

**WINDWARD
ISLANDS
RESEARCH
& EDUCATION
FOUNDATION**



2018 Annual Report



Regional Health Care provided from 12 countries who participated in the World Diabetes Foundation Training Program at WINDREF in 2018.

Cover Photo: Photo credit Joshua Yetman



Mission Statement

WINDREF seeks to advance health and sustainable 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.

Goals

- To provide a scientific resource centre capable of coordinating international collaborative research of the highest caliber in the areas of medicine, medical and veterinary public health, environmental health, anthropology, sociology, ecology, marine and terrestrial biology, and ethics.
- To provide a first rate academic opportunity to scientists from the Caribbean and around the world through unique research opportunities that enhances 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 in the pursuit of evidence-based policies.

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Director’s Report on WINDREF Activities in 2018

2018 proved to be a banner year for WINDREF in terms of obtaining new research grants and continuation of existing programs. Unfortunately, it also marked the end of an era with Baroness Howells of St. David stepping down as our President. She also demitted office from the House of Lords.

The WINDREF Boards at their annual board meeting in London on Wednesday 4th December nominated Dr. Esperance Schaefer and Mr. George McGuire to join the WINDREF Board of Directors. Both these nominees have accepted.



(Figure 1) Dr. Esperance Schaefer



(Figure 1) Mr. George McGuire

Mr. George McGuire, joins the WINDREF Board of Directors having served the Government of Grenada and St. George’s University (SGU) with great distinction over the past 40 years. He received his BSc at Queens University in Canada and his MSC degree in Quantum Physics and Education at Bradley Un in Illinois.

Mr. McGuire has held many important posts in the Government of Grenada including from 1984 as the Minister of Education – a post he held till 1990. Mr. McGuire has also served as the of Minister of Youth, Sports and Culture, Minister of Labour, Social Services and Cooperatives, and Minister of Fisheries and Civil Aviation. He has twice been appointed as Speaker of the House of Representatives: first in 2003 and again in 2008 till 2013. Mr. McGuire recognized the value of SGU to Grenada and has been a good friend and supporter since the University’s earliest days. During his time as Minister of Education Mr. McGuire worked closely with the then VC Dr. Geoffrey Bourne and it was during that period that the groundwork and vision for the expansion of SGU from the Grand Anse Campus to the True Blue Campus was laid out.

Dr. Esperance Schaefer has been visiting the Caribbean since her earliest days and has a great affinity for the people of the Region. She obtained her BSc from Yale, her MD and MPH degrees from Colombia and worked on her MPH practicum with me on looking at the birthrate changes following hurricane Ivan in 2004 which devastated Grenada, but had little impact on the neighboring island of St. Vincent. Dr. Schaefer completed her Internship and Residency in Internal Medicine and Fellowship at the Massachusetts General Hospital. She is Board Certified in Internal

Medicine and gastroenterology. Since 2013, she has served as an Instructor at the School of Medicine, Harvard. She has contributed 5 book chapters and published 15 papers in peer-reviewed journals.

WINDREF would like to thank our outgoing President Baroness Howells who joined the WINDREF Board of Trustees in 2005 and became our President with the retirement of Lord Soulsby in 2013. Baroness Howells was a tremendous advocate for the Sports for Health Program which was launched at the House of Lords in 2010 and has had Kirani James as its sporting advocate since that time. There are also sporting ambassadors in all of the Secondary schools throughout Grenada, Carriacou and Petite Martinique. The goal of the program is aimed at promoting a healthy lifestyle through exercise and eating a healthy diet to prevent the growing global pandemic of obesity and its associated clinical problems of diabetes, hypertension and cardiovascular disease. This program is run through WINDREF's Caribbean Center for Health Equity. At this year's House of Lords Dinner held on Thursday, December 6th, with the generous donation of US\$100,000.00 by Marion Modica, the Sports for Health Program was re-named as the Baroness Howells Sports for Health Program in honor of the commitment of our outgoing President to this initiative.

The House of Lords Dinner was also addressed by Grenada's Olympic Gold and Silver Medalist from the London and Rio Olympic Games, Kirani James, who took time away from his preparations for the 2020 Olympic Games to be held in Tokyo, Japan. In his address, Kirani talked about his personal encounters with the problems of cardiovascular disease which had recently

affected his mother's closest friend and that he was delighted to have a role in the Baroness Howells Sports for Health Program as its Sporting Advocate. He noted that his last visit to the House was two years before the London Olympics and this current visit is two years before the next Summer Olympics in 2020 to be held in Tokyo, Japan.



(Figure 3) Chancellor Charles R. Modica presents Baroness Howells with a painting depicting a Heliconia from the Balthazar Estate named after Dr. Johnson Beharry, VC.



(Figure 4) Kirani James thanks Baroness Howells for her support for the Sports for Health Program and her contributions to the peoples of the Caribbean.



(Figure 5) Dr. Macpherson announces that with Chancellor Modica's mother's, Marion Modica, donation of US\$100,000.00 the Program will now be renamed as the Baroness Howells Sports for Health Program.

The keynote speaker at the House of Lords Dinner was Professor Richard Horton. Professor Horton graduated in 1986 with a medical degree from the University of Birmingham. After a few years in clinical practice, he joined the Lancet in 1990 as its Assistant Editor and became the Journal's Editor-in-Chief in 1995 - a position he has held now for almost a quarter of a century. Since 2001, Professor Horton has served as the Publisher and Editorial Director of The Lancet. During this time, he has also been a member or Chaired a number of important Committees in regional and international organizations and currently Chairs the WHO High-level Advisory group on Women, Children and Adolescents Health and Human Rights. He serves as Patron of Medsin. In recognition of his enormous contributions to the field of medicine, he has received many honorary awards, doctorates, professorships and fellowships from many Universities, international organizations and institutes from many different countries. A truly internationally recognized and respected figure in medical journalism. The Lancet, under Pro-

fessor Horton's leadership, has continued to shine an essential focus on many areas of medical issues including the impact of climate change. Such is the reputation of the journal that articles published in it are quickly picked up by news media around the world. Increasing the influence of the journal on informing and shaping opinions. The title of Professor Horton's presentation was "Global Health in a Wounded World". Professor Horton delivered a powerful speech on the threats to the survival of mankind and reminded us of previous civilizations who once thrived and then disappeared and that we should be ever mindful of these threats.



(Figure 6) Professor Richard Horton delivering his Keynote Speech at the House of Lords on Thursday 6th December 2018.

The recipient of the 2019 Mike Fisher Memorial Award was Professor Janet Hemingway, who unfortunately could not attend the House of Lords Dinner, as she was hosting the inaugural Commencement Ceremony at the Liverpool School of Tropical Medicine (LSTM), where she has served as Director since 2001. During that time, she increased the school's annual budget from approximately 32 million pounds to over 300 million pounds. In addition to serving as Director of the LSTM she is

the Senior Technical Advisor to the Bill and Melinda Gates Foundation for Neglected Tropical Diseases. She was elected as a Fellow of the Royal Society, awarded the Commander of the British Empire by the Her Majesty the Queen, has earned 3 DSc degrees and has received many other awards and distinctions for her research work which has focused mostly on insecticide resistance in mosquitoes. Professor Paul Garner, who is a Senior Research Fellow at WINDREF, and according to Janet, someone who influenced her to join the LSTM in 2001, was nominated by Janet to receive the award on her behalf and will present it to her at an appropriate occasion back at the LSTM.



(Figure 7) Professor Paul Garner receives the Mike Fisher Memorial Plaque from the 2017 recipient, Chancellor Charles R. Modica. Professor Garner will present the award to the 2019 recipient, Professor Janet Hemingway, at a suitable ceremony back at the Liverpool School of Tropical Medicine.



(Figure 8) Pictures from the House of Lords Dinner from top left to bottom right:

- Cal Macpherson, Ellen Ratner, Baroness Howells, Charles Modica
- Cal Macpherson, Kirsten Rausing, Trevor Noël
- Karin Schneider, Nathalie Verpoorten, Randall Waechter, Trevor Noël, Desiree LaBeaud, Guillermo Herrera-Taracena
- Trevor Noël, Andrew Wathey, Charles Modica, Johnson Beharry VC, Baroness Howells, Desiree LaBeaud, Amaya Bustinduy

A silent auction was held during the Dinner and all proceeds will go towards the Sports for Health Program. We thank the following donors to the silent auction:

Kirani who donated an autographed official Grenada National Olympic team tracksuit and his running shoes, properties to stay at in Kenya, donated by our board member, Patrick Orr, a week in Grenada at the Mount Cinnamon Resort and Beach Club, a large bottle of No.5 Westerhall rum, and a lunch for two at the House of Lords, a Tour of the House and gifts from the House of Lords gift shop from Lord Sheik.



(Figure 9) Kirani poses with the autographed tracksuit and running spikes which he donated to the silent auction

Patrick Orr, a member of the WINDREF UK Board of Trustees, and the UK Treasurer, gave the closing remarks.



(Figure 10) Patrick Orr presenting the closing remarks

On April 18th, a Celebration of the Life of Lord Soulsby was held at the Royal Society of Medicine, 1 Wimpole Street, London. The Keynote Speaker was Professor Chris Whitty, Chief Scientific Adviser to the Department of Health & Social Care. Lord Trees, Dr. Judy McArthur Clark, The Hon. Mrs. Katarina Bulloch, Dame Bridget Ogilvie, Sophie McArthur Clark, Dr. Colin Johnstone and Professor Calum Macpherson also gave short presentations at the Celebration which was attended by over 150 dignitaries from the medical and veterinary professions. I was honored to present on behalf of so many colleagues who fondly remember Lord Soulsby from his work and contributions outside of the UK and USA. The Celebration was followed by a dinner for family and friends and provided a memorable evening for all invited guests.

The 2018 WINDREF Lecture was presented by Dr. Tim Endy, MD, MPH, entitled “Dengue: an overview of the proposed incidence study in Grenada 2018-2021”.

2018 saw a further expansion and consolidation of projects conducted by WINDREF. The Sports for Health program was assisted by funds generously donated by Marion Modica and raised at the WINDREF House of Lords Dinner detailed above. The Baroness Howells Sports for Health Program will continue its activities under the umbrella of the Caribbean Center for Health Equity (CCHE) during 2019 and beyond. The activities of the CCHE were further bolstered by a grant from the World Diabetes Foundation which has seen a workshop conducted in Grenada (see cover photo of participants and report by Drs. Macpherson and Bidaisee in this Annual Report) in 2018. The activities of this program will be conducted in other Windward Islands in partnership with Dr. Carlene Radix, Head of Health, and Lydia Atkins, Programme Officer, in the Hu-

man & Social Cluster, Organization of Eastern Caribbean States (OECS), St. Lucia and Kimberly Ashby-Mitchell, Caribbean Public Health Agency (CARPHA). A list of all the other grants received in 2018 is provided in the Grants section. As a result of obtaining external grants of more than US\$5,000,000.00 in 2018 to be implemented over the next five years, WINDREF expanded its financial oversight with the recruitment of Mr. Hayden Redhead as the new Assistant Project Coordinator.



(Figure 11) Mr. Hayden Redhead

During the year, a number of new Research Scientists were appointed to the Research Institute and they are listed in this Annual Report. A number of publications were produced in 2018 and many conference presentations were presented at International Conferences, hosted a Fogarty International Conference here in Grenada. All of these are listed in the relevant sections of this Annual Report. Dr. Macpherson continued to serve as a member of the Research Advisory Committee of CARPHA. It was a pleasure to host Dr. Corey Schwartz, a Charter Member of the MD/MSc degree program and one of four Charter research Scientists of WINDREF in 1994. Dr. Schwartz now serves as the Hospice Medical Director for Kaiser Permanente for Napa and Solano counties and is the Chair of the Hos-

pice Chiefs of Kaiser North California. He returned to Grenada twice in 2018 and served as the Emcee of the August 2018 White Coat Ceremony at of the School of Medicine at SGU.

On behalf of the members of the Grenada, United Kingdom, and United States Boards of Trustees and Directors, I would like to thank our collaborators and donors for making 2018 a very successful year for WINDREF. We thank all of our donors for supporting the work of WINDREF over the past year, and look forward to another successful year in 2019 which will be WINDREF's 25th Anniversary.



Calum N.L. Macpherson
Director, WINDREF

WINDREF Organization

Board of Directors

- Baroness Howells of St. David's, OBE (President)
- Calum N. L. Macpherson, PhD, DIC, FRSPH (Vice President & Director)
- Trevor P. Noël, PhD, MPH, FRSPH (Deputy Director)
- Margaret Lambert, MA, (Secretary Treasurer)
- Mary Jeanne Kreek, MD, PharmD (Hon), PhD (Hon)
- Karen Lawson, PhD
- Ellen Ratner, MEd
- Joseph Feldman, MD
- Joe Childers, PhD

Board of Trustees (United Kingdom)

- Baroness Howells of St. David, OBE
- Sir Kenneth Calman, KCB, FRCSE

- Lord Stevens of Kirkwhelpington, KStJ, QPM, DL, FRSA,
- Lord Trees of The Ross, DVM, PhD
- Neil Poulter, MD
- Patrick Orr
- Margaret Lambert, MA (Ex Officio)
- Calum Macpherson, PhD, DIC, FRSPH (Ex Officio)

Scientific Advisory Board

- Sir Frederick Ballantyne, MD
- John R. David, MD
- Malcolm A. Ferguson-Smith, MBChB, FRCP, FRCPATH
- Edmond Fischer, DSc
- Calum Macpherson, PhD, DIC
- Anselm Hennis, MBBS, PhD, FRCP, FACP
- Mary Jeanne Kreek, MD, PharmD (Hon), PhD (Hon)
- Ian McConnell, BVMS, FRSE, F. Med. Sci.
- Hugh Montgomery, MD
- Baron Peter Piot, MD, PhD, CMG, FRCP
- Neil Poulter, MD, PhD
- Melinda S. Sothorn, PhD, CEP
- Richard Scribner, MD, MPH
- Lord Trees of The Ross, DVM, PhD
- James Hospedales, MB, BS, MSc

Administration — Grenada

Dr. Randall Waechter continued as Grants Administrator, Mr. Kareem Coomansingh continued as Assistant Grants Administrator, Ms. Isha English continued as Assistant Administrator, and Ms. Naomi Alexander and Ms. Yvette Baptiste continued as secretaries. Ms. Celia Clyne Edwards provides legal support. Mr. Hayden Redhead joined as the new Assistant Project Coordinator.

Administration— United States

WINDREF (USA) was established as a 501(c)3 non-profit organization to facilitate coordination of the USA activities and to administer

charitable donations from the United States and worldwide. Its goal is to enhance the development of WINDREF's research and educational programs. The offices are located in Great River, New York. Ms. Sarah Cahill provides administrative and logistical support, and Mr. Michael Cahill provides legal support.

Administration—United Kingdom

WINDREF (UK) was set-up as a charitable trust in Winchester, England in 1999 to promote collaboration between WINDREF scientists and academic centers of research in the United Kingdom and the European community. A Board of Trustees was appointed in 1999 to oversee the activities of WINDREF (UK). The office is located in London. Mr. Patrick Orr provides oversight of the financial operation and charitable status of WINDREF (UK).

Senior Research Fellows

- Hugh W. Ferguson, BVM&S, PhD, Dipl. ACVP, MRCVS, FRCP
- Paul Fields, PhD
- Paul Garner, MBBS, PhD
- Mary Glenn, PhD
- Duane Gubler, ScD
- Ruth Milner, MSc
- Stephen Morse, PhD
- Leslie Ramsammy, PhD, DSc (Hon)
- Douglas Slater, MD, MPH
- Stanley Weiss, MD
- Melinda Southern, PhD
- Richard Schribner, MD, PhD
- Marios Loukas, MD, PhD
- Desiree LaBeaud, MD, MSc

Research Fellows

- John Adamski, MD, MSc, MPH
- Muge Akpinar-Elci, MD, MPH
- Glennis Andall, PhD
- Jonathan Ashcroft, MD, PhD
- Charles Avgeris, MD, MSc

- Grant Burgess, PhD
- Reccia Charles, PhD
- Sonia Chehil, MD, FRCPC
- Cheryl Cox Macpherson, PhD
- Andrea Easter-Pilcher, PhD
- Martin Forde, ScD
- Mark Gibson, MA
- Orazio Giliberti, MD
- Natalie Hendon, PharmD
- Richard Kabuusu, DVM, MPH
- Victoria Kimotho, MPH
- Svetlana Kotelnikova, PhD
- Barbara Landon, PsyD
- Theresa McCann, MPH, PhD
- Barrymore McBarnette, MD, MPH, MBA
- Clare Morrall, PhD
- Shamdeo Persaud, MD, MPH
- Roger Radix, MD, MPH, MIB, FRSPH
- Christine Richards, PhD, MPH
- Bonnie Rusk, MSc
- Hugh Sealy, PhD., P.Eng.
- Karen Schioler, PhD
- Shanti Singh, MD, MPH
- Kamilah Thomas-Purcell, PhD, MPH
- Randall Waechter, BBA, PhD
- Karen Blackmon, PhD
- Michelle Fernandes, MBBS, DPhil
- Andrew Sobering, PhD
- Trevor Noël, PhD, MPH, FRSPH

Research Scientists

Sadiq Al-Tamini, Sumita Asthana, Yitzhack Asulin, Bishara Baddour, Jean-Pierre Barakat, Matthew Beeson, Matthew Boles, William Brown, Ella Cameron, Nicholas Caputo, Rae Connolly, Abraham El-Sedfy, Karla Farmer, Daniel Firer, Kristy Fisher, Scott Forman, Brandon Francis, Christopher Gibson, Vamsi Guntur, François Hallé, Anthony Junck, Megan Kaminskyj, Sebastian Kreitzschitz, Erik Lacy, Ede Langevine, Richard Lehman, Jason Lowther, Setshidi Makwinja, Paul Mancuso, Baher Maximos, Shanice McKain, John McCormack, David

Melamed, Kirk Minkus, Jerry Mitchell, Jessica Morlok, Kevin Neill, Bayela Nfila, Yolanda Ng, Michael Nillas, Steve Nimrod, Andre Panagos, Barry Politi, Sandeep Pulim, Sean Ramsammy, Justin Rebo, Laura Robinson, Corey Schwartz, Sarah Scott, Christopher Skaff, Nadia Solomon, David Steinberg, Derrick Tlhoiwe, Sarah Treter, Nghia Truong, James Tsai, Dan Twyan, Frank Van Natta, Ru-Amir Walker, Juliette Williams, David Winokur, Colleen Wunderlich, Elliot Yung, Regan Schwartz, Nikita Cudjoe, Oxana Aghaei, Pheny Phuu, Molly Ziegler, Katherine Brigman.

Current Research Projects

The Elimination of the Soil Transmitted Helminths from Grenada and Beyond

The practical lab and field based focus of this elimination program was to examine the prevalence and importance of the STH in Grenada and their potential elimination. The STH study was initiated following ethical approval in 2012. The study had a population-based focus and used a multi-stage randomization approach to proportionally represent the geographic distribution of the study cohort. In January 2012, informed consents were circulated with questionnaires. The questionnaires were used to establish the initial attitude and practices (811 students) from 26 primary schools across the tri-island state of Grenada. Between February and April 2012, the STH baseline prevalence 1.3% (7 of 527) was established in children aged 5- 11 examining fresh stool samples using Zinc Sulphate floatation with centrifugation. The 7 children infected with STH immediately received albendazole. Within a month of the completion of the baseline study, STH sensitization posters were erected at all 56 primary schools.



STH sensitization posters in one of the schools (St. Thomas Aquinas R. C School, Petite Martinique)



Students from Chantimelle RC school St. Patrick with ARS

The automatic response systems (ARS) were used on 903 schoolchildren to assess their short term (administered after 20 minutes) in March 2014 and of these 767 could be traced to assess their long term (8 months later). There was a positive short-term effect from the educational intervention in STH knowledge for all questions across all 903 students ($p < .001$). The assessment of the long term recall showed a decrease in knowledge for only one of the eight questions across all 767 students ($p = 0.011$).

The STH prevalence post intervention (0.0%) was assessed in October/November 2014 and demonstrated a statistically significant reduction (p -value $< .001$) using an exact Chi-square test.

A parallel analysis in the Grenada General Hospital Laboratory (GGHL) utilizing their 51,913 records of examining stool samples from all of the country using the formalin ether technique collected annually since 2006 demonstrated a significant decrease in STH from the start of this intervention 0.77% (95% Confidence Interval: 0.68 – 0.90) between 2006 – 2012 and 0.25 % (95% Confidence Interval: 0.19 – 0.33) from 2012 – 2017.



Student participants handwashing at the Tivoli R. C. school in St. Andrew.

Year	Tests	Strongyloides stercoralis	Ancylostoma duodenale/Necator americanus	Trichuris trichiurae	Ascaris lumbricoides	Total	Total/1000
2006	3,244	11	7	1	2	21	6.5
2007	3,635	19	13	6	9	47	12.9
2008	4,362	17	9	5	0	31	7.1
2009	4,352	20	16	6	0	42	9.7
2010	4,523	11	15	5	0	31	6.9
2011	4,950	8	13	1	3	25	5.1
2012	4,608	3	4	0	0	7	1.5
2013	4,308	4	5	0	1	10	2.3
2014	4,154	8	0	2	4	14	3.4
2015	4,809	15	1	0	1	17	3.5
2016	4,829	8	1	1	1	11	2.3
2017	4,139	3	0	0	2	5	1.21

Results Grenada General Hospital Soil Transmitted Helminths

The GGHL also demonstrated a significant decrease in prevalence of feco orally transmitted protozoan species 9.83 % (95% Confidence Interval: 9.5 – 10.2) between 2006 – 2012 and 5.92 (95% Confidence Interval: 5.6 – 6.2) from 2012 – 2017.

Year	Test	Endolimax nana	Entamoeba coli	Entamoeba histolytica	Entamoeba hartmanni	Iodamoeba bütschlii	Giardia lamblia	Total	Total / 1000
2006	3,244	256	85	75	85	77	11	589	181.6
2007	3,635	119	96	57	52	40	29	393	108.1
2008	4,362	156	145	91	14	23	14	443	101.6
2009	4,352	46	102	47	37	19	11	262	60.2
2010	4,523	85	137	45	83	33	3	386	85.3
2011	4,950	119	72	120	19	44	18	392	79.2
2012	4,608	77	76	54	25	26	3	261	56.6
2013	4,308	118	68	84	24	37	16	347	80.5
2014	4,154	82	62	73	24	18	10	269	64.8
2015	4,809	65	44	59	13	12	7	200	41.6
2016	4,829	87	54	96	10	17	9	273	56.5
2017	4,139	49	33	54	0	8	5	149	36.0

Results Grenada General Hospital Laboratory Protozoan Cyst

These data indicate that the intervention program was successful and strongly suggest that education can play a powerful role in the reduction of a wider spectrum of pathogens than those targeted by the intervention study. It is therefore strongly suggested that control programs against STHs should employ the widest possible interventions available. The long term benefits will determine the overall impact that this approach could have on the health of children. This control intervention program has been written up as a dissertation as partial fulfillment of a Doctorate awarded to Dr. Trevor Paul Noël.

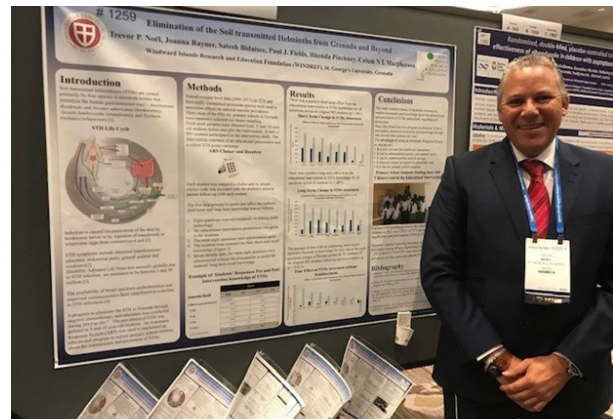
The future considerations in the coming years 2019 - 2023 include the following; Assistance will be provided to the GGHL to regularize their standard operating procedure for appropriate processing of stool samples. The STH prevalence will be carefully monitored in partnership with GGHL along with other fecal orally transmitted protozoan spe-

cies. The appropriate treatment will be provided by WINDREF through our close partnership with the GGHL should this be necessary. WINDREF has established a Caribbean Centre for Health Equity (CCHE) and one of the centres activities will be the continuous education of susceptible low income populations in Grenada.

Upgrading safe drinking water and sanitation facilities will be one of the areas of continued support by WINDREF. The longitudinal impact of these activities on preventable NTDs will be continuously assessed.

In the next two years there will be continued educational campaigns using ARS. This will be implemented biannually in the Primary and Secondary schools to continuously build on the successes demonstrated in the previous work. This study will be expanded to examine its effectiveness for the control of other infectious diseases: for example, vector borne diseases. This future study in 2019 conforms with the request made to WINDREF by the Ministry of Health.

Other novel educational delivery systems will be explored as they are developed. Novel educational delivery systems appear to enhance the messages they impart.



Trevor Noël presenting results at the American Society of Tropical Medicine and Hygiene in October 2018.

Submitted by Trevor Paul Noël

Zika and Neurodevelopment Among Infants in Grenada

The Zika virus is a flavivirus that can be transmitted via the *Aedes spp.* This virus was first discovered in Uganda in 1947 and later identified in homo sapiens in 1952. Similar to dengue virus, persons infected with the Zika virus are usually asymptomatic or present with mild symptoms such as conjunctivitis, rash, muscle pain, joint pain, and/or fever. Prenatal maternal to child transmission can lead to microcephaly in infants. However, the spectrum of adverse neurodevelopmental outcomes associated with *in utero* Zika virus exposure is not well investigated, particularly in children without clinically apparent microcephaly at birth. This research program aims to address gaps in our understanding of the impact of prenatal Zika virus exposure on neurodevelopment by longitudinal follow-up of a large cohort of infants born during the Zika virus outbreak.

In Grenada, the Zika outbreak occurred from April 2016 to January 2018; more than 60% of the population was affected. The first reported case was in St. Andrew's Parish in April 2016 but the highest attack rate was noted in St. George's Parish. During the Zika outbreak, the Grenada Ministry of Health (MOH) carried out a pregnancy surveillance study in antenatal clinics and worked closely with WINDREF to accurately characterize the virological status of pregnant women, in conjunction with Desiree LaBeaud's lab at Stanford University. WINDREF research assistants visited antenatal clinics and tested 700 pregnant mothers. Postpartum follow-up evaluation of 141 of these mothers and their infants as well as 245 newly enrolled mother-infant pairs was conducted as part of a research study funded by Stanford University Child Health Research Institute.

In total, 386 mothers and 388 infants were evaluated during the postnatal period to determine the proportion of mothers and children that had been infected with Zika virus as well as the consequences of prenatal Zika virus exposure on infant development. In this initial postnatal follow-up evaluation, infants ranged from 2 weeks to 20 months. A complete physical examination of the infant was conducted by Grenadian registered nurses. Blood was collected from both the mother and infant. A nanoscale plasmonic gold (IgG) antigen array (pGOLD) was used for serum testing of prior Zika and Dengue infection; assays were run on the maternal and infant's blood sample.

Results from serum testing in the mothers showed that 79.4% had evidence of prior Zika virus infection; 98.6% had evidence of prior Dengue virus infection; and 77.3% had evidence for both (see Figure 1). In terms of timing of infection, avidity testing showed that 95% of the mothers had been infected with Zika in the past 6 months; whereas, only 16.5% had signs of recent Dengue infection. This suggests that the majority of mothers were infected by the Zika virus during pregnancy; whereas Dengue infection most likely occurred prior to pregnancy.

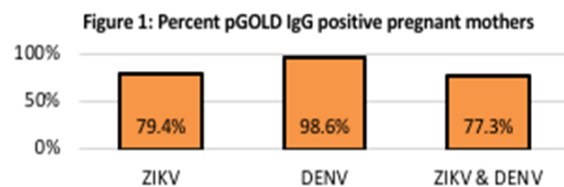


Figure 1: Percent pGOLD IgG positive pregnant mothers

Results from postnatal serum testing of the infants showed that only 0.5% were positive for the Zika virus and 8.3% were positive for dengue (see Figure 2). This is consistent with postnatal IgG findings from other large co-

horts of children born to Zika-positive mothers. Given strong evidence for prenatal vertical transmission of the Zika virus, it is possible that the infant immune system is too immature to launch a response on par with adult thresholds for prior virus detection.

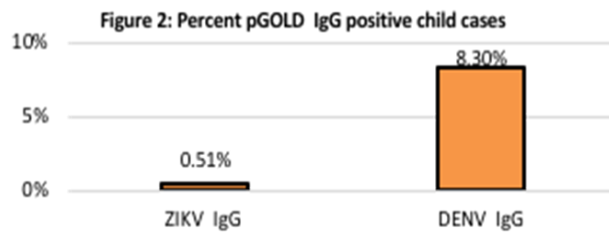


Figure 2: Percent pGOLD IgG positive child cases

In terms of postnatal infant outcomes, 344 children had a normal delivery, 42 were delivered by Caesarean section, and 2 required intervention (i.e., forceps or ventouse). One of the Zika-positive children was born with microcephaly (see Figure 3). This child showed signs of severe developmental delays, hypertonia, hyperreflexia, and seizures. Congenital anomalies in additional children included club foot in one infant, bilateral ptosis in another infant, and hydrocephalus in a third infant.

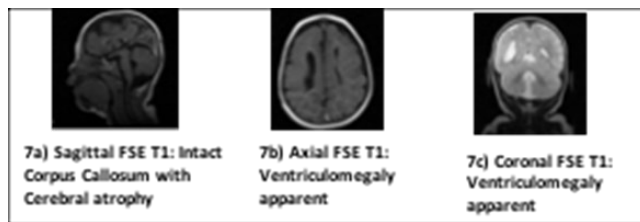


Figure 3: MRI from child with microcephaly

Infants from this large cohort are currently being assessed at 1 year and 2 years of age thanks to funding from USAID and the National Institute of Health (R21TW010536). Follow-up assessments include a comprehensive

evaluation of language, motor, and behavioral functions, serum testing, anthropometrics, and electroencephalography. These assessments aim to determine whether children with in utero Zika virus exposure show signs of neurocognitive delays or behavioral problems later in development, even in the absence of clinically apparent congenital brain abnormalities at birth.

In addition to assessing neurodevelopmental outcomes in children born during the Zika outbreak, we will also be administering an early environmental enrichment intervention as part of a randomized controlled trial. This intervention consists of a series of 12 Conscious Discipline classes over a period of 12 weeks, administered by a trained Roving Caregiver. Conscious Discipline, developed by Dr. Becky Bailey, is a social-emotional learning program that is based on current brain research. During 12 weekly 1-hour Conscious Discipline sessions, the Roving Caregiver along with the parent and child will complete a series of activities (games, stories, songs) specifically designed to foster deeper connections between parents and their children. Parents will have all the materials provided to them. Findings from a prior Saving Brains Grenada study in 2015 showed that children exposed to Conscious Discipline had enhanced cognition, attention and improved behavioral skills after the intervention. We aim to determine whether the cognitive benefits of Conscious Discipline extend to children with neurodevelopmental delays secondary to prenatal Zika virus exposure.

In sum, thanks to a strong collaborative network between the Grenada Ministry of Health and Ministry of Social Development, WINDREF, and Stanford University, we have been able to comprehensively evaluate a large cohort of infants born during the Zika

outbreak in Grenada. Longitudinal follow-up of this cohort will allow us to answer critical questions relevant to all Zika endemic regions such as: Does prenatal Zika virus exposure increase risk of adverse neurodevelopmental outcomes in early childhood? What maternal and infant factors interact with prenatal Zika virus exposure to increase risk of adverse outcomes? Can environmental enrichment attenuate adverse outcomes and enhance cognition and behavior in infants with prenatal Zika virus exposure? Finally, this research program is building regional capacity for neurodevelopmental assessment and intervention by training and employing local undergraduate and graduate students, nurses, and roving caregivers.

Submitted by Nikita Cudjoe, Trevor Noël, Amy Krystosik, Randall Waechter, Barbara Landon, Michelle Fernandes, Karen Blackmon, Elysse Noël Grossi-Soyster, Benjamin Pinsky, Veronica Mapp-Alexander, Priyanka Suresh, Justin Lee, George Mitchell, Calum Macpherson, A. Desiree LaBeaud

Outcomes Following Chikungunya Infection During Pregnancy

Background

Chikungunya virus (CHIKV) is a mosquito-borne virus with recent epidemic global spread to Americas, Africa, Asia and Europe. The name originates from the Makonde language meaning “disease that bends up joints,” referencing its hallmark symptom of crippling joint pain that is often accompanied by fever and myalgia. In 2013, Chikungunya emerged as a large scale outbreak in the Americas and, thus far, has infected over one million individuals in this region. The Caribbean island of Grenada experienced a large out-

break of the Asian lineage of CHIKV from August through December of 2014.

Prior studies of CHIKV during pregnancy have demonstrated high rates of maternal-to-child transmission (MTCT) in the setting of intrapartum maternal viremia. In cases of MTCT, neonatal sequelae are often quite severe and may result in permanent neurologic damage. However, the impact of CHIKV on other pregnancy-related outcomes remains limited. In this study, we investigated pregnancy-related and maternal outcomes for women with laboratory-confirmed CHIKV infection compared to women without CHIKV infection during pregnancy during Grenada’s 2014 CHIKV outbreak.

Aims

1. Determine maternal and pregnancy-related outcomes for women with and without CHIKV infection during pregnancy.
2. Determine the rate of MTCT of CHIKV
3. Determine CHIKV severity and symptom persistence for women with CHIKV during pregnancy compared to women with CHIKV outside of pregnancy.

Methods

This cohort study recruited women who gave birth during Grenada’s 2014 CHIKV outbreak. Mother-child pairs were eligible for study enrollment if the mother had given birth during, within nine months prior, or 11 months following the CHIKV outbreak. After written consent was obtained from participants, we collected detailed demographic, socioeconomic, pregnancy and birth information from mothers. CHIKV specific surveys were administered investigating symptomatology, timing of infection and associated complications

Our study group consisted of women who had experienced CHIKV infection during pregnancy and their infants. We compared our study group to one of two comparator groups depending on the study question. To assess the impact of CHIKV on pregnancy and infant outcomes, we contrasted findings from our study group to our first comparator group of women who gave birth during the specified period and had never had CHIKV infection. Similarly, to assess characteristics of CHIKV infection onset during pregnancy versus outside of pregnancy, we contrasted our study group to our second comparator group of women who tested positive for CHIKV antibodies and reported onset of CHIKV infection outside of pregnancy (see Box 1).

	Study group	Comparator group (1)	Comparator group (2)
Maternal	- Pregnant during CHIKV outbreak (with positive serum testing for CHIKV) -Reported history of CHIKV <u>during</u> pregnancy	- Pregnant during CHIKV outbreak - Negative serum testing for CHIKV	- Pregnant during CHIKV outbreak (with positive serum testing for CHIKV) - Reported history of CHIKV <u>outside</u> of pregnancy

Box 1. Overview of participant grouping

In infants, CHIKV antibodies may be maternal in origin (acquired from transplacental movement of maternal CHIKV antibodies into fetal circulation), fetal in origin (from in utero infection), or neonatal in origin (from infection occurring after birth). By waiting to test infants until after 23 months of age (upon completion of maternal IgG antibody degradation in infant circulation), we eliminated the possi-

bility of detecting maternally sourced IgG in our infant cohort. Therefore, infants from the study group who tested positive for CHIKV IgG antibodies were considered to be likely infected “in utero” and infants who tested negative for CHIKV IgG antibodies in our study group were considered “in utero exposed” but not infected (Box 2).

	In utero exposure	In utero infection likely*	Unexposed	Postnatal infection
Infant exposure	- Positive maternal testing for CHIKV (IgG) and maternal infection during pregnancy - Negative infant testing for CHIKV (IgG, IgM)	- Positive maternal testing for CHIKV (IgG) and maternal infection during pregnancy - Positive infant testing for CHIKV (IgG) <i>*Cannot rule out postnatal infant infection</i>	- Negative maternal testing for CHIKV - Negative infant testing for IgG	- Negative maternal testing for CHIKV or positive maternal testing for CHIKV with maternal infection outside of pregnancy - Positive infant testing for IgG

Box 2. Infant exposure definitions

Planned statistical analysis

Data collected during the enrollment period of November 2016 to March 2018 will be included in our data analysis. We plan to calculate the frequencies of mothers with CHIKV infection during and outside of pregnancy and infant exposure. Using univariate analysis, we will compare demographic, clinical, pregnancy-related and birth outcomes for mothers and infants with and without CHIKV infection during pregnancy. Similarly, we will compare outcomes for mothers and infants

with CHIKV infection during compared to outside of pregnancy. P-values will be determined with the Student's *t*-test for continuous variables and Fisher's exact test or Chi-squared test for categorical values. Potential confounders will be identified and we will control for these factors in the analysis.

Submitted by Desiree LaBeaud, Karen Blackmon, Amy Robyn Krystosik, Trevor Noël, Megan Elizabeth Foeller, Randall Waechter, Nikita Cudjoe.

Dengue in a Travel Population: Prospective Cohort Study of Primary Dengue Infection

Dengue is a mosquito borne virus transmitted by the *Aedes spp.* mosquito. Persons with a primary infection usually are asymptomatic or experience nonspecific mild symptoms such as fever, headache, and retro-orbital pain – hence primary infection can go undetected and undiagnosed. Dengue is endemic to Grenada. DENV-1, DENV-2, DENV-3 and DENV-4 have been circulating in Grenada since 2002. There are more than 50 to 100 million cases worldwide. There has been a rise in the number of annual documented cases of dengue in Grenada over the last three years as reported by the Ministry of Health Epidemiological unit, summarized in the table below:

Year	Number of dengue cases
2016	65
2017	166
2018	404

The State University of Upstate Medical University (SUNY) have collaborated with WINDREF to conduct a prospective population-

based study.

Our study consists of three different types of objectives;

Primary:

- Determine the incidence of DENV infection in the student population

Secondary:

- Determine the feasibility to support a prophylactic dengue efficacy trial
- Characterize DENV viral kinetics for febrile subjects
- Determine the incidence of ZIKV infection

Exploratory

- Characterize the immunology, virus genetics and pathogenesis of primary DENV infection
- Evaluate febrile illness that is DENV or ZIKV negative



Baroness Howells of St. Davids with collaborative representatives from SUNY, Janssen and WINDREF following the initial planning meeting in Grenada.

The participants eligible for this study will complete and sign a consent form and a short survey on demographics, vaccination and arbo-viral exposure history. They will then have their blood drawn via venipuncture by qualified Grenadian registered nurses. Participants are required to come to WINDREF for a blood

draw at the beginning of every term unless they are visiting dengue endemic regions. If they are visiting dengue endemic regions they will need to visit WINDREF before leaving Grenada.

Any participants that are symptomatic will visit WINDREF where the Dengue NS1 Rapid test will be performed. This Rapid test (NS1) that has a specificity of 95.3% and clinical sensitivity of 76.5% and the participant will be followed for a 28-day period to investigate their immunological responses to exposure to possible arbo-viral infection.

This study will comprise of 3 cohorts: Aug 2018, Jan 2019 and Aug 2019. Each cohort will be followed for 2 years. The expected completion date will be August 2020. Currently, there are 302 participants enrolled in the study so far.

Results:

- 1 dengue positive case confirmed via NS -1 Dengue Rapid Test
- Enrollment Demographics

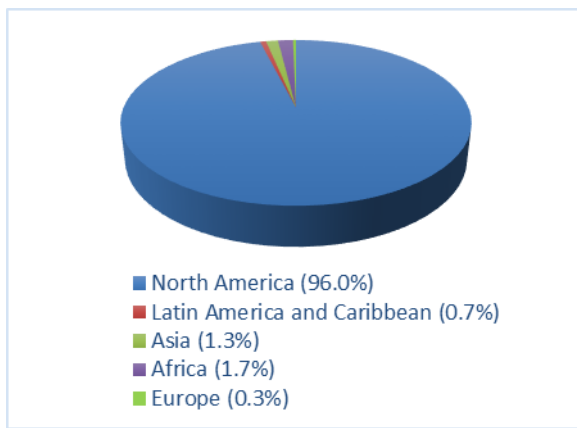


Chart showing the Distribution for Cohort 1

Future:

This study will progress with the 2nd Cohort

enrolling in January 2019. We anticipate greater participation from the SGU Community and possibly an increase in the number of febrile cases since both Cohort 1 and 2 will be experiencing the rainy season. This increase in rainfall will increase mosquito breeding sites and possibly increase in the transmission of arbo-viruses such as dengue transmitted by the *Aedes spp.*

Participants of Cohort 1 will be receiving their dengue status in mid – March.

This study is funded by Janssen Global Public Health, a division of Janssen Pharmaceutica N.V and its collaborators.

Submitted by Dengue Study Team (Dr. Calum Macpherson, Dr. Trevor Noël, Dr. Randall Waechter, Nikita Cudjoe MPH, Dr. Paul Fields, Dr. Satesh Bidaisee, Lisa Ware MS, Dr. Karin Schneider), Dr. Timothy Endy).

Community Health Initiatives – Sport for Health, Touch Toes Test, One Health

Grenada Sports for Health program in 2018 developed into a regional activity while maintaining the local annual schedule. Building upon the success of the community exercise program and the touch toe test as a low cost and effective measure for identifying peripheral neuropathy and complications of diabetes, a regional program was launched. WINDREF successfully partnered with the Organization of Eastern Caribbean States (OECS) and the Caribbean Public Health Agency (CARPHA) to receive funding from the World Diabetes Foundation (WDF) towards promoting diabetic management and preventing complications in the Caribbean. As part of the effort, management guidelines for diabetes and hypertension have been revised, 38 regional healthcare providers have successfully completed a train the trainer course to build

competence on the new guidelines, and local health authorities across the region together with WINDREF, OECS and CARPHA have established a regional network towards surveillance, health promotion and policy for diabetes and hypertension management. Within Grenada, the Sports for Health program has also worked towards the development of community entrepreneurship where trained and qualified physical instructors are engaged in private fitness initiatives which expands the accessibility and availability of persons to the Sports for Health program. Secondary schools across Grenada through the established sporting ambassadors program received continued support from the Sports for Health program towards their annual track and field competition. In December 2018, WINDREF House of Lords Dinner in the UK, under the patronage of Baroness Howells held a successful fundraiser to continue to support the program for 2019. At the House of Lords, the Sports for Health program was renamed the Baroness Howells of St. David Sports for Health program in honor of her leadership and support for the program as the outgoing President of WINDREF.

Submitted by Satish Bidaisee

A Randomized Controlled Trial to Investigate the Effectiveness of a Glucose-stabilizing Dietary Supplement in Individuals Exhibiting Metabolic Syndrome

In 2018 WIDNDREF completed a large randomized clinical trial on a food supplement intended to stabilize blood glucose levels. The research was funded by LifeSeasons, Inc., who distributes 36 food supplements. The product tested in the trial was Glucose Stabili-T, which LifeSeasons claims can be used to “support for maintaining a healthy glucose

level.” The primary active ingredient in the supplement is chromium, as shown in figure



Figure 1: Food Supplement Investigated and Ingredient List

1. The intent of the study was to compare changes in participants’ HbA1c to zero (no change), and to compare changes in participants’ risk profiles.

Participants were enrolled in the trial who displayed risk factors indicative for developing Type II diabetes – as confirmed by a physician – yet otherwise healthy. The risk factors considered were:

- Obesity (BMI ≥ 30) or excess belly fat (waist circumference ≥ 88 cm for females and ≥ 102 cm for males),
- High blood pressure (BP ≥ 130/85), and
- Elevated blood glucose level (BG ≥ 100)

The study enrolled participants (n_{total} = 216) into three groups with target end points at 90 days (n₉₀ = 118), 180 days (n₁₈₀ = 63) and 270 days (n₂₇₀ = 35). Within each group participants were randomly assigned to approximately equal-sized cohorts to take either the food supplement or a placebo. All participants and researchers were blinded to cohort membership.

Participants were instructed to take three capsules per day of either the placebo or supplement, and then participants were tested for glycated hemoglobin level (HbA1c) at approximately 90-day intervals. There was no evidence of differences between groups and cohort profiles for initial HbA1c, gender, age, BMI, nor number of risk factors. Participant’s activity levels and dietary patterns were monitored through the study and there was no evidence of significant differences among participants. No adverse effects were reported that were clinically judged to be related to ingesting the supplement nor to participation in the study.

No evidence was found that there was a difference in change in HbA1c due to the duration participants were in the study. Consequently, the responses for participants in the three target groups were combined into one group. The combined results are displayed graphically in figure 2. Note that the median change in HbA1c for the placebo group was +0.20 (shown by the horizontal line in the “box,” which spans the changes for the middle 50% of the participants). The median change for the supplement group was 0.00, indicating possible “support for maintaining a healthy glucose level.”

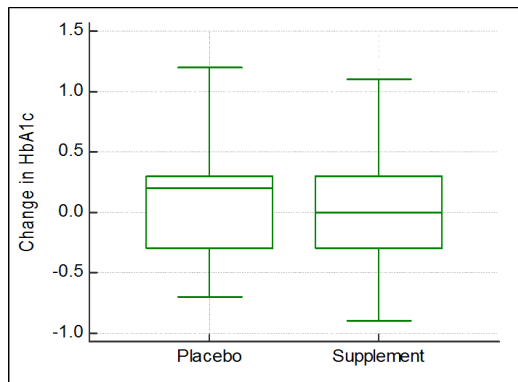


Figure 2. Change in HbA1c by Group. The median change for the placebo group was 0.20, while for the supplement group the median change was 0.00.

In addition, there was evidence of a trend toward an increased number of risk factors per participant within the placebo group ($r = 0.143$, $p = .014$). Although the trend was weak, only a weak trend would be expected over a time span of less than 300 days. For the supplement group, there was no evidence of a change in the risk factor profile ($p = 0.201$), further indicating possible “support for maintaining a healthy glucose level.”

Consequently, the study concluded that there was evidence of a mild effect of the food supplement in stabilizing blood glucose levels.

Research Reviews of Health Conditions and Commonly Used Food Supplement Ingredients

During 2018, sixteen research associates at WINDREF performed comprehensive research reviews examining the published scientific literature reporting research conducted on food supplement ingredients commonly ascribed to be beneficial in relation to various health conditions. The researchers studied 60 ingredients ranging from angelica to zeaxanthin and 40 related health conditions ranging from arthritis to yeast infections. Figure 1 displays an erupt from the report on arthritis.



Figure 1: An Example Report on Food Supplement Ingredients and Health Conditions

WINDREF's research associates produced detailed reports on each ingredient and on each health condition summarizing the most up-to-date scientific findings that are currently available. All research cited in the reports are fully referenced and thus the reports are a valuable resource to researchers interested in investigating the effects of food supplement ingredients on health and to consumers interested in learning more about the possible usefulness of food supplements in maintaining health.

The research was sponsored by LifeSeasons, Inc., a distributor of food supplements headquartered in Lewisville, Texas, USA. All of the reports are published on LifeSeasons' website and are available at <https://lifeseasons.com/research>.

Submitted by Paul Fields

Perspectives on the Uptake of Breast and Cervical Cancer Screening in the English Speaking Windward Islands: A Collaborative Approach

In July 2015, the proposal entitled, 'Perspectives on the uptake of breast and cervical cancer screening in the English Speaking Windward Islands: A collaborative approach' was approved for funding through the Caribbean Public Health Agency (CARPHA) and the National Cancer Institute (NCI) in the United States. The proposal was one of six funded under the request for proposals. The study is funded for two years, 2016 -2017, in the amount of US\$50,000.00. This study has multiple data collection locations in the English-speaking Windward Islands including Grenada, St. Lucia, St. Vincent and the Grenadines and Dominica. The study aims are: 1) To identify cultural factors that influence partici-

pation in breast and cervical cancer screening among women living in the English speaking Windward Islands and 2) To determine the clinical and social services that are available that enhance or support the quality of life for breast and cervical cancer patients in each of the 4 English speaking Windward Islands from the perspective of the gatekeepers who provide care for patients.

Status of the Study

The study is complete. The manuscript for the focus group study is in progress.

Progress to Date

The number of participants: 128

The Data collected to date: We have collected data in each of the 4 countries (Dominica, Grenada, St. Lucia, St. Vincent & the Grenadines. We completed 22 individual interviews with oncology professionals and conducted 9 focus groups that included 106 local women in each country.

Summary of findings of focus group discussions: In progress.

Security and Maintenance of Confidentiality

All data from this study has no personal or identifying information attached. The PI requested a waiver of signed consent to protect participant confidentiality. All data is kept electronically on a password protected computer and a backup file is being kept in a password protected cloud storage program. Any identifying information used for recruitment is kept separate from the data and will be destroyed once the study findings are written up.

Outcomes:

This study laid the ground work for the Woman to Woman (W2W) Intervention.

Submitted by Kamilah B. Thomas-Purcell, Christine Richards, & Marva Joseph

Woman to Woman: A Cervical Cancer Education Program for Grenadian Women

In July 2017, the proposal entitled, 'Woman to Woman: A Cervical Cancer Education Program for Grenadian Women' was approved for funding through the Nova Southeastern University Kenyon Endowed Trust grant award in the United States. The proposal was one of two funded under the request for proposals. The study was funded for two years, in the amount of US\$75,000.00. The goal of W2W was to implement and evaluate a culturally relevant educational curriculum in an effort to educate Grenadian LHAs, on cervical cancer knowledge, the Pap test, HPV, and HPV vaccine. This study employed a comprehensive evaluation component to determine the effects of W2W, the cervical cancer education program, on the LHAs knowledge and competency.

Status of the Study

The study is complete. The manuscripts have been submitted for publication

Progress to Date

The number of participants: LHA: 8; Community Members: 78

The Data collected to date:

We collected data from 7 LHAs. Demographic and pre and post knowledge assessments were from the number of women listed in the

following parishes: St. Andrew 2, St. David 23, St. George 10, St. John 13, St. Mark 12, St. Patrick 17, Missing Data 1
Sixty-six participants completed the post-session evaluation form

Security and Maintenance of Confidentiality

All data from this study has no personal or identifying information attached. The PI requested a waiver of signed consent to protect participant confidentiality. All data is kept electronically on a password protected computer and a backup file is being kept in a password protected cloud storage program. Any identifying information used for recruitment is kept separate from the data and will be destroyed once the study findings are written up.

Next Steps

Two additional manuscripts will be developed based on the NIH/CARPHA study: focus groups of the and the use of technology to train community-based researchers. Each will be authored and submitted to peer-reviewed journals.

The study findings will be used in each of the four participating Caribbean Islands to inform the development of culturally appropriate programs that encourage the uptake of screening and preventative health behaviors. Furthermore, recommendations will be provided to the Ministries of Health of each island for strengthening the screening system and the treatment and support services. The ultimate goal is to reduce morbidity and mortality from the breast and cervical cancers.

Submitted by Kamilah B. Thomas-Purcell, Christine Richards, & Marva Joseph

reachwithin

Reach Within is a principal program of the Windward Islands Research and Education Foundation, in Grenada, West Indies and the Bartholomew J. Lawson Foundation for Children in the United States.

Reach Within works to end the epidemic of child abuse and neglect by getting to the root of childhood trauma, simply, by understanding how trauma changes the brain and affects behavior, Reach Within supports positive outcomes for children and adolescents who have experienced adversity. Our programs focus on the repair and re-patterning of neural pathways in the brain through rhythmic activities, trauma informed caregiving and mentoring practices.

Reach Within provides low-cost, high-impact outreach services to all residential care homes across the island of Grenada, a drop-in centre in the capital city, St. George’s and a recently established centre for trauma informed training in Mirabeau. Working alongside local government and key stakeholders in the region, Reach Within is uniquely positioned to offer its training model at both regional and international levels.

Outcomes

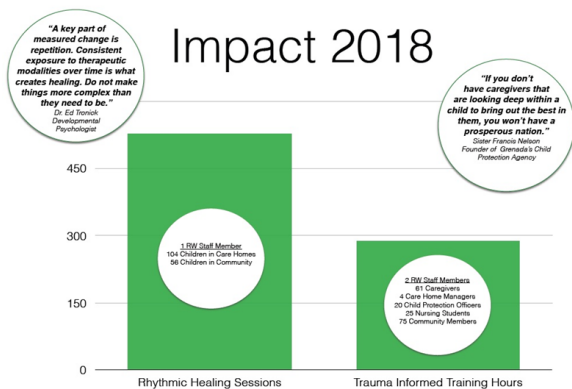
Key relationships strengthened

In September 2018, the Grenadian Government established a Child Abuse Hotline Number, Sex Offenders List and a Special Victims Unit. Reach Within collaborates with the Child Protection Authority on Child Abuse Prevention Campaign to report child abuse reaching over 50,000+ citizens across the island. Reach Within provides a child-friendly mascot and creates marketing materials to demystify how and when to report abuse. Reach Within partners with the Child Protection Agency to develop a protocol manual for officers on how to handle a case once reported using trauma-informed care practices.

Strengthening the local economy and community wellbeing

Reach Within provides rhythmic healing sessions and trauma informed caregiving the moment a child enters residential care and through their transition out of the system. Currently, 83% of adolescents who are aging out of residential care homes are either pursuing further education or employed.

Submitted by Karen Lawson



Saving Brains Grenada: A Community-based Conscious Discipline Program to Reduce Corporal Punishment in the Caribbean

The Saving Brain Grenada project received approval from Canada Grand Challenges for additional funding in July 2018. For Transition to Scale (TTS) projects, Grand Challenges requires matching funds, which were obtained from UNICEF and NIH (see Zika Projects). Stakeholder meetings held at WINDREF and

elsewhere presented the project to educators, government officials, and other interested parties. A vibrant team of researchers, educators, psychologists, social workers, public health professionals, and other health care providers was assembled.

The original Saving Brains Grenada project was a pilot project also funded by Canada Grand Challenges, in which investigators demonstrated that Conscious Discipline, a brain-based adult education curriculum based on self-regulation, safety, empowerment, and attachment, improved cognition in two-year olds and attitudes and behaviors among parents and other caregivers when compared to a control group who did not receive the intervention. The culturally adapted curriculum was delivered by well-trained and enthusiastic paraprofessionals, the Roving Caregivers, who were supported by a colorful mobile unit, the Saving Brains bus, which traveled throughout the island.

Once TTS approval was obtained, the first task was to prepare the mobile resource unit (the Saving Brains bus) for its next set of journeys throughout the island. From October to December 2018 the bus had a major overhaul, which included full mechanical service, interior refurbishment, and extensive bodywork repairs. The bus was re-wrapped, replacing the original generic photograph on the side of the bus with one of a family from the 2014-2016 pilot project. Mr. Troy Nelson was hired as the Saving Brains bus driver.

Meetings were held with Mr. John Williams, programme manager of Grencase and two experienced Grencase Roving Caregivers (Haliey-Ann Green and Curlyn Jeffrey) were hired as Conscious Discipline coaches for the Zika intervention. They received 200 hours

additional training in Conscious Discipline. A twelve-week training course, caregiver instruction manual and parent reference booklet were produced and Conscious Discipline fidelity measures were put in place. The first batch of families received weekly Conscious Discipline classes in December 2018 with a total of 22 classes completed.

76 Roving Caregivers received 12 hours of Conscious Discipline refresher training over a two-day period. 40 of these Roving Caregivers were selected by their supervisors to be part of the bus teaching team and they received a further day's training on specifics of leading the bus classes. Additional and ongoing training and support for them are planned.

Four Conscious Discipline school coaches were hired. The coaches underwent intensive weekly Conscious Discipline training, which included a book study, presentation skills, assisting with Roving Caregiver training, and practice presentations delivered to a local primary and secondary school. The coaching team received the first 1-hour coaching guidance session from Kim Jackson (Conscious Discipline Master Trainer) via Skype call.

The Principal Investigators, intervention and assessment teams met with ministry officials to discuss the collaboration and a plan of action. A subsequent meeting was held with representatives from the Ministry of Education to discuss the selection of 24 primary schools to be included in the project. The schools were divided into 12 intervention and 12 waitlist control schools. The Ministry of Education sent out letters to the selected schools. Initial meetings with the principals were anticipated for December 2018 but

were postponed until January 2019 due to teacher industrial action.

A team of Research Assistants was hired and trained, and data management systems were organized and put in place. In addition to the InterNDA, the internationally validated assessment instrument designed for children aged 24 months, the team added the NEPSY2, also internationally validated, for assessing 3-5 year olds. To assess learning and memory within schools, this team also created a new measure, the Grenada Learning and Memory Scale (GLAMS), which will be piloted and validated within the Saving Brains study.

Plans for 2019 include a replication of the 2014-16 Saving Brains Grenada pilot project with Roving Caregivers teaching from the Saving Brains bus and in homes of children age 0-3; introducing Conscious Discipline to the first 12 pre-primary schools, and assessing 3, 4, and 5 year olds in their schools to provide epidemiological information on neurodevelopment in Grenada, and to assess the effectiveness of the intervention. The project's overarching goal remains the same: introducing and sustaining nonviolent, attachment-focused child-raising practices that provide for optimal neurodevelopment, thus enhancing social capital on the island of Grenada and across the region.

Submitted by Barbara Landon and Randall Waechter

Caribbean Research Ethics Education Initiative (CREEi)

Funding for the Caribbean Research Ethics Education Initiative (CREEi) ends December 2018 and our application for renewal has been submitted with a final decision expected

by February 2019. Supported by the NIH Fogarty International Center (Grant # R25 TW007085), CREEi's English-speaking arm has trained 3 cohorts. If renewed, CREEi will implement innovations in structure and location that are expected to enhance its multicultural impacts.

During its five-year run, CREEi has enhanced research ethics capacity in low and middle income countries (LMIC) of the Caribbean and Latin America by training professionals from those countries at 2 locations: WINDREF and SGU in Grenada, and the Universidad de Autonoma in Mexico. After selection through a competitive application process, trainees completed an intensive on-site course followed by online training over one year. The training for each cohort was concluded in a final onsite intensive 'capstone' course.

Those who completed half of the training received a certificate. Most, however, completed the full program and received a diploma. They became eligible for advanced standing in the masters degree program in bioethics at Clarkson University with financial support through CREEi. About 15 CREEi alumni have completed, or are currently enrolled in, that masters program. CREEi alumni have had many other accomplishments include serving as PAHO consultants, becoming employed by CARPHA and SGU, peer reviewed publications and conference presentations, being invited to design and implement research ethics training at their institutions, becoming IRB members or Chairs at their institutions, and more.

In February, during development of CREEi's proposal for renewal of funding, its Advisory Board met over several days to review the curriculum, challenges to its success, and its

many accomplishments. Advisory Board members include prominent Caribbean bio-ethicists including Donald Simeon, Derrick Aarons, Grace Sirju-Charran, Shereene Dawkins, and CREEi alumnus Sharmella Roopchand-Martin, as well as those from Spanish-speaking countries. The full Board brainstormed possible innovations to the design and delivery of CREEi's curriculum and overall program. Its recommendations included enhancing multi-lingual opportunities for learning and communication, and providing full masters degree training to all trainees. These and other recommendations were incorporated into the renewal and, if funded, will be integrated into CREEi's curriculum and implemented to deliver the masters degrees through SGU in Grenada and UAQ in Mexico.

CREEi Advisory Board Meeting 2018 UAQ, MX



Submitted by Cheryl Cox Macpherson

Caribbean Corporate Measurement Reporting and Verification Hub Project (CCMRV Hub)



L-R: Wiley Barbour, Michael Gillenwater, Hugh Sealy, Luca Brusa, Calros Ruiz Garvia, Hayden Redhead, Molly White, Patrick Cage, Danielle Vaughan

WINDREF has joined the fight to combat Climate Change/Global Warming through its collaboration on the Caribbean Corporative Measurement Reporting and Verification Hub Project (CCMRV Hub).

“The Hub” is a 5-Year project funded by the International Climate Initiative (IKI) of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) of Germany, with additional resources and technical support provided by the UNDP/UNEP Global Support Programme.

12 CARICOM countries will be supported by the implementing Partners: Greenhouse Gas Management Institute (GHGMI), Regional Collaboration Centre of the UNFCCC, St. George’s University and their Department of Public Health & Preventative Medicine, Grenada (STG-RCC) UNDP/UNEP Global Support Programme (GSP) with WINDREF taking on the pivotal role of institutional host.

Participating countries are Antigua & Barbuda, Barbados, the Bahamas, Belize, Dominica, Grenada, Guyana, Jamaica, St. Kitts & Nevis, Saint Lucia, St. Vincent & the Grenadines, and Trinidad & Tobago.

WINDREF hosted the official launch of “The Hub” project on the 8th & 9th November 2018 at their Conference facilities. During these meetings, the partners planned the upcoming work for the next year, including an all-country launch meeting in February 2019, the membership of a steering committee composed of regional stakeholders, determining capacity needs and priorities for all countries, and programming the future capacity-building activities of the Hub based on these needs.

The coming year will also see the launch of capacity-building courses for country experts, mentoring sessions on country-specific technical issues, and collaborative problem-solving.

Submitted by CCMRV Hub Team

2018 Global Water Partnership-Caribbean Highlights

GWP-C Confirms New Steering Committee, Chair and Vice Chair

In March 2018, the Global Water Partnership-Caribbean (GWP-C) confirmed its new Steering Committee (SC), Chair and Vice Chair of the organisation. The organisation gained five (5) new members who are as follows:

- Dr. Paulette Bynoe , University of Guyana {Statutory Entity – Academia}
- Aldrin Calixte, Haiti Survie {Regional Organisation – Non-English-Speaking Jurisdiction}
- Trevor Thompson, Ministry of Agriculture of Grenada {Government Agency}
- Joyce Thomas Peters, Grenada Community Development Agency (GRENCODA) {Community-Based Organisation}
- Reginald Burke, Caribbean Youth Environment Network (CYEN) {Non-Governmental Organisation (Youth)}

After the new SC was confirmed, Mr. Trevor Thompson has been confirmed as Chair of the GWP-C and Dr. Kevon Rhiney, the new GWP-C Vice Chair.

GWP-C Works to Build Capacity on Drought Risk Reduction in IWRM in the Caribbean

There is no denying that climate change is

impacting Caribbean Small Island Developing States (SIDS). A 2016 United Nations Food and Agriculture Organisation (FAO) Report entitled “*Drought Characteristics and Management in the Caribbean*” showed that the expected increase in climate change, means that the region must become more drought resilient.

In recognition of this and the inextricable effects of drought on water resources, the Global Water Partnership-Caribbean (GWP-C) was keen on building capacity on Drought Risk Reduction in Integrated Water Resources Management (IWRM) in the Caribbean. GWP-C kick-started this process in August 2018, by collaborating with Caribbean WaterNet (Caribbean subsidiary of Cap-Net UNDP) and its Partner, the Ministry of Agriculture of Grenada, to host a national Training of Trainers workshop in Grenada. The co-funded three-day workshop on “Drought Risk Reduction in IWRM” targeted trainers, facilitators, practitioners and water and natural resources managers. The activity aimed to improve their understanding of drought risk management and reduction in the country, in the context of water resources management.

The workshop was designed based on a 2015 “Drought Risk Reduction in IWRM” Manual developed by Cap-Net UNDP in partnership with the Global Water Partnership (GWP) and nine (9) other international organisations.

Twenty (20) participants were trained over the 3-day period on a range of areas. GWP-C’s plans to replicate the training in at least two (2) other Caribbean islands in 2019.

Nishana Ramsawak of Trinidad and Tobago, is the first-ever Caribbean representative to participate in an annual Water Summer

School Programme, organised by the Global Water Partnership-Central Eastern Europe (GWP-CEE).

The programme is carefully designed to enhance the skills of students enrolled in various water-related MSc and PhD programmes from universities mainly throughout Europe. The week-long curriculum is known for presenting participants with the most current global and regional issues, and challenges them to explore innovative approaches in addressing them. In 2018, the Summer School focused on Agenda 2030 with a key focus on Water Security and Climate Resilience. It was held in Warsaw, Poland from July 1st – 6th, 2018 at Warsaw’s University of Life Sciences. It represented a collaboration between GWP-CEE, Solidarity Water Europe and Youth Water Community Central and Eastern Europe (YWCCEE).

GWP-C Rainwater Harvesting Toolbox and GWP IWRM Toolbox Included in International Article

On July 17th, 2018, *The Conversation* released an article entitled “Harvesting Rain Could Help Caribbean Countries Keep the Water on After Hurricanes.” *The Conversation* is a well-known international independent (not-for-profit) media outlet, with a monthly online audience of more than ten (10) million users. The outlet produces analysis, commentary, research and news pieces that are written by academics and researchers.

Within the article, Global Water Partnership-Caribbean’s (GWP-C’s) Caribbean Rainwater Harvesting (RWH) Toolbox (www.caribbeanrainwaterharvestingtoolbox.com) was referenced. The article also included a link to a Caribbean case study on RWH in the Global Water Partnership (GWP) Integrated Water Resources Management (IWRM)

Toolbox. The case study entitled “Mainstreaming Rainwater Harvesting to Build Climate Resilience in the Caribbean Water Sector” can be found here: <https://bit.ly/2POHbvc>. The full article published by *The Conversation* can be found here: <https://bit.ly/2Mk4j9C>.

GWP-C Headquarters Moves to WINDREF at St. George’s University in Grenada

On March 27th, 2018, the Windward Islands Research and Education Foundation (WINDREF) became the new Host Institution (HI) of the Global Water Partnership-Caribbean (GWP-C) and its eighth (8th) Partner in Grenada.



Trevor Thompson, GWP-C Chair (left) and Dr. Calum Macpherson, Director of WINDREF (right) are seen here signing the new Host Institution Agreement at the WINDREF Office in Grenada.



GWP-C and WINDREF representatives at the WINDREF Office at the St. George’s University in Grenada.

Since being launched fourteen (14) years ago in 2004, GWP-C’s headquarters have been based in Trinidad. The move to WINDREF in Grenada is therefore a milestone in GWP-C’s operations and one it looks forward to. GWP-C is committed to working with its over one hundred (100) Partners in more than twenty (20) Caribbean territories to share knowledge and strengthen interaction and co-operation to sustain an integrated approach to water resources management in the region. This focus is intrinsically linked to WINDREF’s vision, goals and research areas of interest.

GWP-C Engages Partners in First-Ever “Follow-the-Sun” 2018 GWP Network Meeting

On September 27th, 2018, the Global Water Partnership-Caribbean (GWP-C) joined the entire Global Water Partnership (GWP) Network, as it embarked on the first-ever “Follow-the-Sun” GWP Network Meeting. The dynamic online and in-person format of the Meeting, allowed for the thirteen (13) Regional Water Partnerships (RWPs) of the GWP to journey around the world to all GWP regions. This allowed regions to gain insights into what other RWPs wanted GWP to consider in the development of its new Strategy. This meant that GWP Partners from 46 countries went live from all corners of the world over a two-day period. GWP-C Partners from Grenada, Trinidad and Jamaica were able to participate in-person.



GWP-C Welcomes New Regional Coordinator – Simone Lewis

The Global Water Partnership-Caribbean (GWP-C) announced the appointment of Ms. Simone Lewis, as its new Regional Coordinator (RC) on September 28th, 2018. Ms. Lewis who is from Grenada, took up her position as the new GWP-C RC on October 1st, 2018.

She is a highly qualified professional with a wealth of experience in natural resources management, agriculture and project management. Throughout her career, she has contributed both nationally and regionally to planning and policy development for sustainable management.



Simone Lewis

Her diverse combination of expertise means that GWP-C will have solid leadership in continuing to support Caribbean countries in the sustainable management of their water resources.

GWP-C Chair Provides Caribbean Analysis on GWP’s NDC Report at COP24

On November 11th, 2018 at COP24 in Poland, the Global Water Partnership (GWP) held a Press Conference to provide analysis on its new report “Preparing to Adapt: The Untold Story of Water in Climate Change Adaptation.”

The report which was launched at COP24 can be downloaded here: <https://bit.ly/2SE4EDA>. GWP conducted a new analysis that relates to the Sustainable Development Goal (SDG) 6 baseline reports, with an assessment of over 80 Nationally Determined Contribution (NDCs) plans, compared with national development plans and similar documents. The report shows a mismatch between the appetite for water infrastructure and the weak progress on strengthening institutions for managing water.

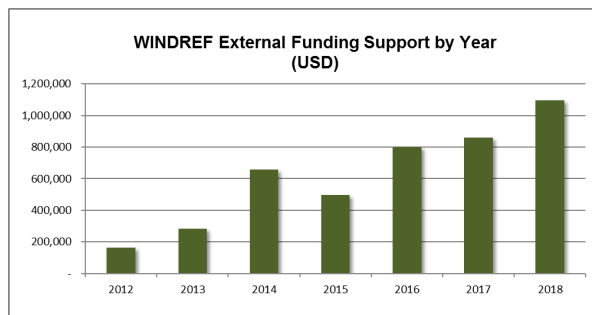
Among the panellists at the Press Conference at COP24, was Mr. Trevor Thompson, Chair of the Global Water Partnership-Caribbean (GWP-C). Mr. Thompson provided NDC analysis from a Caribbean perspective. In his contributions he said, “Caribbean countries have a mitigation focus, not a large adaptation component, but that is changing.”

Submitted by
Global Water Partnership-Caribbean team

External Grants and Funding

We thank all of the donors who have made WINDREF's work possible in 2018:

- Bartholomew J. Lawson Foundation
- Benevity
- Caribbean Public Health Agency (CARPHA) & National Cancer Institute
- Charles and Lisa Modica
- Dr. Mary-Jeanne Kreek, Kreek Laboratory, Rockefeller University
- Ellen Ratner and Cholene Espinoza
- Fogarty International Centre – National Institutes of Health (NIH)
- General Secretariat of the Organization of American States (OAS) – Executive Secretariat of the Inter-American Drug Abuse Control Commission (ES/CICAD) – Secretariat for Multidimensional Security
- German Government's Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)
- Gulf and Caribbean Fisheries Institute (GCFI)
- International Fund for Animal Welfare (IFAW)
- LifeSeasons
- The Nature Conservancy (TNC)
- Nova Southeastern University
- Pan-American Health Organization (PAHO)
- Stanford University
- St. George's University, for ongoing support, including the Small Research Grant Initiative
- United Nations Development Program (UNDP)
- United Nations Environment Program (UNEP)
- United Nations Framework Convention on Climate Change (UNFCCC) Secretariat
- United States Fish and Wildlife Service (USFWS)



2018 Grant Applications

Fifteen grant applications were submitted to external funding agencies in 2018. The total potential value of these grant applications was \$18,261,910 USD – a 19.5% increase over the total potential value of grant applications in 2017. To date, 7 of these applications were successful, 5 were not successful, and decisions on the other 3 are outstanding. The grant applications are listed below (green: funded, red: not funded, black: pending decision).

- Sealy, Forde, Edwards, Waechter. Hosting of the Global Water Partnership Caribbean Office at St. George's University. Global Water Partnership
- Radix, Ashby-Mitchell, Macpherson, Bidaisee. Preventing Diabetes and its Complications for the Eastern Caribbean States. World Diabetes Foundation
- Macpherson, Fields, Noël, Waechter. Product and Ingredient Meta-analysis and Writing. LifeSeasons
- Waechter, LaBeaud, Landon, Fernandes, Noël, Macpherson. Assessment of Neurocognitive Functioning at Two Years of Age in Children Exposed to the Zika Virus. USAID
- Janicke, Stone, Baillie, Warman, & Debnath. Creating the next generation of evidence-based veterinary practitioners

- and researchers: What are the options for a veterinary curriculum?. Council on International Veterinary Medical Education (CIVME) at Association of American Veterinary Medical Colleges
- Yanik, Lee, LaBeaud, Pinsky, Noël, Macpherson, Waechter. Rapid, Multiplexed, and PCR-Free Detection of Arboviral Fever Syndromes in Resource Limited Settings. NIH
 - Gibson. A Consumer Behavior Change Campaign and Intelligence-Led Conservation Capacity Training to Address the Illegal Wildlife Trade in Trinidad and Tobago. US Fish and Wildlife Service
 - Radix, Ashbey-Mitchell, Bidaisee, Macpherson. Diabetes Management in the face of Disasters for the Eastern Caribbean States. World Diabetes Foundation
 - LaBeaud, Kehn-Hall, Waechter, Blackmon, Noël, Macpherson. Interdisciplinary Dissection of Cognitive Zika Syndrome: Epidemiological, Behavioral, and Proteomic Approaches Provide Direction for Prognosis and Prevention. National Institutes of Health
 - Sealy, Edwards, & Waechter. Increasing Climate Resilience in the Water Sector in Grenada. United Nations Development Programme Japan Caribbean Climate Change Programme
 - Cox Macpherson & Corcoran. Promoting a public health model to develop a palliative care service in Grenada, West Indies. Medical Research Council UK, Joint Health Research Initiative
 - Thomas-Purcell, Richards, Keku, Vemulapalli. Exploring Prevention in Cervical Cancer (EPICC). National Institutes of Health
 - Blackmon, Waechter, Noël, Macpherson, Thesen, Baki, Dlugos, Chari, Patel. Epilepsy Surveillance in Children with Prenatal Zika Virus Exposure. NIH
 - Scribner, Sothorn, Radix. Noël, Waechter, Smith. Adolescent Obesity in Cohorts Spanning the Nutritional Transition in Grenada. NIH
 - Yanik, Lee, LaBeaud, Pinsky, Noël, Macpherson, Waechter. Rapid, Multiplexed, and PCR-Free Detection of Arboviral Fever Syndromes in Resource Limited Settings. NIH
- Despite strong global competition for external grants, we continue to achieve an impressive hit rate of successful grants to applications. More SGU faculty and WINDREF fellows are learning about the grant writing process and submitting grants to external funders.

Ongoing externally funded projects

There were 17 ongoing funded projects in 2018 with a total multi-year value of \$5.77 million USD:

- Macpherson, C., Noël, T. & Bidaisee, S. (2011-). Sport for Health. House of Lords Fundraiser and Ratner Family Fund. \$73,181.
- Lawson, K. (2013-). reachwithin. Bartholomew J. Lawson Foundation. \$285,704.
- Sealy, H. (2013-). UNFCCC Clean Development Mechanism (CDM) Caribbean Regional Collaborating Centre (RCC) at St. George's University. UNFCCC Secretariat Clean Development Mechanisms Programme. \$105,179.
- Ratner, E. & Macpherson, C. (2013-). Outreach Activities in South Sudan. Multiple Donors. \$273,815.
- Rodrigo, S. (2013-2015). Drug Demand Reduction: A Caribbean University Interdisciplinary and Integrated Proposal. Executive Secretariat of the Inter-American Drug Abuse Control Commission (ES/CICAD). \$40,000.

- Sealy, H. (2015-). Intended Nationally Determined Contributions (INDC) Consultancy to the UNFCCC St. George's Regional Collaborating Centre. United Nations Framework Convention on Climate Change Secretariat. \$158,217.
- Richards, C., & Thomas-Purcell, K. (2015-). Perspectives on the Uptake of Breast, Cervical, and Prostate Cancer Screening in the English Speaking Windward Islands. Caribbean Public Health Agency (CARPHA). \$50,000.
- Clunes, M., Macpherson, C. C. (2016-). Palliative Care Association of Grenada. Iota Epsilon Alpha Organization. \$5,952.
- Morrall, C. (2016-). The Occurrence of Micro-plastic in the Intestinal Tract of Commercially Exploited Fish in from Grenada. Gulf & Caribbean Fisheries Institute. \$14,085.
- Macpherson, C. (2016-19). One Health Research Initiative. \$450,000.
- Sealy, H. (2017-). Green Climate Action (GCA) Program. United Nations Framework Convention on Climate Change Secretariat. \$10,000.
- Endy, T., & Macpherson, C. (2018-2021). Dengue in a Travel Population: Prospective Cohort Study of Primary Dengue Infection. Janssen Pharmaceutical via State University of New York (SUNY). \$1,931,504.
- Sealy, H., Forde, M., Macpherson, C., Waechter, R., Edwards, O. (2018-). Caribbean Regional Office of the Global Water Partnership. Global Water Partnership. \$90,295.
- Waechter, R., & Landon, B. (2018-2022). Assessment and Intervention in Child Neurodevelopment. UNICEF. \$19,277.
- Waechter, R., Landon, B., Fernandes, M., Blackmon, K., & Noël, T. (2018-2020). Rescuing Neurodevelopment in Zika-exposed Children. National Institutes of Child Health and Human Development. \$302,500.
- Greenhouse Gas Management Institute, Sealy, H., Forde, M., Macpherson, C., Waechter, R., Edwards, O., St. George's RCC. (2018-2023). Caribbean Cooperative Monitoring, Reporting, and Verification Hub (CCMRVH). German Development Bank BMUB via Greenhouse Gas Management Institute. \$1,663,982.
- Private Donation: \$300,000.

Past Research Projects

Non-communicable Diseases

- Genetic Correlates of the Addictive Diseases: Cocaine, Alcohol and Marijuana Addiction -Grenada, WI, Dr. Mary-Jeanne Kreek, Kreek Laboratory, Rockefeller University. \$60,000.
- The Effectiveness of Life Seasons' Diabet-X in reducing HbA1c among Grenadians with Metabolic Syndrome. LifeSeasons. \$100,000.
- Neglected Tropical Diseases (NTDs) and Rheumatic Fever in Grenada: a project to prevent/eliminate helminthic and rheumatic fever infections among children (5-15 years of age). Bartholomew J. Lawson Foundation. \$41,903.
- 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 diarrhea 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 hemoglobin traits in Grenadian secondary school adolescents.
- Knowledge, attitudes, beliefs and practices of sickle cell anemia in Grenadian primary and secondary school children.
- Decompression sickness among the indigenous fishing population in Grenada: Assessing the burden of disease.
- WINDREF / SGU Hurricane Relief.
- Spice Research Program.
- Sulfate-reducing bacteria in oxidized freshwater of tropical mangroves.
- Novel antibiotics from tropical marine environments: drug development in Grenada.
- Study of the mutacin C-7A.
- Gram-negative bacteria isolated from aquatic environments of Grenada (61.4°W, 12.0°N), West Indies.
- Identification of bacteria producing antibiotics isolated from deep marine biofilms of Grenada.
- SGU Environmental Testing Unit (ETU).
- Post-hurricane water surveillance in problematic areas of Grenada.
- Evaluation of the relocation potential for villagers residing in Queen Elizabeth National Park, Uganda.
- Study of the calls of the spotted hyena at feeding.
- Survey on the attitude of villagers in Queen Elizabeth National Park, Uganda towards the threat of lions, leopards and hyenas.
- Epidemiology of human injuries resulting from wildlife in ten villages within Queen Elizabeth National Park, Uganda.
- Rural Ugandan village perspective on lion, leopard and hyena conservation.
- Epidemiology of human injuries by wildlife in six villages within Queen Elizabeth National Park, Uganda.
- Prevalence of *Campylobacter fetus* subspecies *venerealis* and other microorganisms in the reproductive tracts of cattle from the southern region of Santo Domingo, Dominican Republic.
- Antimicrobial properties of skin secretions from *Eleutherodactylus johnstonei* on bacteriological isolates.
- Examination and analysis of prostate cancer in Grenada.
- A Church-based intervention to improve hypertension prevention and control among women in Grenada.
- Occupational Health Problems among Nutmeg Factories Workers, SGU Small Research Grant Initiative.
- Sport for Health Programme.
- Grenada School Nutrition Study: Evidence to Inform Policy.
- Genetic Correlates of the Addictive Diseases: Cocaine, Alcohol and Marijuana Ad-

diction -Grenada.

- Promoting Resilience Among Medical Students: A Comparison of Mindfulness, Yoga, and Exercise

Infectious Diseases

- Neurodevelopment and Vector-borne Diseases: Building Research Capacity in the Tropics. National Institutes of Health - Fogarty International Center. \$298,938.
- Assessment of Neurocognitive Functioning in 2-year-old ZIKV-exposed Children. USAID via jhpiego. \$63,867.
- The Spectrum of Zika Disease in Grenada. Stanford University. \$13,601.
- The Spectrum of Zika Disease in Grenada. Stanford University. \$34,992.
- Zika Surveillance in the Southern Caribbean and Reference Lab Support. Naval Medical Research Center. \$80,000.
- 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 *Anopheles* 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.
- The prevalence of streptococcal infection in school children aged 5 –15 years in Grenada, Carriacou and Petit Martinique.

- 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.
 - Evaluating the level of perceived fear and desensitization towards HIV/AIDS in Botswana.
 - Rheumatic Fever in Grenada.
 - Streptococcal program in St. Vincent.
 - 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.
 - Evaluating the effectiveness of educational methods in the prevention of Rheumatic Fever and knowledge, awareness and practices.
 - Prevalence of intestinal helminth infections in rural Grenadian school children.
 - Cystic echinococcosis in Morocco and Uganda.
 - Elimination of Lymphatic Filariasis in Guyana Program.
 - Neglected Tropical Diseases and Rheumatic Fever in Grenada: A project to prevent/eliminate helminthic and rheumatic fever infections among children (5-15 years of age).
 - Ferguson, H. (2011-2014). Investigation of Disease in Pre-growout Fish in a Commercial Aquaculture Operation in Ecuador. Produmar, S. A.
 - Heath, C., LaBeaud, D., Macpherson, C., & Noël, T. (2016). Characterization of Immune Factors of Chronic Chikungunya Disease. American Society for Tropical Medicine & Hygiene Robert E. Shope International Fellowship.
- Unique Projects**
- Knowledge, Attitudes, and Practices Regarding Rabies in Grenada: A Cross Sectional Study. Pan-American Health Organization/Government of Grenada. \$10,007.
 - Building Climate Resilient Health Systems in the Caribbean: A One Health Approach. Pan-American Health Organization (PAHO). \$20,380.
 - Janicke, H., & Stone, D. (2018). Microgrant Award - Council on International Veterinary Medical Education. \$9,500.
 - In-country Project Coordinator for the Eastern Caribbean Marine Managed Areas Network (ECMMAN) Project. The Nature Conservancy. \$68,109.
 - Caribbean Research Ethics Education Initiative (CREEi). Fogarty International Center –National Institutes of Health. \$1,100,000.
 - Conservation Leadership in the Caribbean (CLiC). U.S. Fish and Wildlife Service, Division of International Affairs, via the International Fund for Animal Welfare

- (IFAW).\$325,205.
- 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.
- Novel antibiotics from tropical marine environments.
- Genetic correlates of the addictive diseases: cocaine, alcohol, and marijuana addiction—Grenada.
- An investigation of pediatric botanical medicine for acute respiratory infections.
- Efficacy of phage therapy using an in vitro biofilm wound model system.
- Degradation of 7 keto cholesterol by Xenohydrolases.
- Ecological survival properties of pelagic and benthic indicator microorganisms from the St. John's river outflow in Grenada.
- The public health importance of dogs, Grand Anse, Grenada.
- Greater occipital nerve zones for treatment of occipital neuralgia.
- Photovoltaic power generation program.
- Review of current biomedical waste management practices in the Organization of Eastern Caribbean States (OECS) Countries.
- Microbial diversity in the iron-oxidizing biofilms of soda springs in Grenada.
- Circadian cycle of iron-oxidation in warm soda springs in St. Andrew's, Grenada, West Indies.
- Do the microorganisms in the soda spring water derive energy from the oxidation of manganese?
- Novel marine bacteria and their antagonistic properties against medically relevant biofilms.
- Physiological characterization of novel marine bacterial species isolated off Grenada.
- Characterization of marine sponge-associated bacteria and cytotoxic activity of sponge extracts towards human cancer cells.
- Examining HIV/AIDS provider stigma: assessing regional concerns in the islands of the Eastern Caribbean.
- Knowledge, attitudes and practice survey for women (baseline survey).
- Caribbean EcoHealth Programme: public and environmental health interactions in food and water-borne illnesses (CEHP).
- Persistent Organic Pollutants.
- Implementing Renewable Energy and Preventing Land Degradation: An Intervention in the Nutmeg Industry in Grenada.
- Effects of prenatal ethanol exposure on the role of matrix-metalloproteinase mediated neural crest cells in an avian model.
- Assessing Medical Students' Behavior, Perception, and Knowledge of UV Exposure and Sunscreen Application in the Car-

- ibbean (Grenada).
 - Basic Life Support Knowledge and Skill Retention in Pre-Clinical Undergraduate Medical Students.
 - Student Satisfaction, Comfort and Self-confidence in a Simulation Lab Practice Session.
 - Reducing marine Litter in the Wider Caribbean: Developing and Implementing Best Waste Management Practices.
 - Ethical Issues and Challenges in Global Population Health Research Partnerships.
 - Disaster Management in Grenada: Northumbria University Student Research.
 - Baseline Coral Reef Monitoring Program for Sandy Island Oyster Bed Marine Protected Area Mooring Buoy Installation Project.
 - Genome annotation in microorganisms and metagenomic libraries as a part of an undergraduate curriculum.
 - Molecular identification of marine *Vibrio* isolated in Grenada.
 - Occurrence of Antibiotic-resistant Fecal Indicators in Coastal waters of Southern Grenada.
 - Investigation of disease in pre-growout fish in a commercial aquaculture operation in Ecuador.
 - Revitalizing the Nutmeg Industry in Grenada.
 - Drug Demand Reduction: A Caribbean University Interdisciplinary and Integrated Proposal.
 - The Bioethics of Health and Climate Change in the Caribbean.
 - Reach Institute for Children at SGU.
 - Outreach Activities in South Sudan.
 - UNFCCC Clean Development Mechanism (CDM) Caribbean Regional Collaborating Centre (RCC) at St. George's University.
 - Humane Association (A. Werners) \$4,000
 - Forde, M., Tomsons, S., Gomez, A. & Morrison, K. (2014). Ethical Issues and Challenges in Global Population Health Research Partnerships. International Development Research Centre. \$15,000.
 - Sealy, H., Solis-Garcia, K. & Waechter, R. (2014). Capacity Building on Carbon Accounting and Clean Technologies Internship for Renewable Energy Post Graduate Students. GIZ Renewable Energies and Energy Efficiency in the Caribbean (REETA). \$5,500.
 - Thomas-Purcell, K. & Richards, C. (2014-2015). Grenadian Women's Perspectives on Screening for Breast and Cervical Cancer. Nova Southeastern University – Ken-yon Award.
 - Ferguson, H. (2011-2014). Investigation of Disease in Pre-growout Fish in a Commercial Aquaculture Operation in Ecuador. Produmar, S. A.
 - Gibson, K. (2015). Student Chapter Student Associate AVMA Faculty Advisor Program. American Veterinary Medical Association.
 - Kotelnikova, S., Morrall, C., Sealy, H., & Waechter, R. (2015-16). Woburn Clarke's Court Bay Water Quality Improvement Demonstration Site Concept. The Nature Conservancy.
 - Morrall, C., Waechter, R., Campbell, E., & Nimrod, S. (2014-). In-country Project Coordinator for the Eastern Caribbean marine Managed Areas Network (ECMMAN) Project. The Nature Conservancy.
 - Noël, T. (2016). Inter-American Institute for Cooperation on Agriculture.
 - Radix, R. (2012-2015). Grenada School Nutrition Study. International Development Research Centre.
- Student Fellow Stipend Agreement -American

- Waechter, R. & Landon, B. (2014-2016). A Community-based Conscious Discipline Program to Reduce Corporal Punishment in the Caribbean. Grand Challenges Canada –Saving Brains Program.
- Waechter, R., Mitchell, D. & Aire, T. (2014-2015). Restoration and Community Co-Management of Mangroves (RECCOMM) in the Northern Telescope Coastal Area. GIZ Integrated Climate Change Adaptation Strategies (ICCAS) Grenadapts.
- Zap, A. & Rush, M. (2015). Thyroid Hormone Concentrations in Galapagos Giant Tortoises. Morris Animal Foundation -Veterinary Students Scholar Program.

Publications

Books (0)

Book Chapters (0)

Journal Articles (99)

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WINDREF Grantee Abstracts/Presentations at International Conferences (0)

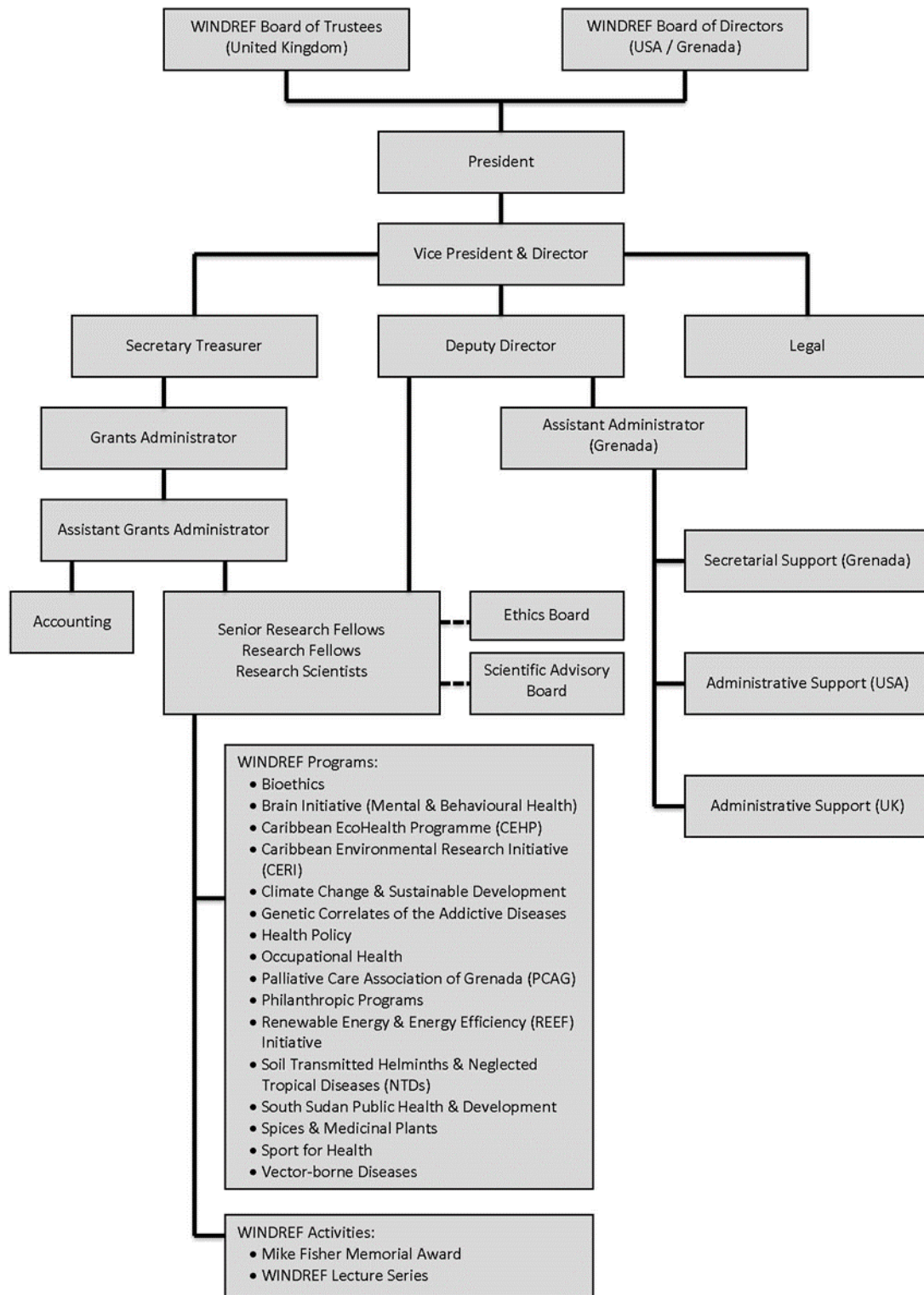
Graduate Seminars (26)

Abstracts/Presentations at International Conferences (7)

- Bidaisee, S (2018). 63rd Annual CARPHA Health Research Conference, St. Kitts & Nevis June 14-16, 2018.
- Bidaisee, S (2018). International Conference on Research in Teaching, Education & Learning (ICRTEL), Thailand, December 19-20, 2018.
- Noël, T P (2018). American Society of Tropical Medicine and Hygiene, USA, October 28-November 1, 2018.
- Sobering, A (2018). The 22nd Annual Meeting for IAMSE in 2018: International Association of Medical Science Educators, Las Vegas, NV, USA, June 9 - 12, 2018.
- Waechter, R (2018). American Society of Tropical Medicine and Hygiene, USA, October 28-November 1, 2018.
- Calum Macpherson: "Kenya Selective Summer 2018: A One Health Tropical Medicine Experience" January 17th 2018.
- Desiree LaBeaud (Stanford University): "Lessons learned at home and abroad: arboviral disease and prevention in Grenada" January 24th 2018.
- Vijay Bhoj (University of Pennsylvania): "New advances in transfusion medicine: T-cell immunotherapy" February 14th 2018.
- David Hinds (University of the West Indies Trinidad): "Electron Microscopy Unit at The University of the West Indies, St. Augustine, Trinidad and Tobago" February 21st 2018.
- Fevzi Akinci (Duchesne University): "Global Trends in Health Care Management and Education" February 23rd 2018.
- Jonnel Edwards: "Prevalence of Salmonella enterica in cloacal carriage of marine turtles in Grenada" February 28th 2018.
- Lowell Kappmeyer (USDA Agriculture Research Service): "Discovery of a previously undetected Theileria in the horse" March 7th 2018.
- Carrie Cole (Gottman Institute): "Gottman Research: Infidelity, Couples' Relationships, and the Gottman Love Lab" March 14th 2018.

- Camille Coomansingh: "An evaluation of factors which contribute to anthelmintic resistance in sheep and goats in Grenada, W.I." March 23rd 2018.
- Monica Tetnowski: "Morphological and genetic characterization of intestinal parasites in the Caribbean hawksbill sea turtle, *Eretmochelys imbricate*" April 4th 2018.
- Molly Zeigler: "The seroprevalence of *Toxocara canis* in humans in Grenada" April 11th 2018.
- Nikisha Bartholomew: "Diversity of culturable microorganisms utilizing *Dictyota* sp. and *Ulva* sp. as a source of carbon and energy" May 2nd 2018.
- David Gimeno and George Delclos (The University of Texas): "Working conditions and health: the national surveys of working conditions and health in Latin America" July 4th 2018.
- Phenyo Phuu: "Vector-borne Diseases in Northern Botswana" August 22nd 2018.
- Tatjana Kolevska and Corey Schwartz (Northern California Oncology and Hematology): "Medical Research" August 29th 2018.
- Narindra Roopnarine: "The Gross Anatomy, Histology and Ultrastructure of the Male Reproductive System of the Cattle egret (*Bubulcus ibis*) in Grenada" October 3rd 2018.
- Kenneth Hoffmann: "Bloodborne Pathogens and General Safety" October 10th 2018.
- Cait Moreland: "Development of a sustainable tilapia breeding and rearing program to support aquaculture in Grenada" November 6th 2018.
- Norma Valdez: "Histological, microstereological and immunohistochemical study of the epididymis of the green iguana, *Iguana iguana*" November 7th 2018.
- Cheryl Cox Macpherson: "Ethical aspects of climate change in light of the impacts, causes, and associated values in conflict." November 14th 2018.
- Viktoria Czarán: "The Potential for Histamine Toxicity in the Invasive Lionfish (*Pterois volitans* and *P. miles*) in Grenada" November 15th 2018.
- Katie Brigman: "Japanese Encephalitis, Genetic Review" November 16th 2018.
- Marcy Kanuka: "Molecular screening of Zika and Dengue viruses in bats from Grenada, West Indies" November 27th 2018.
- Katie Brigman: "Incidence of Dengue in immunologically naïve populations proposal" November 30th 2018.
- Crissy-Ann Harrylal: "The influence of the climatic season and photoperiodism on the reproductive tract of the sexually mature female green iguana (*Iguana iguana*) in Grenada" December 5th 2018.
- Molly Ziegler: "Seroprevalence of *Toxocara canis* in the Grenada population" December 12th 2018.

WINDREF Organizational Chart



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WINDREF Financial Statements

Windward Islands Research & Education Foundation
Grenada Inc. (“WINDREF”)

Financial Statements
August 31, 2018



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INDEPENDENT AUDITOR'S REPORT

To the Directors of Windward Islands Research & Education Foundation Grenada Inc.

Opinion

We have audited the financial statements of Windward Islands Research & Education Foundation Grenada Inc. ("WINDREF"), which comprise the statement of financial position as at August 31, 2018, and the statement of financial activities and changes in net assets and statement of cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of WINDREF as at August 31, 2018, and its financial performance and its cash flows for the year then ended in accordance with 'International Financial Reporting Standards for Small and Medium-sized Entities' (IFRS for SMEs).

Basis of Opinion

We conducted our audit in accordance with International Standards on Auditing (ISAs). Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of WINDREF in accordance with the ethical requirements that are relevant to our audit of the financial statements in the state of Grenada, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with IFRS for SMEs and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing WINDREF's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate WINDREF or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing WINDREF's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with ISAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

Independent Auditor's Report to the Directors of Windward Islands Research & Education Foundation Grenada Inc. (continued)

As part of an audit in accordance with ISAs, we exercise professional judgment and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of WINDREF's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on WINDREF's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause WINDREF to cease to continue as a going concern.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.



Ramona S. Otway, FCCA, CA
For and on behalf of
RSO & Co. Ltd
Chartered Accountants
September 10, 2018
St. George, Grenada



WINDWARD ISLANDS RESEARCH & EDUCATION FOUNDATION GRENADA INC.
STATEMENT OF FINANCIAL POSITION

		As at August 31	
	Notes	2018	2017
Assets			
Current Assets			
Cash and cash equivalents	3	341,854	437,476
Grants and other receivables	4	1,238,240	1,299,096
		1,580,094	1,736,572
Noncurrent Assets			
Property, plant and equipment	5	104,852	119,564
Grants and contracts receivable		-	-
		104,852	119,564
Total Assets		1,684,946	1,856,136
Liabilities and Net Assets			
Current Liabilities			
Trade and other payables	6	75,863	59,062
		75,863	59,062
Noncurrent Liabilities			
Deferred grants		104,852	119,564
Total Liabilities		180,715	178,626
Net Assets			
Unrestricted funds		192,863	5,546
Restricted funds		1,311,368	1,671,964
Total Net Assets		1,504,231	1,677,510
Total Liabilities and Net Assets		1,684,946	1,856,136

The notes on pages 7 to 16 are an integral part of these financial statements.



WINDWARD ISLANDS RESEARCH & EDUCATION FOUNDATION GRENADA INC.
STATEMENT OF FINANCIAL ACTIVITIES AND CHANGES IN NET ASSETS

	Unrestricted Funds	Restricted Funds	Total 2018	Total 2017
Revenue, Gains & Other Support				
Grant and contract revenue – net	-	1,146,824	1,146,824	1,536,095
Contributions, donations and legacies	219,042	524,762	743,804	690,377
Other income	-	-	-	-
Total Revenue, Gains & Other Support	219,042	1,671,586	1,890,628	2,226,472
Expenditure				
<i>Program services:</i>				
Health-science related education and research	21,157	2,009,904	2,031,061	1,693,596
<i>Supporting Services:</i>				
Fund-raising	-	-	-	1,222
Management, general and administrative	10,568	22,278	32,846	22,984
Total Expenditure	31,725	2,032,182	2,063,907	1,717,802
Change in Net Assets	187,317	(360,596)	(173,279)	508,670
Net assets at beginning of year	5,546	1,671,964	1,677,510	1,168,840
Net assets at end of year	192,863	1,311,368	1,504,231	1,677,510

The notes on pages 7 to 16 are an integral part of these financial statements.

The financial statements on page 3 to 6 were authorised for issue by the directors on December 10, 2018 and were signed on its behalf.


.....
Director


.....
Director



WINDWARD ISLANDS RESEARCH & EDUCATION FOUNDATION GRENADA INC.
STATEMENT OF CASH FLOWS

	Note	Year Ended August 31	
		2018	2017
Cash flows from operating activities:			
Changes in net assets		(173,279)	508,670
Adjustments to reconcile changes in net assets to net cash used in operating activities:			
- Depreciation	5	14,712	11,432
- Amortisation		(14,712)	(11,432)
- Donated capital assets	5	-	-
- Impairment of receivables	4	-	-
<i>Changes in operating assets and liabilities:</i>			
- Grant and contract receivables	4	60,856	(362,675)
- Trade and other payables	6	16,801	18,203
- Deferred grant and contract revenue		-	117,836
Net cash used in operating activities		(95,622)	191,806
Cash flows from investing activities			
Purchases of property, plant and equipment (PPE)	5	-	(117,836)
Proceeds from sale of PPE	5	-	-
Net cash provided by/(used in) investing activities		-	(117,836)
Net (decrease)/increase in cash		(95,622)	164,198
Cash, at beginning of year		437,476	273,278
Cash, at end of year	3	341,854	437,476

The notes on pages 7 to 16 are an integral part of these financial statements.



WINDWARD ISLANDS RESEARCH & EDUCATION FOUNDATION GRENADA INC.
ACCOUNTING POLICIES AND NOTES TO THE FINANCIAL STATEMENTS

1. GENERAL INFORMATION

Windward Islands Research & Education Foundation Grenada Inc. ("WINDREF") seeks to advance health and sustainable environmental development through multi-disciplinary research and education programs. WINDREF is a non-profit company incorporated in the State of Grenada. The address of its registered office is St. George's University, True Blue, St. George.

WINDREF is exempt from annual stamp tax, and corporate income tax as a company formed for religious, charitable or educational purposes under section 25 of the Income Tax Act 1994 and is not required to annually file an income tax return under section 65 of the Income Tax Act 1994.

These financial statements were authorised for issue by the board of directors on December 10, 2018.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The principal accounting policies applied in the preparation of these financial statements are set out below. These policies have been consistently applied to all the years presented, unless otherwise stated.

2.1. BASIS OF PREPARATION

These financial statements have been prepared in accordance with the 'International Financial Reporting Standard for Small and Medium-sized Entities' (IFRS for SMEs) and the Companies Act 1994. The financial statements have been prepared under the historical cost convention.

The preparation of financial statements in conformity with the IFRS for SMEs requires the use of certain critical accounting estimates. It also requires management to exercise its judgement in the process of applying the non-profit company's accounting policies.

2.2. PREPARATION OF THE ACCOUNTS ON A GOING CONCERN BASIS

WINDREF receives support from the St. George's University (SGU) in the form of donated premises and premises-related costs in respect of its administrative function, the value of which has not been reported with these financial statements. This support allows WINDREF to carry on activities that further the purposes of the foundation. WINDREF reported a cash balance of \$341,854 (2017: \$437,476).



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2.3. FOREIGN CURRENCY TRANSLATION

(a) *Functional and presentation currency*

Items included in the financial statements are measured using the currency of the primary economic environment in which the entity operates ('the functional currency'). The financial statements are presented in Eastern Caribbean currency, which is WINDREF's functional and presentation currency.

(b) *Transactions and balances*

Foreign exchange gains and losses that relate to borrowings and cash and cash equivalents are presented in statement of financial activities within 'Programme services'. All other foreign exchange gains and losses are presented in statement of financial activities within 'Supporting services'.

Foreign exchange gains and losses that relate to borrowings and cash and cash equivalents are presented in statement of financial activities within 'Programme services'. All other foreign exchange gains and losses are presented in statement of financial activities within 'Supporting services'.

2.4. CASH AND CASH EQUIVALENTS

For the purposes of the statement of financial position and the statement of cash flows, WINDREF considers all short-term investments with an original maturity of three months or less to be cash equivalents. There were no cash equivalents as of August 31, 2018.

2.5. GRANT AND CONTRACT RECEIVABLES

Grant and contract receivables are stated as unpaid balances, less an allowance for doubtful accounts. The allowance is based on collection experience and other circumstances that may affect the ability of agencies and donors to meet their obligations. It is WINDREF's policy to charge off uncollectible accounts receivable when management determines the receivable will not be collected. As of August 31, 2018, management deemed that no allowance for doubtful accounts was necessary on grant and contract receivables.

2.6. PROPERTY, EQUIPMENT AND DEPRECIATION

Purchased property and equipment are recorded at cost. Additions with a cost or fair value of less than \$125 are expensed. Donated property and equipment are recorded at fair value at the time of donation. Depreciation is computed using the straight-line method over the following estimated useful lives:

- Furniture & equipment	10.00%
- Computer and office equipment	16.67%



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2.7. REVENUE RECOGNITION

Revenue is recognised when WINDREF has entitlement to the funds, any performance conditions attached to the item(s) of income have been met, it is probable that the income will be received, and the amount can be measured reliably.

Income from government and other grants, whether 'capital' grants or 'revenue' grants, is recognised when WINDREF has entitlement to the funds, any performance conditions attached to the grants have been met, it is probable that the income will be received, and the amount can be measured reliably and is not deferred.

For legacies, entitlement is taken as the earlier of the date on which either: WINDREF is aware that probate has been granted, the estate has been finalised and notification has been made by the executor(s) to WINDREF that a distribution will be made, or when a distribution is received from the estate. Receipt of a legacy, in whole or in part, is only considered probable when the amount can be measured reliably, and WINDREF has been notified of the executor's intention to make a distribution. Where legacies have been notified to WINDREF, or WINDREF is aware of the granting of probate, and the criteria for income recognition have not been met, then the legacy is treated as a contingent asset and disclosed if material.

Income received in provision of other specified service is deferred until the criteria for income recognition are met.

2.8. DONATED SERVICES AND FACILITIES

Donated services or facilities are recognised as income when WINDREF has control over the item, any conditions associated with the donated item have been met, the receipt of economic benefit from the use by WINDREF of the item is probable and that economic benefit can be measured reliably. On receipt, donated services and facilities are recognised on the basis of the value of the gift to WINDREF which is the amount WINDREF would have been willing to pay to obtain services or facilities of equivalent economic benefit on the open market; a corresponding amount is then recognised in expenditure in the period of receipt. In accordance with accounting standards, the economic contribution of general volunteers is not measured in the accounts.

2.9. FUND ACCOUNTING

Unrestricted funds are available to spend on activities that further any of the purposes of WINDREF. Designated funds are unrestricted funds of WINDREF which the directors have decided at their discretion to set aside to use for a specific purpose. Restricted funds are donations which the donor has specified are to be solely used for particular areas of WINDREF's work.



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2.10. FUNCTIONAL ALLOCATION OF EXPENSES

The statements of financial activities and changes in net assets reflect expenses on a functional basis. Accordingly, certain costs have been allocated among the programme and supporting services functions. Expenses related directly to a program are distributed to that programme.

2.11. EXPENDITURE

Expenditure is recognised once there is a legal or constructive obligation to make a payment to a third party, it is probable that settlement will be required, and the amount of the obligation can be measured reliably.

3. CASH AND CASH EQUIVALENTS

	2018	2017
Cash at bank and on hand	341,854	437,476

Cash, cash equivalents and bank overdrafts include the following for the purposes of the statement of cash flows:

	2018	2017
Cash	341,854	437,476
Cash equivalents	-	-
Bank overdraft	-	-
Cash, cash equivalents and bank overdrafts	341,854	437,476

4. GRANT AND OTHER RECEIVABLES

	2018	2017
Grants and contracts receivable	57,659	875,772
Amounts due by connected parties (note 9)	1,128,605	414,968
Prepaid expenses	51,976	8,356
Total	1,238,240	1,299,096

The fair values of grants and contracts receivable are equal to their book value. As of August 31, 2018, contracts and grants receivable of \$Nil (2017: \$Nil) were fully performing.

The creation and release of provision for impaired receivables are charged to the statement of activities and changes in net assets. Amounts charged to the allowance account are generally written off, when there is no expectation of recovering additional cash.



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5. PROPERTY AND EQUIPMENT

	Furniture & Equipment	Computer Equipment	Total
At 1 September 2016			
Cost or valuation	14,499	24,542	39,041
Accumulated depreciation	(14,070)	(11,811)	(25,881)
Net book amount	429	12,731	13,160
Year ended 31 August 2017			
Opening net book amount	429	12,731	13,160
Additions	117,836	-	117,836
Depreciation charge	(8,712)	(2,720)	(11,432)
Closing net book amount	109,553	10,011	119,564
At 31 August 2017			
Cost or valuation	132,335	24,542	156,877
Accumulated depreciation	(22,782)	(14,531)	(37,313)
Net book amount	109,553	10,011	119,564
Year ended 31 August 2018			
Opening net book amount	109,553	10,011	119,564
Additions	-	-	-
Depreciation charge	(11,992)	(2,720)	(14,712)
Closing net book amount	97,561	7,291	104,852
At 31 August 2018			
Cost or valuation	132,335	24,542	156,877
Accumulated depreciation	(34,774)	(17,251)	(56,025)
Net book amount	97,561	7,291	104,852

Depreciation expense of \$14,712 (2017: \$11,432) has been charged to "Management, general and administrative".

6. TRADE AND OTHER PAYABLES

	2018	2017
Accrued expenses	75,863	59,062
Deferred income	-	-
Total	75,863	59,062



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7. FINANCIAL RISK MANAGEMENT

WINDREF is exposed to a variety of financial risks: market risk (including foreign currency risk, interest rate risk), credit risk and liquidity risk. WINDREF's overall risk management programme focuses on the unpredictability of financial markets and aims to minimise potential adverse effects on its financial performance.

7.1. FOREIGN CURRENCY RISK

WINDREF is exposed to foreign currency risk resulting from balances receivable or payable in foreign currencies.

The currencies which these transactions are primarily denominated are the US and Canadian dollar and Euros. WINDREF's foreign currency risk management objective is to minimise the impact on the Statement of Financial Activities of fluctuations in the exchange rates.

7.2. CREDIT RISK

Credit risk refers to the risk that a counterparty will default on its contractual obligations resulting in financial loss to WINDREF. Financial credit risk arises from cash balances (including bank deposits and cash and cash equivalents) held by WINDREF and business credit risk arises from exposures to donors. Business risk includes grant and contract receivable and contributions.

WINDREF aims to minimise its financial credit risk through the application of risk management policies approved by the Board. Counterparties are limited to major banks and financial institutions. The maximum exposure to credit risk is limited to the carrying value of each class of asset summarised in note 3.

Business credit risk is monitored on an on-going basis. Contributions from donors are required to be settled in cash, banker's cheque or using wire transfer, mitigating credit risk. There are no significant concentrations of credit risk, whether through exposure to individual donors, specific industry sectors and/or regions.

8. SUBSEQUENT EVENTS

Subsequent events have been evaluated through November 30, 2018, which is the date the financial statements were available to be issued. There were no events that met the criteria for recognition or disclosure in the financial statements.



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9. CONNECTED-PARTIES

(a) *Amounts owed by connected-parties*

	2018	2017
Due by connected parties		
As at September 1	414,968	517,094
Charges/(Repayments) during the year – net	713,637	(102,126)
As at August 31	1,128,605	414,968

Windward Islands Research & Education Foundation, Inc, a not-for-profit corporation incorporated in the state of New York, is connected to WINDREF by virtue of common Directors who oversee the activities of both entities. Balances with WINDREF USA relate to net funds received from / paid on behalf of WINDREF Grenada at the year-end.

(b) *Donated services and facilities*

St. George's University (SGU) donated the use of its premises and premises-related costs for WINDREF's administrative function.

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