0.266	0.204 to 0.299	0.234 to 0.333	

aimed at reducing the transmission and impact of HIV. Identify and describe their needs that would enable them to effectively manage HIV/AIDS situation.

- c) Gather information from chiefs and health professionals on what they view as the main barriers in the fight against HIV/AIDS.

- d) Develop recommendations based on the critical findings

Four (3) selected rural areas in the north and one in the central (Boteti) region of Botswana were surveyed. The setting was of village areas with thatched houses, cattle kraals with village activities taking place. This part of the study was conducted in the northern part of the country surveying four villages, Tshesebe, Tsamaya, Jacklas No.2. and Letlhakane. These four villages are within 50 kilometres of each other. The study was a qualitative study designed to collect baseline data from four villages. The aim was to describe and characterize the practices, knowledge and attitudes of the communities regarding HIV/AIDS. There were three modes of data collection adopted for this study; for the general population, health professional and for the village chiefs (dikgosi). Ethical clearance for the study was obtained from the internal review board in Windref research institute, the office of the president through the Ministry of health in Botswana and at a village level the chiefs permissions were granted. A consent statement was read out to all those who were willing to participate. For statistical analysis confidence limit at the 95% level were used. With a sample size of 318 the following precisions from the proportions obtained will be as follows:

**Table 1.** Precision at 95% confidence limits

The qualitative data was interpreted and clustered into four themes: knowledge, actions, condom use and relationships. The domain on relationships comprised a wide variety of social and economic aspects of the questioner focusing on family issues relating loss of lives to HIV/AIDS, sexual relationships and

sources of help of HIV victims within their communities.

## Results

Only one of the four chiefs ( Chief of Tsamaya) admitted to having been trained or formally informed about HIV/AIDS. The increasing deaths in the villages, particularly among the young and sexually active population was evidence that there was a major problem. They all believed that basic training in the form of seminars or workshops could empower them to talk to their subjects intelligently about the epidemic. They complained about the community that still believed in myths about HIV/AIDS, which they argued mitigated against efforts made by the government to educate people about the epidemic.

The chiefs just as much as the nurses felt that they could do more and better if they were adequately equipped. Just to illustrate how committed the chiefs are in fighting the epidemic, one chief said: *"In order to minimize risks of transmission, I have made announcement at funerals that people should bring to an end the washing of hands in the same tab because one never knows who is infected with the deadly virus."*

From the nurses point of view there were indications that people were still engaging in risky sexual behaviours. This was deducted from the numbers of teenage pregnancies reported. A major complaint from the nurses was the tendency for affected families to hide away the sick. This, they said interfered with the delivery of medical services to those in most need of them. Some of the issues raised by the nurses were that the scheduled once a month doctor's visit to the clinics was not

sufficient. In Tshesebe it was reported that there was currently only one medical doctor in the northeastern region of Botswana. These doctors as described by the nurses are overwhelmed by increased workloads as a result of the epidemic. The monthly clinic visits were sometimes canceled for doctors to attend ongoing seminars and conferences. Still on the topic of HIV testing, all the nurses interviewed reported that nobody ever volunteers for HIV screening, only one person had voluntarily requested for a test in Tshesebe in 1999.

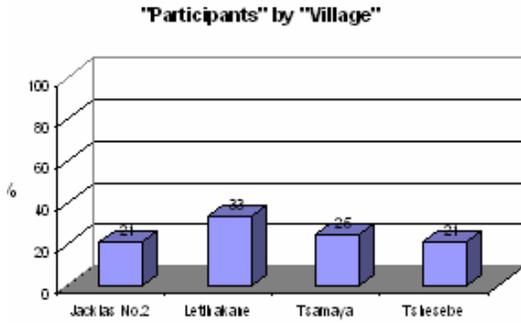
Tebelelopele vehicle: one of the first VTC organization in Botswana



The health care services therefore, face different levels of strain, depending on the number of people who seek services, the nature of the demands for health care and the capacity to deliver that care. Lengthy hospital stays are being reported in Botswana hospitals alongside staff shortages and burnout. Up to 30% more time is being spent in diagnosing cases that have grown more complex as the epidemic intensifies.

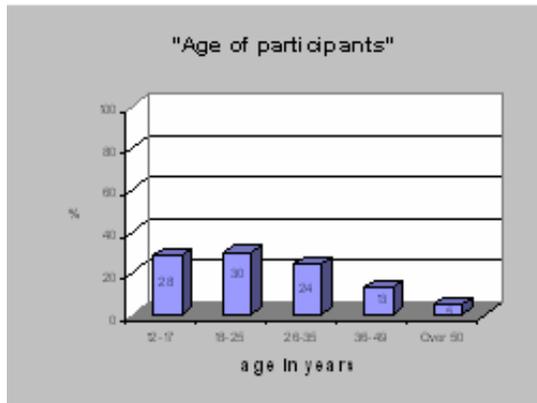
## Demography

### Figure 2



The study had a total of 318 participants with ages ranging from 17 to over 50 years. The female to male proportion was 59% to 40%. The figure shows the participants distribution by village. Tshesebe and Letlhakane are bigger villages than Tsamaya and Jacklas No.2. Three villages are situated in the North-eastern region of Botswana, except Letlhakane, which is in Boteti region.

Figure 3



Most participants in the study (82%) were between the ages of 17 and 35. The reason for the under representation in the age groups between 36-over 50's was probably due to the fact that community recreational areas were often targeted as areas of recruitment.

Figure 4

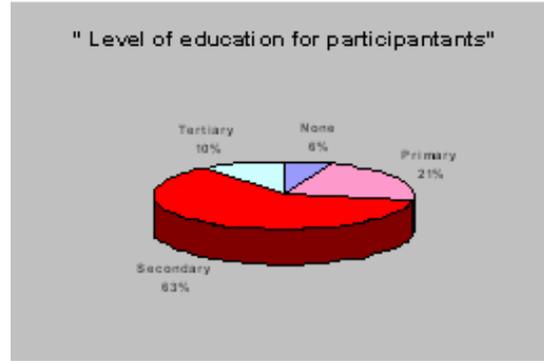
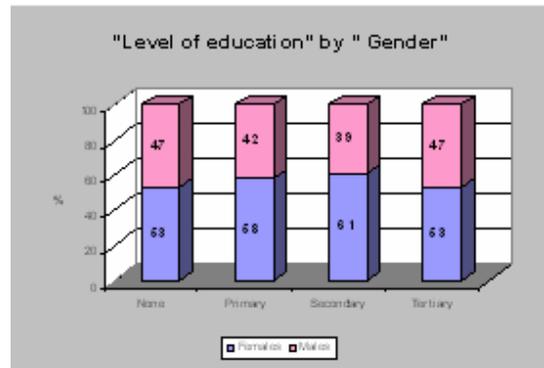


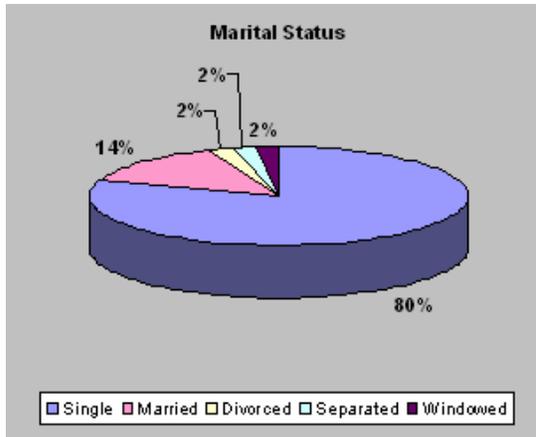
Figure 4 shows the different education levels of the participants, 6% had not received education of any kind, 21 % had primary education. The 63% reported for “secondary” level of education includes both students and those participants who had ended their education at secondary level. The older members of the community were more likely to have had primary or no education at all while the younger members almost all had at-least attended primary school.

Figure 5



In the target group, males and females were nearly equally educated with women educated than men at secondary school level (61% women to 37% men).

Figure 6



The vast majority of respondents were single (80%) with only 14% married. Included in the singles category is also secondary students who were not at the time of study reported not being in any sexual relationship.

stable sexual relationship. Most reported that, even though not officially married under the common law, they had cohabited for a long time. The 100% representing 12-17 age group consisted secondary school students most of who had had not even started engaging in sexual relationships.

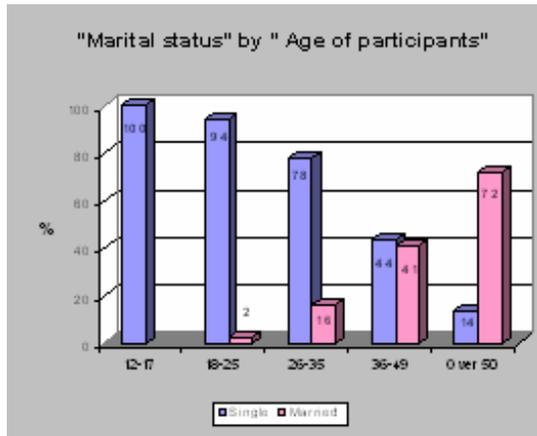
**Knowledge**

Table 2

	Knowledge about female condom		Total %
	No %	Yes %	
<b>Males</b>	57	43	100
<b>Females</b>	62	38	100

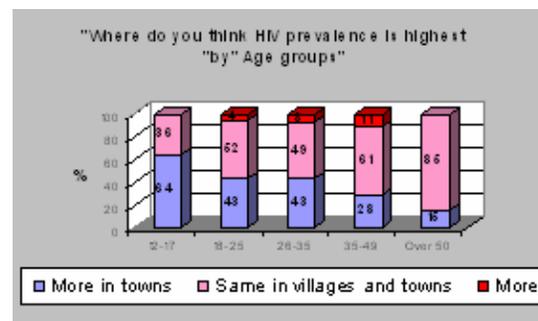
43% of the males know about the female condom compared with 38% of the females. Even though these many people were aware of these condoms, which at the time were not available to the public, 97% of both females and males had not used them before. The 3% who had used them complained that they were too expensive at the time and that was probably the main reason why people were not using them.

**Figure 7**



**Figure 7** shows the marital status of participants by age. It should be noted however that most of the respondents, between the ages of 20 and 35 years who reported being "single" were in fact in

**Figure 8**



87% of the respondents between the four villages said the incidence of AIDS was on the increase. 11% thought it was on the

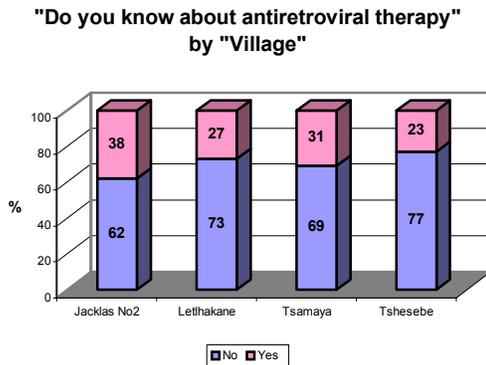
decrease while 2% were not sure. The measure for the severity of the problem has been in increase in AIDS related deaths. The majority of the respondents think that the prevalence between urban and rural areas has now equalized. This deviates from the long-standing view that AIDS was only found in urban areas. In the 12-17 years age group 64% still think it is highest in towns. 85% of the over 50 years age group are in support of the idea that the situation has equalized.

Table 3

	Knowledge about anti-retroviral therapy		Total %
	No %	Yes %	
Males	65	35	100
Females	75	25	100

More males know about anti-retroviral therapy than women with 35 to 25% respectively. At the time the study was conducted, the main source of information about these drugs was the radio and they were only available at a high cost from private practitioners. The drugs were not affordable to most of Botswana population.

Figure 9



An average of 70% between the 4 villages had no knowledge about these drugs. Even though these drugs have been available since the late 80's a vast

majority of the rural communities in all four villages only had limited information about them. The study took place at the start of a national campaign educating specifically on these drugs, the numbers are therefore expected to have risen since.

Table 4

	Knowledge about MTCT		Total %
	No %	Yes%	
Male	46	54	100
Female	43	57	100

Knowledge about mother-to-child transmission is greater than that about general anti-retroviral therapy as the two figures show. This is as expected since at the time this study was conducted, the MTCT treatment campaign was already underway for pregnant women throughout the country. 57% of the said

they were aware of such treatment, but proportion is lower than expected.

**Figure 10**

**"Do you know about antiretroviral therapy" by "Education level"**

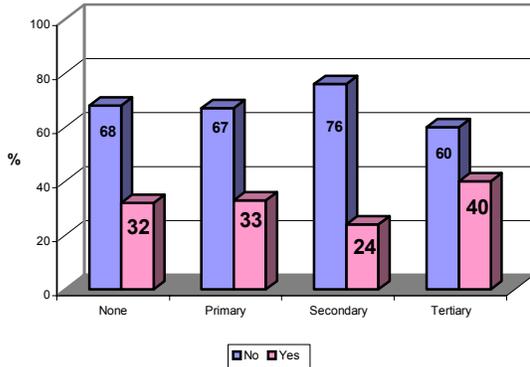


Figure 10 shows that education level does not have a major impact on the level of knowledge on HIV drugs. There is only 8% difference in the proportion of those who know about drugs between those who had not attended school and those having reached tertiary level. This finding will be most useful to those educating the nation on anti-retroviral therapy following the government new policy of availing these drugs to those who need them.

**Action**

**Table 5**

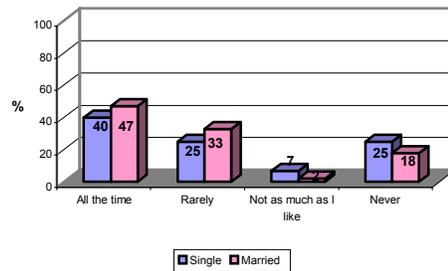
How often do you talk to your partner about HIV/AIDS	Total %
Yes, all the time	36
Yes, rarely	23
Not as much as I would like to	6
No	21

36% of the respondents talked freely about HIV/AIDS while 27% did not. Reasons hindering communication about AIDS need

to be identified and Efforts should be made to minimize them. People must be able to openly talk about sexuality something which is not easy as discussion of such matters is taboo in the Setswana culture.

**Figure 11**

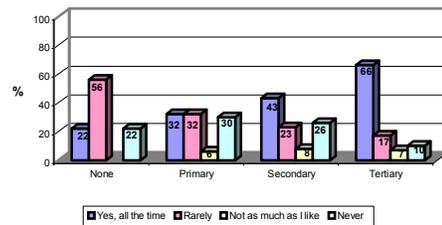
**"How often do you talk your partner about AIDS" by "Marital status"**



The results are as expected; married couples 47% talk more freely about AIDS than 35% in the singles category. More singles-25% to 18%, reported never talking about AIDS. More importantly is the difference observed between the two categories on the option of “not as much as I would like to” with 7% to 2% reported by single and married couples respectively. This means that work can still be done to get people to talk about AIDS.

**Figure 12**

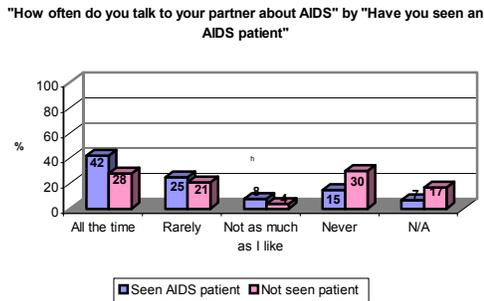
**"How often do you talk to your partner about AIDS" by "education"**



There seems to be an association between the level of education and the

ease in talking about AIDS with 66% of those participants with tertiary education and only 22% for the uneducated group. The non-educated group however had the highest proportion(56%) of people who rarely talked about AIDS.

**Figure 13**



The results are as expected; with more people talking about AIDS once they had seen an AIDS patient. 42% of those who had seen a patient talked about AIDS “all the time” compared to 28% of those who had not. The margin is even more pronounced with those who said they never talked about AIDS, with 50% difference in the numbers.

**Table 6**

	Would you be willing to have unprotected sex (Frequency)		Total
	No	Yes	
Males	106	24	130
Females	161	27	188
<b>Total</b>	267 (84%)	51 (16%)	318

51 respondents (16%) would have

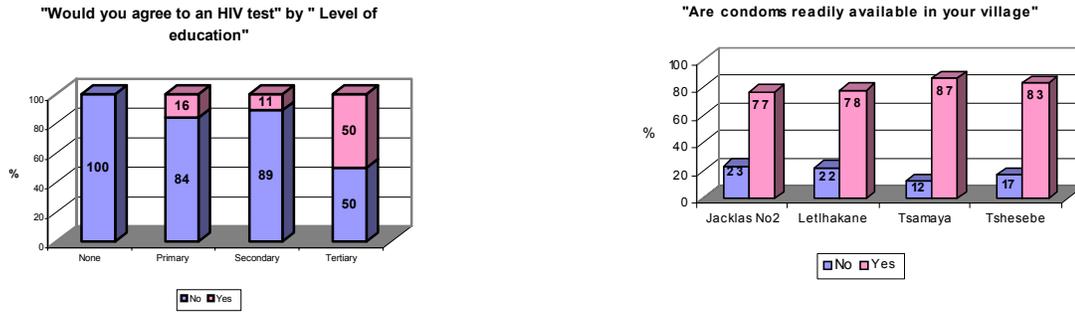
unprotected sex with their partners. The honesty to these answers is questionable. As expected, the majority of respondents reported they would not have unprotected sex. The level of honesty in answering this question is uncertain. Inconsistent condom use was still regarded as safe sex by some people.

**Table 7**

	Would you agree to an AIDS test %			Total %
	Yes	I'm afraid to test	No	
Males	53	35	12	100
Females	64	23	13	100

The majority of patients said they would agree to an AIDS test with more female (64%) than men (53%). In spite of the fact that so many people expressed the desire to want to test, health professionals interviewed reported that even though the public was aware of the testing protocol available to them, very few people turned up.

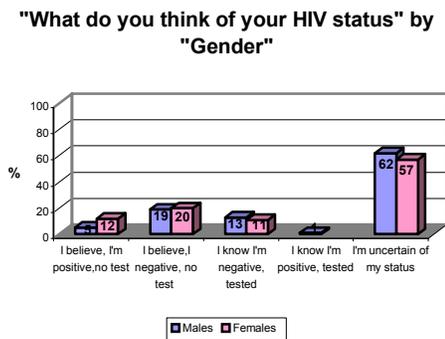
Figure 14



Majority of the participants had not been tested for HIV. With 100% in the group that had not been to school and 50% for those who has received some tertiary education. The majority of those with secondary education were students, still in school and sexually inactive, hence the lower figure. Probable reasons why people get tested while others do are discussed later.

There was a general agreement between the four villages that condoms were readily available to the communities with 77% to 87% response rates. It is important to mention that even though men said condoms could be easily accessed, many of them admitted that they nevertheless did not have any for themselves. The greatest problem with condom use is their inconsistent use.

Figure 15



The majority of respondents seem to be uncertain about their HIV status with males at 62% and females at 57%. Most people (Table 2) reported that they wanted to know their HIV status.

Condom use

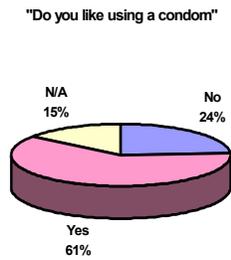
Figure 16

Figure 17



*The above figure clearly confirms that condoms are readily available in villages. Only 50% of the respondents in the over 50 age group agreed and part of the reason could be that they are the least likely group to use condoms and they base their opinions on what they see happening around them. That is, the only reasonable explanation to the increasing AIDS cases to them might be the shortage of condoms.*

Figure 1



In the N/A group are school children who were not sexually active at the time of the study. 61% of the respondents said they liked using a condom. One of the weaknesses of the question was that, it did not specifically ask if participants were using condoms during sexual intercourse and therefore people could have had differing interpretations. 24% did not like using the condom and again this does not necessarily mean that a condom was not used during sex.

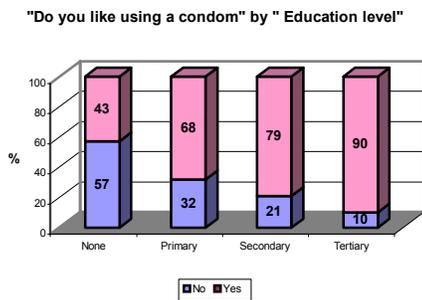
	Do you like using a			Total
	No %	Yes %	N/A %	
Male	24	64	12	100
Female	23	61	16	100

Table 8

Table 9

	Do you like using a condom		Total %
	No %	Yes %	
Single	25	75	100
Married	29	71	100

Figure 19



The above two figures show condom preferences with respect to gender differences and marital status. There seems to be equal proportions in the each of the categories.

It appears that the likeness for condom use is somehow related to education level. There is a clear increase in the number of participants who like using a condom from as low as 43% in those who had never received education to 90% in the group has tertiary training. The slightly lower figure for the secondary group at 79% could as in the above figure, be due to the reason that most of the participants with secondary education were in fact still school and some of them had not yet started engaging in any sexual activities.

Table 10

	Should women suggest condom use		Total %
	No %	Yes %	
Male	11	88	100
Female	2	98	100

The majority of participants think that is it appropriate for women to suggest condom use in a relationship with more women at 98% compared to men at 88%. It does not mean, however that women can freely suggest condom use. Many of them might have the wish to suggest the use of a condom, but are often faced with difficulty when it actually comes to doing it.

Figure 20

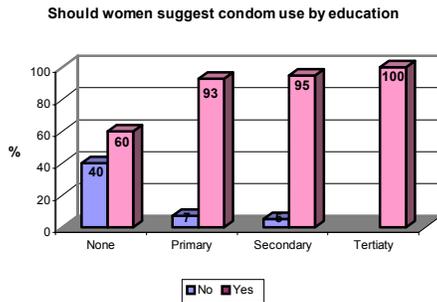
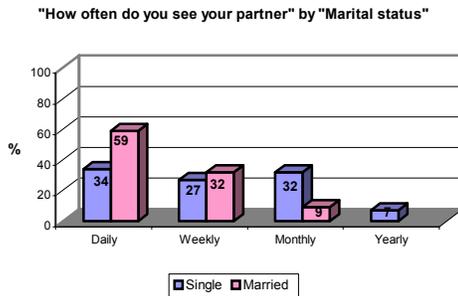


Fig. 34 looks further into the factors that might play a role in the topic of condom suggestion by women. It seems there is a similar pattern to Fig. 33 on condom use and education level. Suggestion of condom use by women seems to be associated with education level. All the participants with tertiary education are in support of the idea while 60% reported by those who have never received any form of education.

Relationships

Figure 21

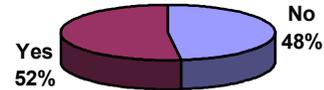


50% of the married participants either lived with their partners in the same home/village as compared to 34% of those who were not married. The trend is expected for married couples, with the numbers decreasing as the time periods

increase from daily to yearly. The pattern is less obvious for those who are single.

Figure 22

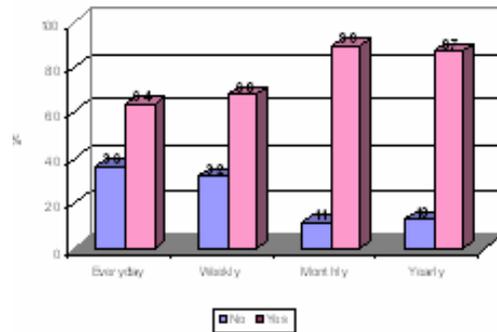
"Does partner travel away to work"



The numbers are nearly equal with 52% of the partners traveling frequently on business while 48% stayed home. A significant number of men and women suggested that the government should consider a change in policy to insure that couples live together during their working lives. Some men interviewed, shared stories about the different kinds of sexual infidelities that took place while they were out at work.

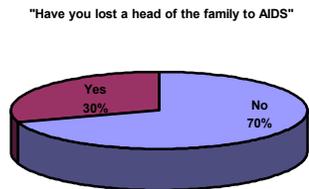
Figure 23

"How often do you see your partner" by "Do you like using a condom"



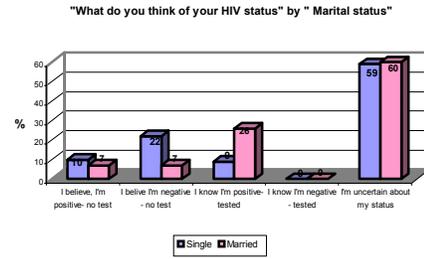
The trend is as expected with higher percentages in relationships where the couple is not living together with figures as high as 89% and 87% for those who see each other monthly and yearly respectively. Frequent travel and migration have been implicated to have a role as some of the driving forces behind the rapid spread of HIV, therefore it is important to couple not living together to take pre-cautions and practice safer sex.

Figure 24



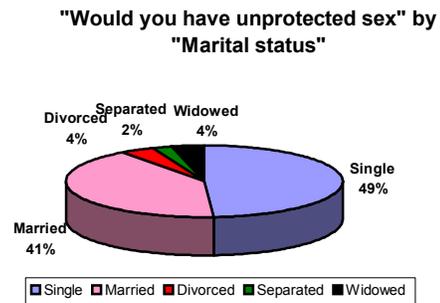
With a high HIV prevalence in Botswana and also taking into consideration the fact that the region of the country in which the study took place, one might have expected higher numbers of reported AIDS related deaths. The rural areas included in the study but one, are within 100 km from the city that has had the highest HIV prevalence in the country. Fig. 38 shows that only 12% of the households had lost a family member to AIDS. The importance of this finding is that people are still in denial of the realities of AIDS. Figure 39 shows that 30% of the group that had lost the head of family.

Figure 25



The vast majority of respondents (both single and married) were uncertain of their HIV status. None of the respondents knew for a fact they were HIV negative. In the category of those who were married 26% had tested for HIV and were positive with 9% in the single category. 22% of the respondents who were single reported that they thought they were HIV negative even though they had not tested. This finding may be beneficial in identifying those at more risk of getting infected and infecting others as well.

Figure 26



49% of the respondents who were single reported that they would have unprotected sex with their partners. The reasons why they would engage in unprotected sex are complex and explain why behavioural change does not come easy. The responses to this question show the reality of the sexual conducts which cannot only be explained on lack of knowledge on the transmission of HIV/AIDS but is dependent on many

other issues.

### Conclusion and recommendations

This study found that the importance of the education level of participants was the main determinant of several behavioral tendencies e.g. likelihood of getting an HIV test, talking to partners about AIDS and condom use. Having seen an AIDS patients also had some considerable influence on the easiness in talking about AIDS. The results of this study also indicate that, even though rural participants are aware of the basics on HIV transmission and prevention, they still have a lot of questions unanswered about HIV/AIDS especially on opportunistic infections and how antiretroviral therapy works. There was an unexpected low reporting of AIDS related deaths within families. This could be viewed as a clear indicator for the persisting stigmatization associated with AIDS which might also be responsible for the very low number of people who volunteer for HIV testing. On the subject of condom use, it was found that, it was not merely the availability of condoms in clinics that was important but rather the possession of condoms ready for use that is important to HIV prevention. Myths surround the condom seem to still have an influence on a lot of people. The nurses are generally overwhelmed by the extra strain imposed by the epidemic. A lot will have to be done in upgrading rural clinics so they could better accommodate the complex HAART regime that is already in place in some places in Botswana. Village leaders were not well equipped in terms of knowledge to play any significant role in HIV/AIDS prevention. Much of the efforts of community groups and national and international agencies have been

devoted to changing inter-personal behaviours in a generalized manner. Yet, across cultures there is a wide diversity of practices, which are often very specific to circumstances and situation. Therefore the challenge is to gain better understanding of the complexities of each local cultural and working around all the social conditions try to intervene with appropriate methods.

From the analysis of the results of this study the following has been recommended:

- 1) Village leaders must be empowered mainly thorough formal education on HIV/AIDS and kept update with development in the field. This should enable them to fulfill their duties as stated in the national AIDS policy.
- 2) VCCTC away from clinics be available for the rural communities as not only testing centers but also as reliable sources of information about HIV/AIDS.
- 3) Care-takers be well informed and educated about HIV transmission so they could take the necessary pre-cautions.

*Submitted by Setshidi Makwinja  
Research Scientist*

#### 6.1.4 Studies on *Echinococcus granulosus* in Africa. (A4)

*Echinococcus granulosus is a small cestode parasite of carnivores which causes hydatid cysts in a number of species of livestock, wild herbivores and humans in many parts of the world. An ongoing collaboration between the veterinary team of the IAV Hasssan II University in Rabat, the National Public Health Institute in Rabat, local Moroccan*

*authorities and WINDREF began in 1999 to examine the epidemiology of E. granulosus in Morocco. The prevalence of cystic echinococcosis (CE) using ultrasound (US) has been established at around 1.0% in the mid Atlas mountains of Morocco. Studies planned for 2003 will examine the prevalence of the disease in the drier south of the country where the people are more nomadic. Studies on the risk of CE in women will also be examined.*

*A new study on wildlife E. granulosus will begin in Uganda in 2003. A team sponsored by grants from the Fogarty Foundation through Texas A&M will visit Uganda in June to begin looking at the importance of CE and the role of wildlife in its maintenance there.*

*Submitted by Calum Macpherson, Director*

### **6.1.5 Studies on lymphatic filariasis in Guyana. (A5).**

WINDREF has long established a working relationship with the Ministry of Health in Guyana since visiting research scientists first went there in 1994. The evolution of the Program for the Elimination of Lymphatic Filariasis (PELF) in Guyana which started in 1997 led to the development of WINDREF's first project on LF looking at the prevalence of the parasite in rural areas of Guyana using the ICT test cards. Data from this project was used for mapping the distribution and importance of LF throughout Guyana. In 2001 and 2002 support from the Liverpool Support Centre, GSK, Fogarty, the Ministry of Health, Guyana and private donations has enabled 12 scientists and fellows to work with the PELF in Guyana contributing to the program in a variety of ways.

This collaboration expanded to include University of Guyana, PAHO/WHO and CDC and a Rapid Assessment Mapping using ICT card method of LF infection was carried out in all ten regions. The findings of the ICT tests have confirmed that infection is present in six of the ten administrative regions of the country. It has also shown that an estimated 650,000 persons or 90% of the population live in these six regions and are therefore at risk of LF infection.

The infection is mostly acquired early in childhood but chronic symptoms of the disease especially elephantiasis and hydrocele, tend to afflict individuals in adulthood. These persons are in their most productive stage of life and therefore, this disease imposes a significant social and economic burden on society, especially women. There are some instances where the micro infection may cause some clinical disease, but the fact that these persons are infected adds to the potential for occurrence of both elephantiasis and hydrocele way into the future.

The Ministry of Health through a National Task Force, appointed to oversee the project and its partners have developed the strategy for elimination of this infection. This Task Force consists of a wide cross section of the health service and the community at large and the major partners as mentioned above. This project is based primarily on the mass treatment of the entire population at risk using salt fortified with DEC (diethylcarbamazine) supported by a community based morbidity CARE program within the primary health care system of Guyana.

*Aim and Objectives*

The main aim of this project is to eliminate lymphatic Filariasis as a public health problem by reducing the natural pool of microfilaria in human and thus breaking the chain of transmission.

The objectives are to:

1. Establish the magnitude of the LF problem in Guyana by mapping the distribution of the micro-infection
2. Develop a mass treatment strategy, using DEC-salt for the population at risk
3. Develop and implement a social marketing and education program to promote and maintain the use of DEC salt.
4. Develop the capacity of the local salt importers to import and distribute DEC salt to the target population
5. Determine the burden of disease caused by filarial (both elephantiasis and hydrocele)
6. Train all health works in identification, treatment and control of LF disease
7. Develop a community based program for the management of persons suffering from elephantiasis
8. Develop a program for the systematic examination and surgical repair of hydroceal identified nation-wide

9. Develop a mechanism to monitor and evaluate LF over the short, medium and long term

**6.1.5.1 Studies on morbidity reduction**

Dr. McPherson, a UK trained physician specializing in dermatology, has been employed as a consultant with support by WINDREF (Liverpool/ GSK Grant) and PAHO/ WHO. Dr McPherson is contracted to work with counterparts in the Ministry of Health (MoH) and other development partners on the morbidity component of Guyana's Lymphatic Filariasis elimination programme. This programme is working to reduce disability in people affected by the long-term sequelae of LF. Dr McPherson is developing the programme in the following areas:

- Models of Skin Care
- Education in Management of L.F.
- Patient Care
- Morbidity Data
- Research

**The following report is an update of outputs over the past 6 months.**

**6.1.5.2 Establish Models of Skin Care**

The International Foundation for Dermatology (IFD) is an international NGO currently developing models where skin care can be applied to reduce morbidity of chronic skin disease such as LF and leprosy. The IFD has been collaborating with Dr McPherson to co-ordinate morbidity control in Guyana and develop an integrated programme and

ensure appropriate sustainable treatment for patients with skin disease from LF.

This process has been supervised by Professor Rod Hay and Professor Terence Ryan from the IFD. Professor Ryan and Ms Rebecca Penzer from the International Skin Care Nursing Group (ISNG) visited Guyana August 8<sup>th</sup>- 14<sup>th</sup>. They attended clinics, with the leprosy/ skin services and met with key people in the Ministry of Health and the Chief Medical Officer. Professor Ryan gave a CME for physicians on 'models of skin care'.

Through this collaboration several key principles have been developed:

- The recognition that lymphoedema morbidity reduction measures constitute a model for prevention of other skin disease.
- The recognition that there are many other skin diseases in Guyana and other tropical countries that are common and may be poorly managed.
- The recognition that there are varying levels of disease and these have different needs and services across the spectrum.
- That, whilst there is a need for some key people to have a high level of knowledge with regards to LF, the vast majority need to have a less in depth knowledge but need to be able to refer to an appropriate service should this be necessary.

Based on these principles the programme is aiming to integrate lymphoedema management into community level care with access to treatment available to patients within current services. With appropriate training the majority of lymphoedema cases can be managed at local existing health centres but with

availability of more specialist services for more severe disease.

Training has updated all health workers (from community health workers, nurse, and medex (specialist nurses) to physicians) but has concentrated on various key individuals who will play a pivotal role in the programme while community level care is being achieved. These are the leprosy/ skin clinic nurses and other key workers identified within the existing health infrastructure. Such staff now have the appropriate skills to identify and treat patients. This training should also benefit other common skin diseases.

Provision of care for lymphoedema must continue after the elimination of infection, as there will continue to be disease resulting from lymphatic damage for some years. To ensure that knowledge transfer is sustainable in the long term training will be incorporated into existing programmes.

#### **6.1.5.3 Education in management of LF**



During the implementation of the elimination programme health professionals will play a key role in disseminating information to the public. An initial survey last year identified an urgent need among health workers and patients for up to date knowledge of LF, management of lymphoedema and urogenital disease.

To address this several strategies were proposed;

1. Educational Workshops and Clinical training
2. Development of educational materials
3. Introduction into existing programmes

Dr Singh (MPH St Georges, Grenada) has begun to monitor the education of health workers and evaluate these strategies.

Educational workshops by members of the L.F. team in Guyana (PAHO/WHO and MoH) have now been completed in all endemic regions (9 workshops) with over 400 health workers attending. These one-day workshops covered details about the

disease, transmission and how lymphatic damage develops. They presented the current situation in Guyana and the international and national elimination programme including transmission interruption, morbidity management and social mobilization. Sessions on Morbidity management included interactive teaching with lymphoedema patients.

Clinical training in morbidity management in health centers and clinics followed on from the workshops (to date 12 sessions in Region 4, Region 3, Region 6 and Region 10). Identified nurses and medex trained in morbidity management have been conducting these sessions with supervision from the consultant and will continue the process of training of health workers.

### **Educational Materials**

A booklet, leaflet and desk top with information on both components of the programme have been developed for health workers. These have utilized and adapted CDC and WHO materials and are currently being field tested with health workers. The concept of SKIN CARE (Clean, Apply, Regular movement and Elevate) as a mnemonic to encapsulate morbidity management has been developed. Copies of these accompany this report.

### **Curricula Development**

Issues regarding lymphoedema management and skin care are being introduced into existing training curricula of Medex, Nurses, Community Health Workers, and Doctors. This ensure that the education process continues as health workers must be able to cater for the need of patients even after the infection is eliminated from Guyana. Rebecca Penzer, who is involved in international nurse training, met with members of the

nursing schools in Regions 4, 6 and 10, the Department of Education at the Ministry of Health (Ms Sarah Gordon and Sister Bernice Brown) and Dr Rudi Cummings, the Chief Medical Officer. Her visit has initiated the introduction of a 'skin hygiene course' into nurse and community health workers curricula and in-service training programmes. This process is to be continued with a follow up visit in 2003 (work supported by Liverpool and GSK). Materials (Power Point and overhead presentations, leaflets and booklets) have been developed by Dr McPherson in collaboration with the nurse and medex educators and the medical school which will be used on upgrade and training programmes.

## Patient Care



Up to the start of this programme patients with lymphoedema were referred to Vector Control Clinic where they received repeat prescriptions for anti-filarial tablets and little skin care. After health workers are educated they are able to manage most patients at the community level with referrals to the services for more severe cases.

Initial workers have been identified in each endemic region to set up clinics ensure patient care, set up patient support groups and support the education of other health workers. Dr McPherson has been in regular contact and provides skin creams (from the MoH pharmacy bond), educational material and technical support. Key staff within existing services had already established clinics in Region 6 and 10. In the past six months there has been continued support for these clinics and further clinics established in region 3 and region 4 (Georgetown). These provide centres for patient care, staff training, collection of morbidity data and research.

Mechanisms are being put in place for the continuation of these clinics. In particular the MoH Pharmacy has procured treatments for the next year and established a procedure to ensure that annual request

for additional treatments needed will be made.

## Morbidity Data

Demographic data and details of disease has been collected on patients attending the clinics though May- July by Dr McPherson and the nurses in regions 6 and 10. Dr McPherson has been working with the CDC and developed questions for use in the sentinel sites (prior to the introduction of DEC Salt). These will enable population-based epidemiological data to be collected early next year.

Dr McPherson arranged for the surgical departments undergoing hydrocele repair to provide access to their records and these were collected and analyzed by Nathan Boddie, a St Georges medical student on a Fogarty grant, who visited Guyana in July.

### 6.1.5.4 Research



GSK are supporting operational research by Dr McPherson to investigate the fungal and bacterial flora of inter-digital lesions, severity and dermatological manifestations of lymphoedema and acute attacks. This research aims to detail inter-digital lesions and their microbial flora as a risk factor for acute attacks.

70 consecutive patients attending the clinic have had an initial detailed skin survey focusing on entry lesions including sampling for fungal and bacterial infection. The fungal cultures have been done in the laboratory which Dr McPherson set up and a sample of swabs were sent to Grenada for bacterial cultures. A questionnaire has been compiled in order to record details on acute attack as well as demographic data. These patients were given treatment and education and advice to return if they have an acute attack. A group presenting to the clinic with acute attacks have also been recruited over this period. A control groups of age and sex matched controls have been selected from health clinic attendees in Georgetown.

Most of the initial data has been collected for further analysis. Further laboratory work will be undertaken at the St Johns Department of Dermatology, London next year and it is aimed that his research will form the basis of an MD thesis.

## **Implementation**

Over the past six months Dr McPherson has been on implementation visits to the regions where there have been workshops and clinics set up.

In region 10 repeat KAPB surveys were performed and a life quality assessment made to patients who had been attending the clinic for the past year. A greater level of understanding of LF was found and an increased use of skin care and appropriate treatments by staff and patients. There is extremely positive feedback from patient groups. They are not only beginning to see improvement in their condition but feel supported and are now acting as advocates for the programme and the introduction of

DEC salt. The results of the life quality study have been written up for the lymphoedema journal 'Filaria' by Dr McPherson and this has been accepted for publication. ([www.filaria.com](http://www.filaria.com))

Discussions with the Vector Control Clinic shows the staff there are now giving increased skin care advice and becoming less reliant on repeat banocide prescriptions.

The Implementation will continue over the next year by Dr McPherson and other members of the L.F. team with visits, repeat questionnaires and assessment of patients to monitor success of programme and identify further needs.

Funds received through WINDREF have increased capacity and collaboration, supported research, strengthened the morbidity programme in Guyana and will help ensure sustainability.

*Submitted by Tess McPherson  
Research Fellow*

### **6.1.5.5 Salt study in Guyana**

In 1993 the International Task Force for Disease Eradication identified lymphatic filariasis as one of six infectious diseases that would be possible to eliminate. It was chosen because of advances in diagnosing and treating the disease and in controlling its transmission. In 2000, the World Health Organisation, in collaboration with other international agencies in the public and private sector, launched a global campaign to eliminate lymphatic filariasis by the year 2020.

The global eradication programme aims to break the cycle of transmission for the

disease between mosquitoes and humans. Populations in endemic regions will be treated with antifilarial drugs – albendazole plus either ivermectin or diethylcarbamazine, or by fortification of cooking salt with diethylcarbamazine (DEC). The drugs are being donated by the pharmaceutical companies GlaxoSmithKline and Merck.

In the Americas, 704,400 individuals are estimated to be infected with *Wuchereria bancrofti*, the only known causative agent of lymphatic filariasis in the region. The actual number of cases might be higher when assessed by currently available and far more sensitive techniques, such as the antigen detection assay. Since 1981, transmission has been reported in Haiti, Guyana, Brazil, Trinidad & Tobago, Costa Rica, Suriname and the Dominican Republic. The estimated number of the population at risk in the Americas is considerable: 10,681,000 individuals.

Lymphatic filariasis has been an area of concern in Guyana for a number of years. In 1999, Guyana started to examine its own program and control efforts of lymphatic filariasis. It was decided then that because of the need for a massive public health undertaking, the Department of Disease Control, would develop and implement a control program. A strategy based on intersectoral collaboration and community participation was agreed on and a National Task Force was established. This Task Force was coordinated by the Ministry of Health and included representatives from the Pan-American Health Organization/World Health Organization (PAHO/WHO), UNICEF, Ministry of Education, The University of Guyana, service organization such as the

Red Cross, private medical practitioners, and several departments of the Ministry of Health.

As part of an ongoing collaboration with these efforts, research scientists from WINDREF visited Guyana in January 2002, and worked with the Ministry of Health to advance its eradication program. These students participated in the initial mapping efforts of the sentinel site in Georgetown, for the monitoring of the eradication program, as well as with a test pilot of the mapping procedure in New Amsterdam. In addition to this, each student carried out an individual research project to contribute information and data to the overall effort. One such project was a retail salt survey executed by Juliette Blau.

DEC – fortified salt has been used successfully as a principal public health tool to eliminate lymphatic filariasis (LF) in China. The Ministry of Health in Guyana is planning to use DEC – fortified salt as part of their program to eliminate lymphatic filariasis. In the past decade, the very successful global efforts to eliminate iodine deficiency through universal salt iodization have demonstrated that partnership with the salt industry can be both successful and effective as a public health tool. Guyana does not produce salt, but imports it from other countries. Effective implementation of the LF elimination program relies on the distribution and importation patterns of salt in Guyana.

The purpose of this study was to determine the source of supply of salt to Guyana, and the distribution patterns of salt once it is imported. It was found that the majority of salt coming into Guyana

originates from three countries: Trinidad, Jamaica, and Cuba. Most salt arrives in the country in the capital Georgetown, and is distributed from there. This was found to be consistent all along the Atlantic coastline of Guyana. However, on the Brazilian border, in the town of Letham, salt was imported from across the border from Brazil. Successful implementation of the DEC – fortification program in Guyana will come from a collaborative effort between the government and the importers, and with extensive focus on mobilizing public support of the program through education.

*Submitted by Julie Blau  
Research Scientist*

#### **6.1.5.6 Immunologic studies on lymphatic filariasis**

The Global Program for Elimination of Lymphatic Filariasis has been initiated by WHO and is based on mass treatment of the susceptible and affected populations with albendazole and diethylcarbamazine or ivermectin ([www.who.org](http://www.who.org)).

As equally important to the eradication of lymphatic filariasis is the focus on those who are currently suffering from the clinical manifestations of a blood borne filarial infection. The pathogenesis of lymphatic filariasis is fairly simple, but it leads to a diverse pathology of this disease that can be grouped into three main categories. The first consists of the chronic manifestations which include hydrocoele, lymphedema, and chyluria. The second include acute manifestations such as “filarial fevers,” adenolymphangitis (ADL) or dermatolymphangioadenitis (DLA), and tropical pulmonary eosinophilia. Also included in this group are expatriots who develop lymphangitis upon returning to endemic regions. The third category

consists of those who are microfilaremic, but remain asymptomatic.

The cause of these clinical manifestations is not so much a result of infection by the nematode, but the hosts response towards larvae, adult worms, and microfilariae. Immunological response can be hypersensitive resulting in amicrofilaremia and lymphedema or hyposensitive resulting in microfilaremia without external symptoms. This creates two populations of patients - symptomatic and asymptomatic. Whether the differential response is limited to the adult worm or the microfilaremia is still under investigation. It has been found that most patients who develop lymphedema or elephantitis develop a hyperimmune response towards the microfilaremia and are therefore amicrofilaremic. While those who appear to be asymptomatic are usually microfilaremic due to a hypoimmune response. It has been proposed that this differential immune response is related to the Th1/Th2 paradigm. The same study also shows that the functions of the T lymphocytes of the patients are normal. A 17 year study shows that a down-regulated T lymphocyte response persists in people who were once microfilaremic, but at the end of the 17 years became amicrofilaremic after drug treatment. This can be an implication that the way their immune status perpetuates is not dictated by their current antigenic state, but is rather a result of their initial response to antigen.

Since a proliferative T lymphocyte response is dependent on proper presentation of antigen by antigen presenting cells (APCs), it is possible that those who are experiencing

hyporesponsiveness via a down-regulation of T lymphocytes have abnormal APC function. In addition, it has been shown that the down-regulation of T lymphocyte remains after microfilaremia have been cleared indicating that the once microfilaremic patients immune status is non-reversible after microfilaremia has been cleared. Recently it has been found that the microfilaremic antigen (MFAg) has the ability to interfere with the differentiation of monocytes into functional dendritic cells but there is no effect on dendritic cell markers. To further understand the role of dendritic cells in the differential immune response towards filarial antigen, cytokine production and expression Toll-like receptors as well as other dendritic cell markers in response to stimulation with filarial antigen will be examined. Toll-like receptors have been found to bind various types of antigenic protein as a part of the initial steps towards antigen uptake.

Understanding the immunological aspect of lymphatic filariasis is important towards understanding the reason behind asymptomatic patients and symptomatic patients. Not only have the symptoms brought about drastic changes in their lifestyles, lymphedema serves as a premise for secondary bacterial and fungal infections of the skin which can become systemic without strict adherence to vigorous cleaning regimen. Relieving them of their symptoms will require an all inclusive effort from all fields of study. A biological part of this effort will be to understand the reason behind the difference between the two populations of patients. A step towards deciphering the differential immune response is the investigation of the mechanism used by antigen presenting cells, specifically dendritic cells, to

uptake and present filarial antigen.

*Submitted by Yolanda Ng  
Research Scientist*

### **6.1.6 Prevalence of heartworm in owned dogs in Grenada, West Indies (A6)**

#### **Introduction**

Heartworm (*Dirofilaria immitis*) is a common cause of morbidity and mortality in dogs in most tropical and subtropical areas of the world and even in some temperate climates. There have been few reports of the occurrence and prevalence of the parasite in the Caribbean region and there are no previous published reports on the prevalence of canine heartworm, *Dirofilaria immitis* in Grenada. In this study hemotologic assays were used to detect *D.immitis* infections in dogs recruited at free rabies vaccination clinics and at a veterinary teaching hospital in Grenada. Seventy-two (26%) out of the two hundred and seventy-five dogs from five of the island's six parishes were found to be positive by a serologic antigen test. Twenty-nine (14.8%) out of two hundred and twenty-four dogs were positive for microfilaria using the modified Knott's test with an agreement of 40.2% with the antigen test. Prevalence increased with age, males were more often infected (male:female ratio of 1:1.6) and dogs in the south of the island had higher prevalences than the rest of Grenada.

*Submitted by Nannette Wagner, Research Scientist and Calum Macpherson, Director*

### **6.2 Non-Communicable Diseases**

6.2.1 *End of Life Care in Grenada:  
Perspectives from Families and  
Caregivers (A7)*

*Reported here are select findings of our qualitative study designed to document end of life concerns in the Caribbean. Qualitative studies provide valuable information about end of life concerns. Methods employed in this study include face to face interviews patterned after Singer et al and focus group discussions as described elsewhere<sup>1</sup>. Most focus groups were formed from pre-existing groups where participants already knew each other. Participants included 24 family members and caregivers who had lost a loved one within the last five years. Additionally, 4 physicians and 4 nurse participated in interviews and/or focus groups. Sessions were semi-structured around these themes: place and perceived cause of death, pain suffered by the deceased, sources of support for the deceased and their caregivers, and the use of herbal or traditional medicine at the end of life. No incentives were offered, the study had IRB approval, and anonymity was maintained.*

**Results**

Data is reported separately for those who had lost a loved one, and for health professionals. Concerns reported here were prevalent among participants, and specifically reflect perceptions, opinions, and experiences verified by several participants.

**Families and Caregivers**

**Place and perceived cause of death**

More than half of the deaths reported occurred at home. Nine occurred in a local hospital, and 2 in hospitals abroad. The perceived causes of death was revealed for

20 of the deceased. These included cancer (6), heart/kidney condition (5), accident (3), stroke (2), perceived hospital/medical error (2), diabetes (1), and old age (1). Many of the deceased chose to remain at home, or be discharged from hospital. Comments included “I think she felt more comfortable being in her house rather than at being in the hospital.”, and “My sister died at home because we could not convince her to go to hospital for treatment because, ah, she felt that there was nothing anybody could do for breast cancer.”

**Pain and suffering**

*Participants were asked whether they thought the deceased had died in pain. One said “...pain and suffering is a must ...pain is there ...there was a time when I thought she [my wife] was going to die because she had so much pain.” A representative comment is that “She bore her pain well, but whenever she was in great pain, you would hear it”. One said “He was going through a lot, a lot, a lot of pain. ... He sort of suffered his pain, um, grinding his teeth and so because of the pain he was going through. He just wanted to go. He didn’t want the tablets cause somehow he seemed to know that the end was near for him.” Some said the hospital sometimes runs out of pain medicine, or refuses to provide it. Two health professionals agreed that medicines sometimes run out.*

**Sources of support for the deceased and their caregivers**

*When discussing support to the deceased or caregivers, spirituality was mentioned by almost all participants. One of the deceased “... died so peacefully because, you know, she gave it to the Lord, and the Lord was looking out for her and this*

*helps a lot.” “All my friends supported me, even if they called to just find out how he is, telling me to keep on going and so. ... my friends they visited him, pray with him, pray with me.”*

#### *Use of herbal or traditional medicine*

*No participants reported the use of traditional medicine near the end of life. Several, however, reported that they and/or the deceased used herbal medicine at other times.*

#### *Concerns about end of life care*

*In addition to the themes above, participants raised other concerns. Most noted the absence of support services for dying patients or their caregivers. Many mentioned debts from medicines, treatments, and/or the funeral. Three of the deceased had traveled abroad at their own expense to obtain treatment. Many commented on the quality of nursing care, perhaps because nurses are an accessible target for the frustration of grieving families. “Some of them were very harsh...My sister is a nurse. Every time she was there they treat him better. ...Well everybody work under stress, not enough pay. I don’t blame them.”, said one participant. Another believed that because he was friends with one nurse, his father got better treatment.*

#### *Health Professionals*

*Generally, health professionals agreed with participants perceptions, but their concerns centered on working conditions and hospital resources.*

#### *Nurses*

*The nurse participants agreed that most patients die at home, and that cardiovascular disease was a major cause*

*of death. They confirmed that support services for dying patients are limited: “There is no real policy in place for that kind of thing”. One said that the hospital has “...one counselor. I’m not sure if he’s still around.” Another said that “facilities need improvement, more social workers, improved treatment to extend lives, more readily available care. We give lots of pain medications. Sometimes we run out, but rarely”. One said that she had never heard of nurses being unkind to patients, but added that there “may be certain isolated cases”. Another explained that “We are short staffed... Some come in with a negative feeling of nurses. ...We try, but we cannot please everybody. With a dying patient, we try and make the patient feel as comfortable as possible”.*

#### *Physicians*

*The physicians expressed concern about nurses low salaries and long working hours. They confirmed that most patients die at home, and suggested that home care is often better than patients might get in hospital. They agreed that hospital resources are limited, and noted that Caribbean people tend to accept this because they “believe that illness is a God given destination, so they don’t mind suffering. They believe that maybe it was something they did, and it is a question of almost purification before they go beyond. So they accept it”.*

#### *Conclusion*

*In Grenada, most people die at home by choice, but do not receive financial support, or assistance with providing home care. Effective pain relief is not provided consistently, and some patients are not compliant. Limited hospital resources and salaries impinge on patient*

*care. This study corroborates anecdotal reports that patients die in severe pain, and that other forms of pain do not routinely receive immediate or effective pain relief.*

#### Acknowledgements

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Submitted by Sebastian Kreitschitz, Research

Scientist and Cheryl Cox-Macpherson, PhD

#### 6.2.2 Investigation of Grenadian medicinal plants for antibacterial activity in childhood diarrhea (A8)

Diarrhoea is a major cause of infant morbidity worldwide, particularly in tropical, developing areas such as the Eastern Caribbean, and standard antimicrobial use is often limited by resistance and other factors. For millennia the plant kingdom has provided some of our most important medicines, and more recently the field of ethnobotany has emerged as a means of identifying new drugs, often with novel modes of action. The purpose of the present study is to initiate an investigation into Grenadian medicinal plants for bioactivity relevant to diarrheal disease. It is comprised of two parts: 1. field ethnobotany to determine plants used to treat childhood diarrhea, and 2. lab testing of extracts for antibacterial activity against common enteropathogens.

The Caribbean is a region of rich and poorly investigated biodiversity, and also one of the most threatened. It is home to over 2000 species of wild tropical plants, approximately 13% of which are native to the region, and some even particular to individual islands. The use of medicinal

plants, commonly called *bush tea/medicine*, is widespread and represents a syncretic indigenous tradition based largely on Afro-Caribbean practices which, like many such oral traditions, is currently dying out.

#### Guava leaf/bud (*Psidium guajava*)



Two prior MSc theses have been conducted at WINDREF during the years of 1996-1997 which studied the tradition of *bush medicine* in Grenada. One was a survey of domestic/personal use of bush medicine which showed that over 80% of those interviewed used bush medicine for at least some of their ailments, and that over 50% of mothers used it for children with stomach problems or diarrhea (Skaff, 1997). The other thesis was a descriptive study based on interviews with *bush doctors* aimed at characterizing which plants were being used for which conditions (Politt, 1996). The results again identify diarrhea as commonly treated. This present study thus builds upon past work through 10 additional interviews with traditional healers of at least 20 years

#### Drying medicinal plants



experience, focusing on use in pediatric diarrhea and manner of preparation. The combined results of prior and present studies are used to identify the 5 most commonly used medicinal plants for diarrhea in infants <2 years of age: Guava Leaf/Bud (*Psidium guajava*), Cudjoe Root (*Petiveria alliacea*), Female Malome (*Chamaescye hirta*), Masheate (*Alysicarpus vaginalis*), and Kod a vyelon (*Desmodium incanum*).

#### Drying the Collected Medicinal Plants



#### Traditional Healer in Carriacou

Aqueous extracts are prepared for each plant as per indigenous prescriptions, and these are assayed at various concentrations for antibacterial activity against 3 lab-derived microorganisms, chosen both for regional etiological

relevance and convenience. These organisms were as follows: *Shigella sonnei*, *Salmonella typhimurium*, and nonpathogenic *E. coli*. The assay was performed as a series of two experiments, each with a different purpose. Experiment 1 is an initial assay of 7 plant extracts at 5 concentrations; Experiment 2 is a follow-up assay of 4 extracts for activity at 2 concentrations, designed to test the effect of autoclaving on extract activity, and to include a fresh plant extract. In both experiments the same plant parts are used, namely the whole plant (stem, leaves, root, flower) for all but guava, of which leaves and leaf buds only are used.

Of the extracts tested, only guava leaf/bud (*Psidium guajava*) showed significant *in vitro* antibacterial activity; this nontoxic native proved bactericidal against *Shigella sonnei* at a concentration of .02 g/ml (dry herb/water). This activity was destroyed by autoclaving of the extracts (121°C, 15 lb/in<sup>2</sup>, 15 min) but not by 10 minutes of boiling. The discussion of the results, both ethnobotanical and laboratory, places the study in the context of the extant literature and research regarding the identified plants. Although the focus is on guava and its antibacterial effect, the importance of investigating all of these plants for other relevant modes of activity (eg binding of bacterial toxins, preventing adhesion to enterocytes) is emphasized as well. This thesis thus continues the investigation of Grenadian medicinal plants, providing one potential antimicrobial, and identifying several other plants for future bioassays.

*Submitted by Charles C. Avgeris  
Research Scientist*

### **6.2.3 Demyelination induced by lysolecithin and its effects on the blood-nerve barrier and axonal integrity (A9)**

Most neurons both in the central and peripheral nervous systems possess axons that are ensheathed in a membrane of white material called myelin. Myelin is a complex substance composed of alternating membranes of both lipid and protein. Myelinated axons possess greater conduction velocities compared to unmyelinated axons due to the fact that myelin conveys an insulating property to the neuronal structures it invests. Most peripheral nerves are comprised of a combination of myelinated and unmyelinated neuronal fibers.

Peripheral nerves possess a unique blood supply so that potentially harmful substances do not pass readily across the membrane of the inner perineurial sheath and endoneurial blood vessels into the endoneurial compartment. This so called blood-nerve barrier is made possible by the presence of specialized cytoskeletal membrane complexes known as tight junctions, or zonula occludens, in the endoneurial capillary membranes and inner layers of the perineurium. Tight junctions bind these cells together blocking the passage of most substances.

Because of the ubiquitous presence of myelin in the nervous system and the tremendous advantage of rapid impulse conduction it provides, pathological conditions affecting myelin often have detrimental effects on bodily functions. As a consequence of demyelination, conduction velocity of action potentials will be reduced. Demyelinating diseases are seen both in the central nervous system

(example: Multiple Sclerosis) and peripheral nervous system (example: Guillain-Barre syndrome).

Lysolecithin has been used to experimentally induce demyelination in both the central and peripheral nervous systems. Artificial demyelination affords scientists the ability to induce demyelination in a controlled manner and study the effects of myelin sheath breakdown.

This project utilized lysolecithin as a demyelinating agent in order to focus on the two topics of axonal integrity, the blood-nerve barrier, and demyelination of peripheral axons.

In order to test blood-nerve barrier integrity, trypan blue (which is normally unable to pass the barrier) was administered. Trypan blue fluoresces under appropriate epifluorescent conditions. Hence, nerve sections were observed under epifluorescence to determine whether or not the barrier was compromised. To detect demyelination at the site of application of lysolecithin, Sudan Black B stain was used. Then the slides were then observed under standard bright-field microscopy. In order to observe the axon and myelin sheath integrity of nerve segments distal to the site of application, osmium tetroxide stain and immunohistochemistry were utilized.

The purpose of this study, which was conducted at the University of Idaho, was to understand the effects of artificially-induced demyelination by lysolecithin on adult rat sciatic nerve over varying periods of exposure. The results of this study could expand the overall models of disease

processes relating to human demyelinating diseases in the peripheral nervous system and make it possible to test treatments for those particular diseases.

*Submitted by Andrew Nagengast  
Research Scientist*

## 7.0 Acknowledgements

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Internationally WINDREF collaborates with a growing number of Institutions and individuals who are listed in 7.1.

### 7.1 Associated faculty, staff and collaborators

Collaborator	Affiliation	Project(s)
Mr. I. Abraham	Mt. Rose Seventh Day Adventist School	A1
Dr. D. A. Addiss	CDC, Atlanta, USA	A5
Mrs. M. Alexander	Grand Anse R.C. School	A1
Mr. X. Ameer	MPH student, SGU	A1
Mr. R. Andall	Traditional healer	A8
Dr. A. Antoine	Ministry of Health, Grenada	A1, A2
Mrs. E. Baptiste	Vendome R. C. School	A1
Mr. M. Baptiste	Chief Education Officer, Ministry of Education, Grenada	All projects in Grenada
Dr S. Barada	National Institute of Health, Morocco	A4
Dr. C. Barnes	SGU	A9
Mrs. J. Benoit	Ministry of Health	A1
Mr. J. Bernard	Traditional healer	A8
Ms. J. Blau	Research Scientist, WINDREF	A1
Dr. F. Brahim	SGU	A5
Dr. B. Brathwaite	Former Chief Medical Officer, MOH, Grenada	A2
Ms E. Braithwaite	SGU	A1
Ms. E. Cameron	Research Scientist, WINDREF	A1
Mr. B. Charles	St. Dominic's R.C. School	A1
Ms. E. Charles	Traditional healer	A8
Mr. R. Charles	Traditional healer	A8
Mrs. M. Charles-Fletcher	Calliste Government School	A1
Mrs. B. Christopher	St. Andrew's Methodist School	A1
Mrs. A. Clarke	Ministry of Health/General Hospital	A1
Dr. G. Clark	CDC, San Juan, Puerto Rico	A2
Ms. B. Clarkson	Ministry of Finance	A1

Dr. C. Cox-Macpherson	SGU	All projects
Mrs. C. Crosby	Bonair Government School	A1
Dr. R. Cummings	Chief Medical Officer, Guyana	A5
Mr. S. Dabreo	Vector Control Division, MOH, Grenada	A2
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Mrs. A. David-Antoine	NEWLO	A1
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Mrs. G. Dolphin-Bond	SGU	A2
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Mr. A. Felix	Tivoli R.C. School	A1
Mr. G. Ferguson	Chantimelle R.C. School	A1
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Mrs. E. Forsyth	Florida Government School	A1
Mr. T. Frank	St. Paul's Government School	A1
Mr. E. Frederick	Paraclete Government School	A1
Dr S. Gaborone	Ministry of Health, Botswana	A3
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Mr. H. Gordon	Traditional healer	A8
Mrs. A. Holder	South St. George Government School	A1
Mr. W. Horsford	St. Joseph's R.C. School	A1
Dr. P.J. Hotez	George Washington University	A8
Dr. C.R. House	SGU	A9
Ms. H. Husband	Traditional healer	A8
Mr. A. John	Minister, Ministry of Education, Grenada	All projects in Grenada

<b>Mr. R. Johnson</b>	Westerhall Secondary School	A1
<b>Ms. R. Jones</b>	Traditional healer	A8
<b>Dr. L. Joseph</b>	Ministry of Health, Grenada	A1
<b>Mr. D. Joules</b>	Forestry Dept., Ministry of Agriculture	A8
<b>Dr R. Kabuusu</b>	Research Fellow, WINDREF	A4
<b>Dr M. Kachani</b>	Hassan 11, Rabat, Morocco	A4
<b>Dr. Ed Kaplan</b>	University of Minnesota/CDC	A1
<b>Dr. W. Kolbinger</b>	SGU	A9
<b>Mr. J. Kopycinski</b>	SGU	A1
Mrs. R. Kopycinski	SGU	A1
Mrs. M. Lord	Mt. Moritz Anglican School	A1
Dr E. Lyagoubi	National Institute of Health, Morocco	A4
Ms. C. Lambert	Harvey Vale Government School	A1
Ms. M. Lambert	SGU/WINDREF	All projects
Dr P. Lammie	CDC, Atlanta	A6
Dr B. Louison	CVO, Ministry of Agriculture, Grenada	A6
Dr. C.N.L. Macpherson	SGU/WINDREF	All projects
Dr. S. Maharaj	Chief Medical Officer, Ministry of Health	A1
Dr. T. McCann	SGU/WINDREF	A6
Mr. D. McFarlene	Dover Government School	A1
Ms K. McGrath	GSPCA, Grenada	A6
Dr Tess McPherson	Research Fellow, WINDREF	A6
Dr. R. Milner	Vancouver Hospital	All projects
Dr. C. Modest-Curwen	Minister, Ministry of Health, Grenada	All projects in Grenada
Dr. B. Nelson	Grenada Medical Association/Ministry of Health	A1
Ms. H. Owens	Research Scientist, WINDREF	
Mr. Reuben Patrice	Petit Martinique R.C. School	A1

Ms T. Patterson	SGU	A6
Dr. A. Pensick	SGU	A2
Dr S. Persaud	Ministry of Health, Guyana	A5
Mr. C. Peters	Samaritan Presbyterian School	A1
Dr. J. Pettus	SGU	A7
Mrs. J. Phillip	Morne Jaloux	A1
Dr. T. Poon-King	Ministry of Health, Trinidad and Tobago	A1
Princess Alice Hospital	Ministry of Health	A1
Princess Royal Hospital	Ministry of Health	A1
Dr. L. Ramsammy	Minister of Health, Guyana	A5
Dr. C.V. Rao	SGU	A8
Dr. P. Reiter	CDC, San Juan, Puerto Rico	A2
Ms. K. Richardson	Grenada Heart Foundation	A1
Mrs. C. Roberts	Concord Government School	A1
Dr. P. Rooney	SGU	A3
Ms. J. Roseman	Traditional healer	A8
Dr. Z. Ross	SGU	A8
Mr. S. Samerson	L'Esterre Rosary School	A1
Dr L. Sieffert	Makerere University, Uganda	A4
Ms. J. Smith	St. Giles Anglican School	A1
Mr. Henry Stiell	Hillsborough Government School	A1
Mrs. M. Strachan	Woburn Methodist School	A1
Dr. C. Subbarao	SGU	A2, A7, A8
Dr. K. Taylor	SGU/WINDREF	All projects
Mr. D. Thomas	Happy Hill Secondary School	A1
Mrs. O. Thomas	St. John's Anglican School	A1
Mr. D. Tortugal	Research Scientist, WINDREF	A1
Dr. V. Vorndam	CDC, San Juan, Puerto Rico	A2
Ms. N. Williams	Traditional healer	A8
Mr. G. Wilson	St. John's Christian Secondary School	A1
Mrs. M. Wilson	Corinth Government School	A1
Mr. A. Worme	Ministry of Health, Grenada	A2

Dr. J. Zabriskie

Rockefeller University, NY, USA

A1

## 7.2 Grants

We would like to thank all of the donors who have made WINDREF's work possible in 2002. These include:

- The Lounsbury Foundation who kindly renewed the grant for the collaborative project on rheumatic fever in Grenada for the third year.
- The Liverpool Support Center for their continued support of the lymphatic filariasis project in Guyana
- Ambassador Bartholomew Lawson for supporting the hosting of the New York Academy of Sciences meeting in Grenada in April.
- The Fogarty Foundation who supported students to work on various projects.
- The Danish Research Academy for support for Karin Scholer's work on dengue.

A number of other donors gave financial support during the year and we acknowledge:

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 Dr. Bradford Noel  
 Ernest Marshall Construction  
 Steele's Auto Supplies  
 Nyack & Company Ltd.  
 Independence Agencies Ltd.  
 Esther Noel  
 Coral Cove

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*Assurance Society*

Sun Motors

Dr. Douglas Noel

Anric Co. Ltd.

Coyaba Beach Resort

M&C Gibbs Travel

Caribazaar

Payless Ten Dollar Stores

George Prime

L.A. Purcell

Avril Perrotte

John Braithwaite

## *8.0 Past, present and future*

*research projects*

(Present Research Projects bolded)

### 8.1 Non-communicable diseases

- **Angiotensin converting enzyme and angiotensinogen gene polymorphisms in the Grenadian population: relation to hypertension**
- **Development of a decision rule for screening Obstructive Sleep Apnea and its epidemiologic relevance to the people of Grenada**
- **Prevalence and associated risk factors of hypertension in a sample population of native Caribbean's in Grenada, West Indies**
- **Assessing the prevalence of diabetic complications by examining type I**

and type II adult diabetics for signs of retinopathy, neuropathy, nephropathy and dermatological changes associated with poor glucose control within the native Caribbean population of Grenada

- Hypertension management and control in two Caribbean countries
- Assessment of the effectiveness of broad-spectrum treatment to children with protozoan and nemathelminthic parasitic infections on diarrhoea and school attendance
- The effects of iron-deficiency anemia on cognition and behavior in infants
- **Diurnal variation of urinary endothelin-I and blood pressure: related hypertension**
- Alcohol consumption in Grenada
- The incidence and mortality of cancer in Grenada over the ten year period: 1990-1999.
- The prevalence of abnormal haemoglobin traits in Grenadian secondary school adolescents
- Knowledge, attitudes, beliefs and practices of Sickle Cell Anemia in Grenadian Primary and Secondary school children

## 8.2 Communicable diseases

- Investigation of the prevalence of SIV in the mona monkey (*Cercopithecus mona*) in Grenada
- Seroprevalence of HIV-I and HIV-II in pregnant women in Grenada, W.I. Their knowledge of AIDS and their exposure hazards to the virus
- A cross sectional study of the current status of *Schistosoma mansoni* in St. Lucia by field surveys and supplementary data collection
- Identification and characterization of hantaviruses among the mammal population of Grenada
- HIV/AIDS health education and evaluation program in Grenada
- The seroprevalence of *Toxoplasma gondii* in a population of pregnant women and cats in Grenada, West Indies
- The efficiency of diagnosing women of *Toxoplasma gondii* using PCR techniques in comparison with ELISA
- Dengue virus in Grenada: seroprevalence and associated risk factors
- A current appraisal of dengue virus in Grenada - serotype analysis and vector assessment
- A site receptivity study determining the threat of reintroduction of malaria into Grenada through the study of Anopheline spp. mosquito vectors
- Chlamydial infection among STD clinic attenders in Grenada
- Fever in Grenada
- Mosquitoes and Tourism in Grenada
- Effectiveness of a formula feeding/weaning intervention program in preventing transmission of HTLV-1 from seropositive mothers to newborns in Grenada
- A multi-center longitudinal research study of the behavioral significance of the prevalence of HIV-1 infection in pregnant women and their babies on the islands of Grenada and St. Vincent
- A multi-center longitudinal research study of the ethical analysis of informed consent of the prevalence of HIV-1 infection in pregnant

women and their babies on the islands of Grenada and St. Vincent

- Determining the role of IL-15 in mediating function of viral-specific CD8+ T cells in the myelopathogenesis of HTLV-1: Symptomatic versus asymptomatic patients
- Intestinal protozoan infections in 6-12 year old children in Grenada
- Intestinal helminth infections in 6-12 year old children in Grenada
- The prevalence of intestinal parasites in school children in rural Guyana
- The prevalence of filariasis and its effects on children aged 8-14 in the central corentyne region of rural Guyana
- **Studies examining the elimination of lymphatic filariasis as a public health problem in Guyana.**
- **Seroprevalence of heartworm infection in dogs in Grenada.**
- **Dengue in Grenada**
- Assessing the potential risk factors of dengue and dengue hemorrhagic fever in the tri-island state of Grenada, Carriacou and Petit Martinique
- A comparative study to find out if there is an association between sexual practices and knowledge in adult populations of Botswana and Grenada with the prevalence of HIV/AIDS
- **HIV/AIDS in rural Botswana differentiating between informing and educating.**
- **Rheumatic Fever in Grenada**
- **Isolating T cells from Rheumatic Fever positive blood: Immunofluorescent assay of T lymphocytes via fluorescently labeled monoclonal antibodies**

- **Possible genetic predisposition to Rheumatic Fever: Demonstrating the inheritance fashion of non-HLA B lymphocyte alloantigen D8/17, a marker for Rheumatic Fever**
- **ELISA antibody titres against group A streptococcal M protein moiety and cell wall N-Acetyl-D-Glucosamine in Grenadian Rheumatic Fever patients**

### 8.3 *Unique projects*

- Characterization of five amphibians inhabiting Grenada and subsequent isolation and antimicrobial assay of potential antibiotics derived from their skin
- Mona Monkey studies in West Africa
- Investigation of medicinal plants in Grenada
- Use of medicinal plants in Grenada
- Medicinal drugs from the sea. What do Grenada's waters have to offer?
- Beekeeping in Grenada: Effects of the mite *Varroa jacobsoni* and its control
- **Effects of Grenadian Medicinal Plants on Endemic Microbial causes of Diarrhoeal Diseases**
- *The neurobiological basis of hypoglycemia-associated autonomic failure*
- *Stimulation of angiotensin 4 in cardiac fibroblasts activates matrix metalloproteinases through MAP kinases pathways: A model for astrocytes*
- *REM sleep and memory*

• **End of life care in Grenada**

9.0 Conferences/meetings/workshops

**April 2002** Dr. Cheryl Cox-Macpherson attended the Values in Health Care Conference in Wisconsin, where she presented a paper entitled, "Disclosure in cross-cultural research: A little information may be too much".

Dr. Macpherson, Dr. McCann and Mr. Sean Ramsammy attended the 47<sup>th</sup> Caribbean Health Research Council (CHRC) Meeting in Guyana, where two accepted papers were presented. Dr. McCann presented a paper entitled, "Cancer incidence and mortality in Grenada: 1990-2000" and Sean Ramsammy presented his paper entitled, "Lymphatic filariasis and intestinal parasitoses in a rural area of Guyana: Prevalence and strategies for control".

Dr. Macpherson and Karin Schioler presented a joint paper entitled, "Epidemiology and diagnosis of dengue: Why DHF and DFSS are important now in the Americas?" at the CME Conference held at St. George's University.

Dr Macpherson gave an overview of research at St George's University at the opening ceremony of the Kunkel Conference: The Annual meeting of the New York Academy of Sciences on the 14<sup>th</sup> April 2002.

**September 2002** Dr. Macpherson attended the 3<sup>rd</sup> Regional PAHO /WHO meeting on lymphatic filariasis in Haiti. He was appointed the rapporteur for the first day.

Dr. Macpherson attended the 8<sup>th</sup> MASU International Congress in Kampala Uganda where he was invited to present a plenary paper entitled: "Diagnostic imaging and new sonographic classification".

**June 2002** Dr. Michael Anson attended the American Aging Association 31<sup>st</sup> Annual Meeting in San Diego California, where he presented three Papers. They were entitled: "The protective effects of dietary restriction can be dissociated from calorie intake", "Planarians as animal models for comparative biogerontology: A prospectus" and "Plasma membrane redox system during aging calorie restriction".

**November 2002** Dr. Macpherson was invited to Texas A & M University to give a seminar and lectures to the veterinary faculty and students.

10.0 Publications/papers/abstracts  
2002

- ❖ Cox-Macpherson, C. and Connolly, R.L. 2002. Enough is enough?: Disclosure in cross-cultural research. *IRB*, (In press)
- ❖ Cox-Macpherson, C. 2002 Palliative care: A global duty *Etigi. Tirkkiye Klinikleri: Turkish Clinical Journal of Medical Ethics*, (In press)
- ❖ Cox-Macpherson, C. 2002. To strengthen consensus, consult the stakeholders. *Bioethics*, (submitted)
- ❖ Bartholomot, B., Vuitton, D.A., Harraga, S., Da Zhong Shi, Giraudoux, P., Barnishj, G., Wang, Y.H., Macpherson, C.N.L.

and Craig, P.S. 2002. Combined ultrasound and serologic screening for hepatic alveolar echinococcosis in Central China. *The American Journal of Tropical Medicine and Hygiene*, 66(1): 23-29.

- ❖ Kreitschitz, S. and Cox-Macpherson, C. End of life care: Perspectives from families and caregivers (In preparation)
- ❖ Macpherson, C.N.L., Vuitton, D.A., Gharbi, H.A., Caremani, M., Frider, B., Brunetti, E., Perdomo, R., Schantz, P.M., Felice, C., Teggi, A., da Silva, A., Pawlowski, Z.S., Todorov, T., Pelaez, V., Salama, H., Tinelli, M., Guarnera, E., Lapini, L., Akhan, O. and Hao, W. 2002. International classification of ultrasound images in cystic echinococcosis for application in clinical and field epidemiology settings. *Acta Tropica*, (In press).
- ❖ Macpherson, C.N.L. and Milner, R. 2002. Performance characteristics and quality control of community based ultrasound surveys for cystic and alveolar echinococcosis. *Acta Tropica*, (Submitted).

### 10.1 Completed MSc theses 2002

- Maximos, Baher. Reduced spatial memory performance with diminished REM sleep during different sleep windows.
- Kreitschitz, Sebastian. End of life care in Grenada.

### 10.2 Seminars

- ❖ *A Doctor in the House*. Lord Walton of Detchant. 18th January, 2002.

- ❖ *Metabolic consequences of diseases in and surgery of the distal (part of the) small bowel with respect to bile and vitamin B12 metabolism*. Dr. Gunnar Olofsson. 23rd January, 2002.
- ❖ *Cat fleas and insecticidal resistance: An international monitoring initiative*. Professor Dennis Jacobs. 30th January, 2002.
- ❖ *Medicine on trial: Time to get the evidence right*. Professor Paul Garner. 6th February, 2002.
- ❖ *Lymphatic filariasis in Guyana*. Dr. Calum Macpherson and Ms. Juliette Blau. 13th February, 2002.
- ❖ *Local and international environment justice: New ideas that are changing the face of environmental health*. Dr. Carolyn Stephens. 20th February, 2002.
- ❖ *Knowledge, attitudes, beliefs and practices of Sickle Cell Anemia in Grenadian Primary and Secondary school teachers*. Mr. Elliot Yung. 27th February, 2002.
- ❖ *Our environmental prospect: Profound problems and glorious opportunities*. Professor Norman Myers. 6th March, 2002.
- ❖ *Our environmental prospect: Time of breakdown or breakthrough?* Professor Norman Myers. 7th March, 2002.
- ❖ *End of life care in Grenada*. Mr. S Kreitschitz. 13th March, 2002.
- ❖ *Demyelination induced by lysolecithin and its effects on the blood-nerve barrier and axonal integrity*. Mr. Andrew Nagengast. 20th March, 2002.
- ❖ *The Discovery of Ivermectin*. Dr. Michael Fisher. 20th March, 2002.
- ❖ *Rheumatic Fever in Grenada*. Mr. Trevor Noel. 27th March, 2002.

- ❖ *Moral reasoning: Authorship and publication.* Dr. Cheryl Cox-Macpherson. 10th April, 2002.
- ❖ *What's new in Parasitology at Merck?* Dr. Michael Fisher. 21st August, 2002.
- ❖ *Prevalence of Dengue in Grenada.* Ms. Karin Schioler. 28th August, 2002.
- ❖ *Effects of Grenadian medicinal plants on endemic microbial causes of diarrhoeal disease.* Mr. Charles Avgeris. 11th September, 2002.
- ❖ *Ultrasound, lions and cystic echinococcosis.* Dr. C Macpherson. 25th September, 2002.
- ❖ *Toward the continued development of hospital services in Grenada.* Mr. Dexter James. 2nd October, 2002.
- ❖ *Demyelination induced by lysolecithin and its effects on the blood-nerve barrier and axonal integrity.* Mr. Andrew Nagengast. 9th October, 2002.
- ❖ *Lymphatic Filariasis in Guyana.* Nathan Boddie, Greg Robbins, Geoff Ball and Juilette Blau. 16th October, 2002.
- ❖ *Apoptic events of Macrophages.* Ms. Esther Chapoval. 23rd October, 2002.
- ❖ *The prevalence rate of canine heartworm infection in Grenada.* Ms. Nannette Wagner. 30th October, 2002.
- ❖ *Pooches, people and parasites: A global perspective.* Dr. C Macpherson. 6th November, 2002.
- ❖ *Rheumatic Fever in Grenada.* Mr. T. Noel. 13th November, 2002.
- ❖ *Ethnicity and culture: Impact on end of life care.* Dr. Jerome Kurent. 27th November, 2002.
- ❖ *Hypoxic ventilatory response: Assessing its predictive value in AMS, HAPE and acclimatization* Mr. Scott Forman and *HIV/AIDS in rural Botswana: Differentiating between informing and educating.* Ms Setshidi Makwinja. 4th December, 2002.
- ❖ *Chronic neck and back pain: New concepts, new directions and a melding of the disciplines.* Mr. Michael Brown. 11th December, 2002.



**Dr. Shamdeo Persaud, MD, MPH, PhD candidate, supported by a grant from the Liverpool Support Centre**



**From left to right: Andrew Nagengast, Dr. Macpherson, Isha English and Setshidi Makwinja discuss research projects in WINDREF**

#### 11.0 Further information

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