The Tropical Medicine Research Institute

The Tropical Medicine Research Institute is a University of the West Indies, Caribbean wide health research institution. It was formed in 1999 at the request of the then Vice Chancellor, Sir Alister McIntyre on the basis of a proposal to the UWI Grants Committee by its Founding Director, Professor Terrence Forrester. The Institute was constituted, using as its base, 2 existing research units, the Tropical Metabolism Research Unit and the Sickle Cell Unit, both of them legacy UK MRC Units, on the UWI Mona Campus in Jamaica. It was fleshed out by creating, at the outset, an Epidemiology Research Unit from the staff members in the TMRU who worked in that discipline. A year later, the Institute expanded by funding the Chronic Disease Research Centre, another epidemiology unit at UWI Cave Hill in Barbados. Ten years later, the Institute is trying to raise funds to construct a new health intervention unit. Funding difficulties have caused lengthy delays in implementing this project. In its earlier incarnations, this unit was called the TMRI Health Intervention Research Unit. Recent alignment with UWI Mona campus initiatives and the grant funding climate has made for a name change. This new unit is presented as an Energy Metabolism Research Unit at Mona which will use research findings to develop novel interventions for obesity and co-morbidities. The TMRI has also responded to requests from the Dean, UWI St. Augustine in Trinidad to replicate this new Unit on that Campus within a three year period. The Dean has very recently (June 2010) successfully negotiated access to space in a new University (St. Augustine Campus) complex sufficient to house an energy lab and the associated
The Mission of the Tropical Medicine Research Institute

The TMRI exists to conceive and deliver high quality research that addresses regional and global health priorities in order to improve health, enhance wellbeing, and create wealth through this investment in human capital.

Overall Objectives

Overall objectives in pursuit of this mission are:

- Increased focus of the research programmes on regional and global priorities so designed as to facilitate uptake by policy makers and programme designers
- Increased training of the next generation of research scientists, with a particular focus on Academic Clinicians
- Through research and training, derive income to better resource the operational and capital budgets of the Institute

Specific Objectives

The specific objectives that the Institute will pursue in order to meet its mission will continue to include those aiming:

TMRI Research Programme

The TMRI is composed of four research units; each unit expresses specific areas of research activity. Programmes are therefore rooted in, and driven by individual Units. However, continuing efforts to stimulate cross Unit collaboration has allowed for emergence of programmatic themes that indeed span units. Despite the resource constraints, the Institute, through its specialist Units, has focused on research and training programmes that fall within its current capacity. The Institute is active in the following
programmatic themes which are anchored in specific Units though enriched by cross Unit collaboration.

- **Child Development** – Child Development Research Group, Epidemiology Research Unit
- **Human Nutrition and Metabolism** – Tropical Metabolism Research Unit
- **Developmental Origins of Health and Disease** – Tropical Metabolism Research Unit
- **Genetic underpinnings of disease susceptibility and severity** – Tropical Metabolism Research Unit
- **Sickle Cell Disease** – Sickle Cell Unit
- **Chronic Non-Communicable Diseases** – Chronic Disease Research Centre and Epidemiology Research Unit
- **Inflammation** – Chronic Disease Research Centre and Sickle Cell Unit

**CLINICAL SERVICES**

**Sickle Cell Unit**

**Sickle Cell Clinic**

The Sickle Cell Unit is the only comprehensive type clinical facility for the care of persons with sickle cell disease in Jamaica. Sickle Cell Clinics are held Mondays to Fridays at the SCU building located at Ring Road, University of the West Indies, Mona as well as on the last Tuesdays and Wednesdays of each month at St. Elizabeth (Black River hospital) and St. James (Cornwall Regional Hospital) respectively.

The SCU operates an ambulatory clinic and a day-care ward where complications such as acute painful crises, acute febrile illness and acute anaemia are managed. Over 90% of patients with acute painful crises are managed as outpatients and this model of aggressive acute day-care has acted as a model for SCD Centres elsewhere. There has been a continual
increase in the number of patients attending the clinic (patient load) and the number of visits per patient (clinic load). The clinic load has increased ~10-fold, from 3668 visits in 1973-75 to 55,686 visits in 2005-2010.

**Severe Childhood Malnutrition**

The TMRI provides in-hospital care for children with severe malnutrition at the TMRU ward. Through the TMRU, the Institute also provides a **Clinical Nutrition Service to the University Hospital**, offering nutritional support to the critically ill, including enteral and parenteral nutrition. In addition to the clinical care offered on site, TMRI also provides an outreach programme for social work and social welfare.

**Undergraduate and Postgraduate Teaching**

The Tropical Medicine Research Institute provides teaching at undergraduate and postgraduate levels as above. The TMRI faculty teaches both undergraduate and graduate medical students in the areas of Biostatistics, Epidemiology, Family Medicine, Paediatrics, Clinical Nutrition and Haematology.

MSc degree programmes in Nutrition and Epidemiology are offered.

**Post Doctoral Fellowships**

The Institute operates a structured Post Doctoral programme which aims to develop independent Academic Researchers. There are three Faculty of Medical Sciences Fellowships tenable on the Mona Campus and three TMRI institutional Fellowships.

**Student Achievement – MSc Epidemiology**


**Supervisor:** Jan Van den Broeck
Iyanna Wellington: “Adolescent Overweight and Socioeconomic Status: the Jamaican Situation” – Awarded 2009
**Supervisor:** Rainford Wilks

Denese McFarlane: “Prevalence and Correlates of Anaemia in Jamaican Adolescents” – Awarded 2009
**Supervisor:** Rainford Wilks

Shelly Ann Hunte “Validity and Reliability of Interviewer Assessed Built Environment” – Awarded 2009
**Supervisors:** Marshall Tulloch-Reid, Novie Younger

Chisa Cumberbatch “Hours of Sleep and Sleep Quality on Diabetes Prevalence and Control in Jamaica” – Awarded 2009
**Supervisors:** Marshall Tulloch-Reid, Novie Younger

Sabrina Simpson “Educational attainment and physical activity in Jamaican Adults” – Awarded 2009
**Supervisors:** Trevor Ferguson, Novie Younger

**Supervisor S. Walker:**

**Programmes based in the Child Development Research Group**

**PUBLICATIONS**

**Peer Reviewed**


External Funding and collaborations (collaborators affiliations indicated)


2009-2010 Environmental Foundation of Jamaica. Planning for the sustainability of an intervention to prevent child conduct problems and to promote children’s social and emotional skills.
Investigators: H Baker-Henningham, S Walker, J$2,006,000

2007-10 The Wellcome Trust Research Training Fellowship for Dr H Baker-Henningham. Promoting young children’s social and emotional competence and preventing conduct problems.
Investigators: H Baker-Henningham, S Walker, S Scott (Institute of Psychiatry, UK) £297,190

Programmes based in the Tropical Metabolism Research Unit

Research: Three programmes have their intellectual centre of gravity rooted in TMRU; they are the Human Nutrition and Metabolism, Developmental Origins of Health and Disease and Genetics Programmes. The respective Programme Leaders are Terrence Forrester, Michael Boyne and Colin McKenzie. These programmes have discovery research as their organising principle; within this context, opportunities are sought to add translation research to the more indirect effects such more clinical and basic research exert on policy, programme and practice. Thus, the studies on disordered intermediary metabolism in severe childhood malnutrition have made their way into the WHO Manual for clinical care of severe malnutrition; and ongoing research includes laboratory based proof of principle studies that could inform formal trials. The strategy for both DOHAD and Genetics is the more indirect route of defining mechanism and in the process, identifying potential translation targets.
**Clinical Service:** The Unit operates a full time paediatric ward with 13 beds as a tertiary referral centre for children with severe childhood malnutrition. Clinical Care is coordinated by the Head of TMRI Clinical Services and there are two professional staffers; one Paediatrician and a Clinical Nutritionist. An Adult Physician will be appointed in 2010 using UHWI resources. All the Clinicians of TMRU contribute to clinical coverage. The Staff engaged in this clinical practice form the Clinical Nutrition Team which responds to requests for consultant input into the care of critically ill patients in the University Hospital of the West Indies who have special nutrition needs.

**Tropical Metabolism Research Unit (Consolidated Human Nutrition & Metabolism, DOHAD and Genetics Programmes)**

**PUBLICATIONS**

Peer reviewed


populations of unknown origin by genome-wide genotyping of pooled samples. PLoS Genet 2010; 6(3).


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**List of Grants held for, Human Nutrition and Metabolism, Developmental Origins of Health and Disease and Genetics Programmes anchored in TMRU**

<table>
<thead>
<tr>
<th>Funding Agency</th>
<th>Research Project</th>
<th>Total Grant Amount</th>
<th>UWI Grant Amount</th>
<th>Start Date</th>
<th>End Date</th>
<th>Principal Investigator</th>
</tr>
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<tbody>
<tr>
<td>National Institutes of Health</td>
<td>Glutathione Homeostasis &amp; Oxidant Damage in Kwashiorkor (NIH)</td>
<td>US$1,372,623</td>
<td>US$335,121</td>
<td>Apr. 07</td>
<td>Mar. 12</td>
<td>Terrence Forrester/Farook Jahoor Baylor</td>
</tr>
<tr>
<td>International Atomic Energy Agency</td>
<td>Programming of Body Fat Composition and Metabolic syndrome in African origin syndrome</td>
<td>£21,600</td>
<td>£21,600</td>
<td>Dec. 05</td>
<td>Dec. 10</td>
<td>Terrence Forrester</td>
</tr>
<tr>
<td>National Institutes of Health</td>
<td>Aromatic amino acid metabolism in the pathogenesis of kwashiorkor (NIH)</td>
<td>US$645,000</td>
<td>US$205,024</td>
<td>Sep. 06</td>
<td>Aug. 10</td>
<td>Terrence Forrester (UWI)/Farook Jahoor (Baylor College)</td>
</tr>
<tr>
<td>International Atomic Energy Agency</td>
<td>Non-exercise activity thermogenesis and weight gain in urban and rural adults in Jamaica, a low middle income country in epidemiologic transition</td>
<td>US$232,000</td>
<td>US$232,000</td>
<td>2007</td>
<td>2009</td>
<td>Terrence Forrester</td>
</tr>
<tr>
<td>Health Research Council of New Zealand</td>
<td>Developmental adaptation to an obesogenic environment</td>
<td>US$365,000</td>
<td>US$365,000</td>
<td>Oct. 08</td>
<td>Sep. 10</td>
<td>Peter Gluckman (University of Auckland) CO-PI: Terrence Forrester</td>
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<tr>
<td>International Atomic Energy Agency</td>
<td>Management of Service Acute Malnutrition</td>
<td>£45,000</td>
<td>£15,000</td>
<td>Nov. 08</td>
<td>Sept. 10</td>
<td>Asha Badaloo</td>
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<tr>
<td>The Broad Institute, Inc. / Doris Duke Charitable Foundation</td>
<td>Whole-exome re-sequencing in sickle cell disease patients with extremely mild clinical course</td>
<td>US$486,000</td>
<td>US$32,400</td>
<td>Nov. 09</td>
<td>Oct. 12</td>
<td>Guillaume Lettre (Montreal Heart Institute), Colin McKenzie</td>
</tr>
<tr>
<td>National Institute of Health</td>
<td>Genetic study of severe childhood malnutrition</td>
<td>US$9,000</td>
<td>Jul. 10</td>
<td>Jun. 11</td>
<td>John Belmont (BCM), Colin McKenzie (collaborator)</td>
<td></td>
</tr>
</tbody>
</table>

Programmes Based in the Sickle Cell Unit

The Sickle Cell Unit (SCU) is the only comprehensive facility for the care of persons with Sickle Cell Disease (SCD) in the English speaking Caribbean. In fact, we are one of the largest of such facilities world-wide with over 5000 patients registered in our database. We are fully owned and managed by the University of the West Indies (UWI), through the Tropical Medicine Research Institute. In addition to recurrent costs (staff costs and utilities) which are funded by the UWI, our operational budget has to be supplemented by competitively acquired grants from external donor agencies to sustain our programmes.

The mission of the Sickle Cell Unit is to be a research institution which seeks to improve the lives of individuals with sickle haemoglobinopathies through rigorous Biomedical Research, Education and Clinical Care. The Unit has evolved from being a research clinic that catered to the needs of the Jamaica Sickle Cell Cohort recruits to being a full service primary care facility that is involved in research, clinical care and education.

2010 - Specific Objectives

For the strategic plan 2010 we will continue to build on our gains of the last quinquennium

Clinical Care Division

a. Strengthen organizational factors to improve health care delivery to persons with sickle cell disease. This includes the hiring a social worker, clinical psychologist, and a public health nurse dedicated to persons on hydroxyurea, improving health care workers’ skills, information systems and formal patient
self-management programmes. With regards to information systems we propose to complete improvements in our Patient Management Systems to a web based application that incorporates core management strategies of our Standard of Care guidelines.

b. Work with Ministry of Health to decentralize health care delivery to persons with sickle cell disease.

c. Work with Ministry of health to have Island-wide screening for Sickle Cell Disease.

d. The establishment and equipping of a clinical diagnostic centre at the SCU to facilitate both service and research by identifying complications early so as to allow timely intervention. The resource requirements are:

i) Construction of new diagnostic laboratory 800 sq ft (~75m²) facility.

ii) Equipment required are an Oxygen saturation monitor, vital signs monitor, ultrasound machine, Transcranial Doppler Machine and dual head gamma counter.

Research Division

a. Continue observational cohort studies refining phenotypic expressions with the aims of facilitating genetic research and providing data to inform public health and clinical interventions

b. Clinical trials in the following phenotypes

   i) Conditional TCD velocities

   ii) Renal insufficiency

   iii) Asthma and Acute Chest

   iv) Leg Ulcers

c. Mechanistic studies examining the role of genetic polymorphism, inflammation and nutrition in the expression of these phenotypes.
Peer reviewed publications – Sickle Cell Unit


Grants supporting clinical trials and clinical epidemiology in Sickle Cell Disease

Title: HQP 2008-004
A Randomized, Blinded, Placebo-controlled, Dose Escalation Study of Evaluate the Safety, Tolerability and Pharmacokinetics of HQK 1001 in Subjects with Sickle Cell Disease
Principal Investigator:  Prof. Reid / Dr. Cumming
Source of Funding:  Hemaquest (J$382,421 per patient)2009-2010

Title: Pneumococcal Serotype and Resistance Patterns in Children with Sickle Cell Disease: A comparative study between a developing country and a developed country.
Principal Investigator:  Dr. Knight-Madden
Source of Funding:  Wyeth (US$19,100) (2008-2010)

Title: A longitudinal study of lung function in adults with Sickle Cell Disease
Principal Investigator:  Dr. Knight-Madden / Prof Reid
Source of Funding:  UWI & CHRC - J$1,702,755.40 and US$7,879.80 (2009-2010)

Title: Quality of life of patients with Sickle Cell Disease: Rural-urban differences
Principal Investigator:  Dr. Asnani / Dr Anderson
Source of Funding:  CHRC (US$5,637) (2009-2010)
Title: Measuring Glomerular Filtration in Sickle Cell Disease: 99m-Tc DTPA scan vs. cr51- EDTA measurement.  
Principal Investigator: Dr. Asnan / Prof Reid  
Source of Funding: CHRC (US$5,475) (2009-2010)

Title: Prevalence of Microalbuminuria in Jamaican Children with Sickle Cell Disease  
Principal Investigator: Dr. King / Prof Reid  
Source of Funding: CHRC (US$4,000) (2009-2010)

Title: Sparing Conversion to Abnormal TCD Elevation  
Principal Investigator: Prof Reid / Dr. Ali / Prof Ware  

Programmes Based in the Epidemiology Research Unit

Epidemiology is a basic science for clinical medicine and public health medicine and is an important tool and skill for persons pursuing a career in academic medicine. The skills and competences derived from training in epidemiology are applicable to all areas of the biomedical sciences.

The discipline of epidemiology can only develop and flourish on the basis of a viable research programme providing relevant information for science and policy and the opportunity for continuous training and retention of new epidemiologists which will sustain and expand the discipline as the needs increase.

The ERU has been accepted into the International Clinical Epidemiology Network (INCLEN), as a Clinical Epidemiology Unit (CEU), and we see this as an important stepping stone to achieve ‘internationalization’ while not losing sight of the regional imperative. We have benefited from this collaboration with one of our graduate students receiving the Canadian Emerging Leaders in the Americas Programme (ELAP) scholarship and the training of 9 members of the Unit in Effective Project Planning and Evaluation (EPPE) through the World Health Organization Special Programme for Research and Training in Tropical Diseases (TDR). At the same time the CNCD group is advancing collaborations on its CNCD
agenda with Morehouse School of Medicine (CNCDs in minorities and health disparities), the University of Michigan (chronic kidney disease and cardiovascular diseases), the University of Arizona (CNCDs and fracture risk) and University of Pittsburgh Graduate School of Public Health (Translation of Diabetes Prevention Programme to Caribbean). So far or major planned collaboration with another developing country is with the Public Health Institute of Mexico (obesity) (with Simon Barquera) and with Professor W.P.T. James of the International Association for the study of obesity (IASO) through his connection with Mexico.

We are now exploring novel risk factors for cardiovascular disease and diabetes such as social indices, depression, quality of life, sleep and the built environment which are of international interest. These factors are important determinants of adherence and complications.

In response to the increasing burden of cardiovascular disease and diabetes we have started the process of developing intervention programmes to address this issue. A project to address obesity in 6-10 year old children in Jamaica (Pan American Health and Education Foundation [PAHEF]) is currently underway and two proposals – one for Type 2 diabetes prevention and the other for reducing foot complications are currently under development.

In the upcoming period the CNCD group anticipates growth and strengthening primarily from retaining the current core staff which continues to improve its skills and competences, but also from the further training of three members of staff in areas which are crucial to its long term objectives. These members of the team will be trained in social epidemiology (Colette Cunningham-Myrie) via a Hubert Humphrey Fellowship; in nutritional epidemiology (Damian Francis) via a Canadian ELAP Fellowship and completion of a PhD; and mental health epidemiology (Shelly McFarlane) via completion of a PhD. Additionally faculty and students are expected to benefit from INCLEN collaborations in Latin America, Canada and the USA. These efforts will no doubt accelerate our publication rate and quality which are the important indicators that can be used to assess the work of the Unit.
The University of the West Indies (UWI) has declared its commitment to strengthen and promote research as part of its strategic plan and the establishment of UWI institutions like the Tropical Medicine Research Institute (TMRI) is evidence of its commitment. The ERU within the TMRI with its focus on the CNCD research and its commitment to training of skilled health researchers has an important role to play in this imperative.

Epidemiology Research Unit

PUBLICATIONS

Peer reviewed

\(WIMJ = West\ Indian\ Medical\ Journal\)


Programmes based in the Chronic Disease Research Centre

The CDRC’s Mission is to develop a world-class research centre focused on the surveillance, pathogenesis and prevention of chronic non-communicable diseases, with the capacity to influence health policy and practice in Barbados and the wider Caribbean.

Aims

■ To establish robust systems for monitoring the burden of chronic non-communicable diseases.

■ To develop evidence-based strategies for reducing the burden of these diseases.

■ To estimate the economic and social costs associated with these diseases in order to guide cost-effective healthcare interventions.

■ To evaluate the contribution of molecular mechanisms to disease aetiology

■ To build capacity in healthcare research:

  a. To utilise the skill sets of the CDRC in order to create a robust and secure research data management environment for use across the university and by external collaborators.

  b. To provide postgraduate research training.

  c. To strengthen and extend diagnostic laboratory capacity nationally and in the Eastern Caribbean.

■ To collaborate intra-murally, with governments, non-governmental organisations, regional and international organisations in addressing the chronic disease epidemic.

Chronic Disease Research Centre (CDRC)

PUBLICATIONS

* Hambleton IR, Jonnalagadda R, Davis CR, Fraser HS, Chaturvedi N, Hennis AJ. All-cause mortality after diabetes-related amputation in Barbados: a prospective


**PUBLIC SERVICE**

**Asha Badaloo**

– Member, of team reviewing recommended daily allowances of energy and nutrients, Caribbean Food and Nutrition Institute.

– Reviewer, Journals (*West Indian Medical Journal, Pediatric Research, Public Health Nutrition, Case reports in Medicine*)

**Michael Boyne**

– Member, Medical Association of Jamaica Ethics Committee

– Founding member and organizer, Annual Scientific Meeting, Caribbean Endocrine Society

– Honorary Treasurer, Association of Consultant Physicians of Jamaica

– Member, Board of Jamaica Osteoporosis Society

– Reviewer for the following medical journals: *Diabetes Care, Diabetic Medicine, West Indian Medical Journal, Journal of National Medical Association, Journal of Human Hypertension, Postgraduate Doctor*

**Susan Chang-Lopez:**

– Member, Research Committee of the Early Childhood Commission.

**Cunningham-Myrie C**

– Editor, TMRI’s, biannual newsletter

– Peer-reviewer, *West Indian Medical Journal*
– Member CARICOM Health & Development Sub-Committee on Chronic Non-Communicable Disease
– Member, Jamaica Musical Theatre Company & University Singers Alumni

**Ferguson T:**
– Honorary Consultant, Department of Medicine, University Hospital of the West Indies
– Examiner, Caribbean Association of Medical Councils Licensing Examinations
– Reviewer, *West Indian Medical Journal, Diabetes Research and Clinical Practice*

**Terrence Forrester**
– Adviser to regional and international institutions in the areas of Nutrition and Cardiovascular Diseases.
– Scientific Secretary, Caribbean Health Research Council, a regional body reporting to the Heads of Government and providing advice of matters of health research for the Caribbean.
– Advisor to the Pan American Health Organization
– Head a University of the West Indies think tank to coordinate necessary academic work to provide policy and programme ready advice on a major crisis
– Commissioner, National Commission on Science and Technology
– Member National Advisory Committee on Health
– Director, Arts Foundation of Jamaica

**Francis DK:**
– Board Member, Jamaica Island Nutrition Network
– Executive member, Jamaica Association of Professionals in Nutrition and Dietetics
– Systematic Reviewer, Cochrane Effective Practice for Organization of Care Group and Cochrane Musculoskeletal Group

– Member, Cochrane Equity Methods Group


**Ian Hambleton**


– Statistical expert, The Barbados National Ethics

– Caribbean representative, Data management and statistical advisor. PAHO / WHO committee on development of Human Resources for Health (HRH) resources in the Caribbean.

**McFarlane S**

– Coordinator, ERU Annual Research Skills Workshop

– Distinguished Secretary and Director, Kiwanis Club of Constant Spring

– President Elect, Kiwanis Club of East Charlton

– Director, University Diabetes Outreach Project and Conference Organizing Committee

– Member, Caribbean Nephrology and Hypertension Conference Organizing Committee

**Christine Powell**

– Member, Child Nutrition Committee of the Early Childhood Commission.

– Ministry of Health, Infant and Young Child feeding Committee

– Planning Institute of Jamaica, Social Welfare an Vulnerable Groups Task Force
**Tulloch-Reid MK**

- Honorary Consultant, Endocrinology, The University Hospital of the West Indies
- Honorary Secretary and Treasurer, Conference Organizer – The Caribbean Endocrine Society
- International Committee Member, Minority Health Affairs Committee Member, American Association of Clinical Endocrinologists (AACE)
- Medical Director, Diabetes Educators of the Caribbean
- Examiner, Caribbean Certified Diabetes Educator Examination
- Reviewer, *American Journal of Epidemiology, Diabetologia, Medical Science Monitor, West Indian Medical Journal, Diabetes Care, British Medical Journal*

**Susan Walker**

- Scientific Secretary, Caribbean Health Research Council
- Member, Advisory Committee on Early Childhood Development in Latin America and the Caribbean, Inter-American Development Bank
- Member, Essential National Health Research Committee, Ministry of Health, Jamaica
- Member, National Early Childhood Development Policy Steering Committee, Early Childhood Commission, Jamaica
- Steering Committee, Global Child Development Group
- Associate Editor, Public Health Nutrition.

**Carolyn Taylor-Bryan**

- Member, Pediatric Association of Jamaica education committee
- Clinical services

**Wilks R**

- Member, WHO/PAHO Salt Experts Sub-group on Dietary salt Surveillance
– Peer-Reviewer, *BMC Public Health; European Journal of Public Health*

– Member, St. Josephs Hospital Transformation Committee

– Member, Board of Directors, The Heart Foundation of Jamaica

**Younger N**

– Director, Education Department, Andrews Memorial Seventh Day Adventist Church

– Member of Board of Elders, Andrews Memorial Seventh Day Adventist Church

– Co-Editor, “Counted for Righteousness” Newsletter published by the Christian Statisticians” Informal Discussion Group, American Statistical Association