

Assessing the health effects of exposure to westernised lifestyle on the Amerindian Guyanese population

A Proposal of the Aberdeen Guyana Research Expedition



THE SCIENTIFIC
EXPLORATION
SOCIETY



Maynard's Trust



PRINCIPLES OF EXCELLENCE FUND

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Assessing the effects of westernisation on the Amerindian population residing in urban areas compared to non-Amerindian Guyanese and Amerindians residing in the jungle.

1 - Introduction

Our team is investigating whether the Guyanese Amerindian people who have moved from the Interior (Guyana's large jungle region) to the coastal cities are at greater health risk than Amerindians who still reside in the interior, and compared to non-Amerindian Guyanese.

This expedition will take place from the 27th of October 2015 to the 27th of November 2015, along the Rupununi and Rewa rivers, near Annai, North Rupununi, Region 9, Guyana.

The team will consist of 4 medical students from the University of Aberdeen at varying stages of their academic careers. Seven students from the University of Guyana will be conducting the Urban phases of the study. The expedition will comprise of two main projects: Project one will be looking at the physiological impact of western diet and lifestyle on Amerindian health, while Project two will be assessing cultural, social and spatial factors that influence attitudes and use of healthcare.

The UK members of the team will fly to Guyana on the 27th where they shall spend a short time acclimatising, being brought up to date by the Guyana team and finalise any administrative details such as meeting with the Minister for Health and Minister of Indigenous Peoples Affairs. The full team will then fly to Annai, from where we will get 4x4 to Kwatamang, and from there we shall get a 2hr 30 boat ride to the Caimen House Field Station near Yupukari who have agreed to let us use their facilities as a base camp. The team shall spend a further few days recuperating, getting to know our guides and the Mukushi people before traveling along the Rupununi river to visit the more distant tribes.

Our team from Aberdeen will be working with a partner team of students from the University of Guyana in Georgetown, who will conduct the city based research and will take two groups of 200 (100M, 100F), one Amerindian group and one non-Amerindian Guyanese group. This research will take place over a series of months and will be nearly completed by the time the Aberdeen team arrives. As there is very little research activity by the University of Guyana, and this is the first medical research of this nature the university will be a part of, we are heavily involved in the conduct of the experiments by the Guyana student team. We are also aware of the large 'brain drain' where a large proportion of medical students leave the country. therefore we feel compelled to encourage home grown research, rather than exploiting an academic resource.

Pioneering with Purpose

Although research has been conducted with indigenous communities around the globe, none that we have found has looked at non-westernised control groups. Often this is due to communities having already been fully integrated into the more domineering western culture. Guyana is at a vital stage of its economic development with increasing number of people being drawn from its hinterland to the more industrialised cities, but due to the Amerindian communities selected hard to reach locales, an element of non-westernisation has remained, and so, we hope to be some of the first to scientifically compare westernised and non-westernised indigenous peoples, and so be able to draw more conclusive understanding from the results. The purpose of those results once published, we hope is to allow policy makers to have the issue highlighted and for them to make informed decisions.

The project involves extreme travel to incredibly remote locations, conducting the pioneering biomedical research, the first of its kind in Guyana.

2 - Aim

An investigation into the overall health impact of westernisation on city dwelling Amerindians compared to non-Amerindian Guyanese and Interior based Amerindians.

2.1 Research objectives

- Assess whether Amerindians who are exposed to Western diet and lifestyle are at increased health risk.
- Assess cultural, social and spatial factors that influence attitudes and use of healthcare.
- Qualify perceptions of health care provision in its current form.
- Analysing perception of body image and diet amongst Guyanese Amerindian Women.
- Develop research techniques in working with indigenous communities.
- Develop skills in working with an international team and build strong relationships with the partner team at the University of Guyana.
- Improve personal skills and abilities in field research.
- Lay the foundations for future research in this unique environment and attempt to enable University of Guyana students to conduct research themselves in the future.

These objectives can be broadly classified into three distinct subprojects looking at; the physiological impact of western diet and lifestyle, access to healthcare in the Interior and the perception of body image the role of Guyanese women of child bearing age.

Project 1 : Physiological Impact of Western Diet and Lifestyle

Assessing whether Amerindians who are exposed to Western diet and lifestyle are at increased cardiovascular and respiratory health risk.

Introduction

Multiple Indigenous populations such as American Indian, Alaska Natives, Native Hawaiians and Other Pacific Islanders, have been shown to have a higher risk of developing Non-Communicable Diseases (NCD's) after having been exposed to a westernised diet and lifestyle, (Hutchinson and Shin, 2014; Mau *et al.*, 2009). These NCD's include diabetes, metabolic syndrome, hypertension, cardiovascular disease, and respiratory disorders. In the current proposal, hypertension, peak flow, BMI and hip-waist ratio will be investigated. Relatively simple procedural techniques are being used due to the difficulty posed by reproducibility in a jungle based setting, as well as being consciously aware that more invasive investigations could result in psychological and social damage in primitive communities. There is a large population of Amerindians in the cities that lie along the coast in Guyana, as well as increase in 'eco-tourism', logging and mining, with large numbers of non-Amerindian people traveling into the Interior, thus increasing the exposure of Amerindian people to Western diets and lifestyles. Assessing the population risk would allow policy makers to act in the best interest of the Amerindian community.

The relevance of the chosen outcome measures is based on a vast body of research demonstrating their relevance to human health. Hypertension is a major risk factor for cardiovascular disease and is associated with coronary heart disease (Roccella and Bowler, 1990), myocardial infarction (Yusuf *et al.*, 2004) and increased mortality (Kannel, 1974). Both body mass index (BMI) and waist to hip ratio are measurements of relative weight and body fat distribution respectively and can be used together to predict disease risk (WHO, 2008). An increased waist to hip ratio is associated with cardiovascular events (de Koning *et al.*, 2007) and has been found in multiple studies to be a superior predictor for cardiovascular disease than BMI (Czernichow *et al.*, 2011).

As well as determining of underweight, overweight and obese individuals, BMI is also associated with an increased risk of stroke (Hu *et al.*, 2007). Obesity itself is associated with hypertension, hypercholesterolemia (both cardiovascular risk factors), certain cancer types and type II diabetes (NIH, 1985). Both BMI and Hip-to-waist-ratio are associated with hypertension, type II diabetes and overall mortality (WHO, 2008).

Peak expiratory flow (PEF) is a measurement of maximum expiratory airflow which can be used epidemiologically for identifying airflow limitation and its severity (Quanjer *et al.*, 1997). There have been studies which have found an inverse relationship between height adjusted peak flow readings and mortality from cardiovascular and respiratory disease in men over the age of 40 (Smith *et al.*, 2013) as well as a relationship between low height adjusted peak flow and disability and death in the elderly (Fragoso *et al.*, 2008). It has also been found to be an independent predictor of hospitalisation and decreased expected survival times in the elderly (Roberts and Mapel, 2012).

Aim

To determine if there is an increased health risk posed by western lifestyles to Amerindian Guyanese compared to non-Amerindian Guyanese. This will be assessed through risk factor comparison between those Amerindians with a traditional lifestyle and those Amerindians in urban areas.

Research Objectives

- Diet and Obesity - looking at the Body Mass Index (BMI) and hip to waist ratio of city based compared to Interior based Amerindian people.
- Peak flow (a non-invasive assessment of lung function) in city vs interior based Amerindian people, as well as smoking prevalence.
- Blood pressure (hypertension prevalence) in city vs interior based Amerindian people.
- General health questionnaire - Assessing a variety of variables and conditions including : ethnicity, age, diet, exercise, smoking, diabetes prevalence and mental health status.

Methodology:

Participant recruitment

City based recruitment will be arranged through the University of Guyana and will occur through a variety of means including collaborative efforts involving medical practitioners and dentists from the Ministry of Health. Jungle based recruitment will take place through visiting villages in the Interior (Guyana's jungle region) which will have been pre-approved by the Ministry of Indigenous Peoples Affairs, as well as the Toshoo of each of the tribes prior to access. These tribe visits shall be co-ordinated through the ministry of Indigenous Peoples Affairs.

Trial design

Before agreeing to take part, all participants will be provided with a participant information sheet and a consent form. A researcher will go through these forms with

the participant explaining what the research is about, what the experiments will involve and answering any queries they may have. They will then be asked to sign the consent form. For those who cannot read the participant information sheet will be read out to them, and for those who cannot read English, we will provide translated Mukushi copies and an interpreter will assist communication between the researcher and the participant. If informed consent cannot be guaranteed, the volunteer will not be asked to participate further.

City Phase

Data will be collected from 200 Amerindians who have resided in cities for 5 years or more spanning the ages up to and including 18 to 70. Potential participants will be asked if they would like to participate and will be provided with relevant information to fulfil informed consent. They will then be asked to complete a health questionnaire and blood pressure, BMI, waist to hip ratio and peak flow will be recorded. The same process will take place with 200 non-Amerindian Guyanese participants in the city, between the years of 18 to 70.

Interior Phase

Due to the remoteness of this phase of the study and the fact that there has never been any research of this nature conducted before, it is difficult to establish a definitive number of participants for the jungle phase. As a result we will take recordings from as many people as we can who are willing and who fulfil our participant parameters (18-70 years of age, spent whole life residing in jungle, infrequent western contact). The Amerindian villages we visit will have been pre approved by the Ministry of Indigenous Peoples Affairs, as well as the respective tribal chiefs.

Data Collection Methods

Blood pressure – The participant will be asked to expose their arm and a sphygmomanometer will be placed around the arm and the stethoscope placed above the brachial artery. The sphygmomanometer will be inflated and then slowly deflated, with the commencement and cessation of Karotkov sounds noted as systolic and diastolic pressure (in mmHg) respectively.

BMI - Involves measuring height (in metres) and weight (in kilograms). These will be measured using a stadiometer and stand-on scales. BMI is calculated as weight divided by height squared (Kg/m^2). BMI classification will then be made using the WHO international classification of weight.

Waist to hip ratio - This requires the participant to be measured around the circumference of the waist and hip using a stretch resistant tape which has a constant tension of 100g (as recommended in WHO, 2008). The participant will be in the standing position with feet positioned together and arms by sides. Placement of the tape will be at the top of the iliac crest for waist circumference and around the widest area of the buttocks for hip circumference. Values will be recorded in centimetres.

Peak flow - Measuring peak expiratory flow (PEF) involves the participant to perform a forced exhalation into a peak flow meter. This is repeated three times and the highest value recorded. The researcher will demonstrate the procedure prior to the participant, as it is likely they will be unfamiliar with the way it is operated.

Project 2 : Healthcare Accessibility

Introduction

The 'hinterland' is the regional classification given to Interior region of Guyana, the topography in such areas predominantly consists of mountain ranges, savannah and dense rain forests accounting for population densities as low as <1 person per square kilometer. The population and spatial dynamics of Guyana's hinterland create inherent difficulties in implementing health care policy, additionally variations in cultural factors influence the accepted standard of government provide health care in remote and rural regions. The proximity and accessibility of built up populated areas &/or 'Western influences' on Amerindian populations must be taken into consideration, currently there are very few if any near villages along the Rupununi and Rewa rivers and surrounding areas that have not been impacted by Western culture.

Aim

The primary objective of the study is to establish the extent of accessibility to health care of Amerindian populations residing in Guyana's 'hinterland.' Currently this varies greatly from accessibility to health care experienced by populations in Guyana's urban regions, specifically the capital Georgetown. The following research objectives shall be conducted by a means of quantitative and qualitative methods to establish the factors, which contribute to the accessibility and format of healthcare experienced by hinterland populations. Additionally some objectives aim to establish differences in the perceived acceptable standard of healthcare, incorporating socio-economic, mobility, accessibility and spatial factors, with an overarching aim to establish why variations in accessibility to healthcare exists, and the what this means to those implementing health care in Guyana, and to those that it effects.

Research objectives

- Establish the spatial factors that influence accessibility and the extent to which they do so.
- Establish social/cultural factors that influence accessibility and the extent to which they do so.
- Establish the perceived spatial factors that influence accessibility and the extent to which they do so.

- Establish the perceived socio-economic factors that influence accessibility and the extent to which they do so.
- Establish the differences in perception, if any exist, of the format and availability of the health care the currently exists for rural/remote populations and the potential health care that WHO and PAHO aim to provide.

Methodology

Data collection shall be based primarily on a questionnaire, which shall be conducted in each of the villages visited.

In addition to this, a series of informal recorded interviews shall be conducted with a variety of willing participants with the aim to interview residents of the village that vary in age, gender, health, education and perceptions of what healthcare is and how it is and should be administered.

Project 3 – Perception of Body image and role of Guyanese women of childbearing age

Introduction

The current burden of obesity and lifestyle related disease worldwide is undoubtedly multifactorial (Popkin and Doak 1998). The increase in portion sizes and change in the constituents of the diet have been in part driven by increase in wealth and availability of food, but also by social and cultural shifts (Lobstein, Baur and Uauy, 2004) The patterns of economic growth, social changes and rise in obesity has been repeated societies worldwide, particularly in South America (Popkin, Adair and Ng, 2012). In short their needs to be research into the determinants of healthy eating. As Guyana teeters on the brink of major socioeconomic development the Amerindian population has increasing access to processed foods high in sugars, saturated fats, salts (Clegg, 2014). However the choices made by this population to consume these foods are influenced by local perception of food and concurrent to this is the issue of body image. Evidence suggests that patterns of disordered eating that play a major role in the obesity crisis are greatly by social and cultural behavioural pattern. As a westernised lifestyle exposes women to body ideals via the media women have an ongoing preoccupation with body size despite increasing waistlines (Muennig et al., 2008). Whether this preoccupation is mirrored in Guyana is an interesting enquiry and might provide insight into the relationship between food and body image at a societal level and provide another dimension to our understanding of how to approach to lifestyle advice and interventions.

Aim

To compare understanding and attitudes of factors known to influence obesity in women between 18-50 years in three separate groups: Amerindian women and

Guyanese women in and around Georgetown and Amerindian women residing in the interior of Guyana, as well as views of women of the same age in Great Britain.

Research objectives

To obtain information of the following key areas:

- Access the availability of food, content of diet and portion size.
- Perception of diet
- Food and development
- Emotional responses and eating
- Perception of body image and beauty

Methodology

The study will comprise of a series of semi structured recorded interviews with those living in the city and those living in the interior. Consent for interviews to be recorded will be obtained and an explanation of the purpose of the questions will be given. Discussion with Guyanese guides and students will be carried out upon arrival in Guyana with regard to specific phrasing or to inform the interviewers of cultural sensitivities that may require us to adapt the questions. We would aim to interview 10-20 women between 16-50. Women of childbearing age have been chosen as the target group for the enquiry as they are pivotal figures in determining the way society consumes food. They are not only the principal providers of food in most cultures but also it might be argued that the variation in cultural perception of ideal body image is most pronounced in females worldwide. The questions below are just guiding questions, the context of the interviews may alter the questions and challenges like language barriers and cultural sensitivity may lead researchers to adapt the questions. Supporting evidence provided by the team's general observations with, pictures of local food sources and Amerindian cuisine.

Key Questions:

1. ACCESS TO FOODS
 - a) Where do you get your food?
 - b) How much does food cost? (Proportion of income)
2. DIET CONSTITUENTS and PORTION SIZES
 - a. What/when do you eat in a normal day?
 - i. Morning
 - ii. Evening
 - iii. Night
 - b. Are there foods you do not eat? Why?
 - c. Who prepares the food?
 - d. What do you drink?
3. PERCEPTION of DIET

- a. What foods do you dislike?
- b. What foods do you like?
- c. What does unhealthy food mean to you?
- d. What is it important to eat?
- e. Can food make you ill? Why?
- f. c)What do you think of American food?

4. FOOD and DEVELOPMENT

- a. What do children eat?
- b. When are children weaned?

5. DIET and EMOTIONAL

- a. Do you eat differently when you are upset?
- b. Do you think food is used as a reward?

6. BODY IMAGE

Ask participants to choose a flashcard

- a. Do you like the way you look?
- b. Which one do you think is the most beautiful?
- c. What is a good body?

3 – Map



Figure 3.1 shows extent of the Guyana Shield, the Amazonian like rainforest region which covers most of Guyana.



Figure 3.2 - Map showing location of Rewa Eco-Lodge, Rewa village is the final village we will visit. On this image you can also see the airport we will fly into from Georgetown, Annai, and the Rewa river which we will travel up.

4 - Itinerary

Monday, 26th -28th October, 2015: Leave Aberdeen (20.30) and Fly to London Gatwick (22.10), **Tuesday 27th :** Fly from Gatwick (10.05) to Barbados (14.50). Spend night in Barbados. **Wednesday, 28th October, 2015:** Depart Bridgetown 17.40. Land in Ogle 19.40. Use this afternoon to print Questionnaires. Overnight in GT.

Thursday, 29th October, 2015: 01:00 am, depart Georgetown by road to Yupukari. Arrive at Kurupukari crossing at approximately 06:00 am. Drive from crossing to Yupukari to Caiman House Research Centre. Unpack, get introduced to Toshoa and health worker.

Friday, 30th October to 8th November, 2015: Conduct research based in Health hut at Yupukari with some of team going house to house. Day visits to satellite vilages near Yupakari: Quatata and Kaicumbay.

Monday, 9th November: Travel from Yupukari to Katoka. Get introduced to Toshoa. Start collecting data.

Thursday, 12th November, 2015: Depart Katoka and go straight to Kwatamang Landings. Meet Rewa's boat at Kwatamang to transfer to Rewa Village. Get introduced to Toshua. Moved to Rewa Eco Lodge as Toshua felt that the research we were doing was 'very important'

13th November to 16th November, 2015: Research in Rewa Village. Taken on day hike to a families farm in the jungle river and up to the top of a sacred Amerindian mountain.

17th November 2015: Depart Rewa at 04:00 am by boat; arrive at Kwatamang Landing at 07:30 am. Picked up by vehicle and taken to truckers stop benab just before Kurupikari.

18th November, 2015: Depart 06:00 am and travel to Georgetown.

18th – 19th November, 2015: Spend time in Georgetown. Met Guyanese team including members of faculty from University of Guyana.

Friday 20th, 2015: Depart for St. Cuthberts Mission with students from UG and practitioners from MoH. Spend whole day at SCM conducting health checks and asking for participants.

Saturday, 21th November, 2015: Met with minister of Amerindian Affairs with members of UG team – presented initial impression of findings from project.

Sunday, 22st November, 2015: Flight Depart Ogle 06.00, land in Bridgetown 10.20

4 - Foreign office summary:

Still current at: 29 September 2015

Updated: 15 September 2015

- Latest update: Summary and Health sections - recent confirmed cases of Chikungunya virus; Safety and security section –increase in serious crimes; local government elections scheduled for early 2016

Further cases of Chikungunya virus have recently been confirmed in Guyana. You should take steps to avoid being bitten by mosquitoes.

Most visits to Guyana are trouble-free.

Crime levels are high. You should take sensible precautions to protect yourself and your belongings.

If possible, avoid travel to and from Georgetown Cheddi Jagan international airport late at night and before dawn. There have been incidents of violence, fatal accidents

caused by erratic driving and incidents of violent theft by gangs, who follow cars travelling from the airport and attack their victims when they reach their final destination. Always drive with windows closed and doors locked.

There is a low threat from terrorism.

Take out comprehensive travel and medical insurance before you travel.

5 - Permission & Approval

We have received approval from the Ministry of Indigenous Peoples Affairs, which also required written permission from the Toshos (village leaders) from each village we intend to visit. As permission is granted, a copy of any findings and publications resulting from the data must be sent to the tribal chief.

We have also received permission from the University of Aberdeen Ethical Review Board, as well as the University of Guyana Ethical Review Board, thus ensuring that both participating countries standards of ethics were met.

Each member of the team has also undergone the NIH Office of Extramural Research 'Protecting Human Research Participants' course.

Finally, we are also seeking permission from the Guyanese Environmental Protection Agency.

6 – Medical Precautions

Prior to travel all participants will require Hepatitis A, Hepatitis B, Yellow Fever, Rabies and Typhoid vaccinations. The team will also take Malaria tablets prior to and during the expedition in accordance with the team members doctors advice.

Each member of the expedition team will also have been on the Expedition Care Plan (ECP) level 7 course. This is the highest level and qualifies each member to be an expedition medic in their own right.

7 – Insurance

UK Students

STA have confirmed that their 'Blue, Single Trip, Premium' package will fully cover the UK members of our expedition; including repatriation, emergency evacuation and search and rescue.

8 – Casualty Evacuation

All team members will have purchased comprehensive medical and evacuation insurance cover. UK team members will have STA Blue, Single Trip, Premier cover. This includes £5000 search and rescue, £10 million emergency medical and associated expenses. It is the responsibility of the Expedition Leader to liaise with insurance company at the end of any completed evacuation.

STA Emergency contact: (+44) 151 559 3930.

The expedition leader and Medical Officer will decide level of emergency evacuation required for the patient. These can be classified as High Priority or Emergency – Requires immediate evacuation using fastest possible transport (usually plane) to Georgetown or Trinidad Mount Hope Hospital. Medium Priority – Patient required to be moved by land or speedboat to closest hospital or medical facility (not immediately life threatening) Lethem hospital.

In all High Priority emergencies the patient should be accompanied by the Medical Officer (MO) or someone appointed by the medical officer as being fit to accompany the patient. The absence of the MO requires all high-risk activities on site to be stopped.

Medical Facilities

Georgetown Public Hospital
New Market Street

Tel: +592 227-9449 or 227-8236

This is the best public hospital in Guyana with a large group of leading specialists capable of carrying out a wide range of major surgery and procedures. Facilities include operating theatres, X-ray, body scanner and magnetic resonance equipment, laboratories, a diagnostic centre etc. This hospital can provide suitable facilities for all emergencies.

Woodlands hospital (Private)

110 Carmichael Street
Georgetown Guyana

Tel: +592 225-4050

Fax: +592 225-58653

This is the best private hospital in Guyana with several doctors and surgeons capable of carrying out a wide range of major surgery and procedures. This hospital is likely to provide suitable facilities for most emergencies, and may be likely to give the fastest response time.

Trinidad

Mount Hope Hospital
The Eric Williams Medical Sciences Complex
Trinidad, West Indies
Tel: +1 809 645 2640

Evacuation Facilities

In the event of an emergency priority evacuation, air services to the closest airstrip will be used. Depending on where the team is along the river depends on the closest airstrip. Annai, Apoteri, Kwatamang, Karanabu and Lethem all have airstrips that are accessible. The following services will be utilised and are listed in order of priority.

1. Trans Guyana Airways
Tel: +592 222-2525 (office hours)

3. Roraima Airways Ltd.
Tel: +592 225-9647 (office hours)
After hours: Learie Barclay +592 225-9648 / 665-4998
Basudewa Rupchand +592 222-4032 / 626-3001

After hours: Dale Hing +592 624-1693
Capt. Gonslaves +592 624-3768

2. Air Service Ltd.
Tel: +592 222-4368 / 222-4357 / 222-6739

The MO will be equipped with a comprehensive expedition medical kit recommended by the NOMAD.

MO has 24hr Satellite phone communication access to pre arranged A&E doctor in the UK.

Medic Assess patient → Medic sat phones 24hr A&E doctor in UK → Medic discuss with expedition leader evac procedure → Use sat phone to request evac → Patient and medic moved to air evac point → Patient and medic move to Georgetown and onto hospital

9 – Risk Assessment

Full document available on request.

10 – Intra-expedition Incidents

We only had one real hiccup with any of the expedition team and that was during our time in Yupukari. It was the day after one of our day trips to a satellite village and Will had been severely ill during the night. Bryan was struck down in the morning and Genevieve followed soon after, however remarkably I remained unscathed.

Due to the illness having afflicted Will for the longest and as he had not been able to keep down any of the food or drink from the night before I became increasingly worried about him as I was conscious it was 40 degrees and he had taken in no fluids, but had expelled many. Will began to feel weak, dizzy and had a lowered BP. At this stage I called our 24hr A&E dr via satphone, and we assessed the available options. These were to either put will in the back of a pick up for him to be driven 5 hours over very rough terrain to the nearest medical facility, where in all likelihood he would be given Saline, or that I administer saline to him myself. We decided on the later option and so I gave Will 2 500ml 0.9% NaCl bags of Saline, which resulted in a very swift recovery.

The only other incident of note was on our last day in Rewa, I took the quadcopter out for one last flight. I checked the battery pack which indicated it was full, however approximately 40 seconds into the flight it lost all power and plunged into the river, where a caiman very briskly swam over to investigate. Thankfully the next day some local men dived for it and we were able to retrieve the footage, but unfortunately the quadcopter did not survive.

11 – Expedition Team

John Mitchell - Team Leader

Whilst studying for my first degree in Biomedical Science at University of Aberdeen, I took part in several scientific projects and led multiple student based projects. I had the great experience of conducting my own 12 week research project looking at spinal cord regeneration.



Whilst studying I have grasped every available opportunity to explore foreign cultures by backpacking around Tunisia and India in whatever free time was given to me. I also took my partner, someone who had never left the UK due to the severity of her nut allergy, successfully inter-railing around Europe.

After joining the Wilderness Medicine Society (WMS) I have been on several trips and attended a multitude of expedition training days along with extensive critical wilderness emergency care training. This is something I have continued to be a part of in my current degree studying Medicine at Aberdeen and I am now the Expedition Officer, where i have led several outings, including mountain rescue trips and where i have been in charge of a large number of people.

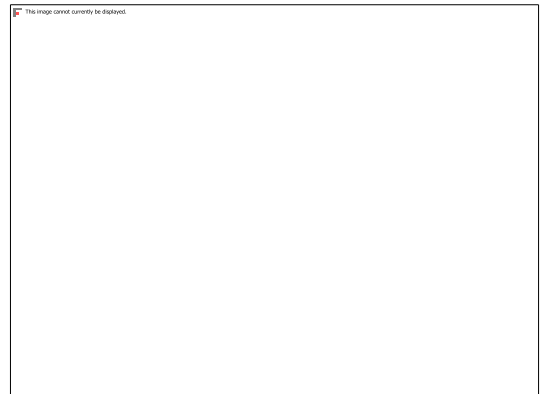
Although my background is primarily medicine and science based, I have substantial media training having done 2 weeks of work experience around various stations at BBC television centre. This involved both field and editorial work. I have also undertaken my Grade 6, 7 and 8 LAMDA acting qualification, for which i received distinctions. For two years I have also been the host of a science based student radio show.

As team leader I marry the two worlds of expeditioning and science and bring to it my experience in acting and presenting. I am a confident individual, but I also pride myself in knowing my own limits, and am not afraid to consult others who I feel would be better placed to take charge of a situation.

William Paine - Head of Media

Although I have not been involved in an research project such as this before I was part of an expedition who worked with a remote tribe in the Amazon rainforest.

I hope to bring my experiences of the challenges faced working in such an extreme climate and remote location to our team so as to be allow us



to better cope and plan ahead. I have a strong interest in world health and in particular how we, as westerners, impact the health and social well-being of other groups (such as indigenous populations) around the world as our societal impression grows. Alongside the medical side of the project i look forward to being involved in running our media project to help get more Guyanese students involved in medical research. I am a previous winner of the Npower Future Leaders competition that involved running a sustainability project in my community and documenting this as a 5 minute video to present at the final. That competition sparked my interest in video production and engaging with large groups of people through different and innovative media forms. I developed some technical skills in producing and editing videos and enjoyed being creative to better engage with viewers, including learning how to fly and capture unique dramatic footage using a quadcopter.

Genevieve. Marsh-Feiley- Secretary

I am extremely excited to be involved in this trip and hope that I can make a meaningful contribution to the team I am currently a second year medical student at the University of Aberdeen, our curriculum has given me a foundation with which to understand the biomedical basis of our investigations and over the course of the last year I have thoroughly enjoyed researching current theories concerning nutrition and eating behaviours, it is this reading which encouraged me to begin work on a subproject to examine the perceptions Amerindian women have concerning diet. I am also keen to consider the ethical implications of biomedical research, especially in a country like Guyana where so few studies have been carried out in the past. . In my role as secretary I have used the organisational and planning skills learnt through becoming a committee member of the Aberdeen University Wilderness Medical Society, although I have limited research experience I have been involved in an audit of the THD procedure within ARI, and during my final year of school completed a large project on the Eradication of Trachoma, both of these have provided with with a basic understanding of research techniques on which I will be building upon throughout this project. In addition to the scientific aspects of this project I am looking forward to the chance to see Guyana's incredible jungle region. I have always loved the outdoors and I am involved in the local University Officer Training Core (AUOTC) which has given me access to survival training and navigation techniques, as well as fitness training . In addition through the AUOTC and my part



time job as a support worker with dementia patients I have learnt the importance of tenacity and teamwork, and although I have never been part of a project like this before I am entering it with an enthusiasm for all things medical, a willingness to work hard and an easy going attitude.

Bryan Dunsmore – Treasurer

The thrilling prospect of medical research expeditions was a huge factor in my initial attraction to the world of medicine, thus it is with tremendous enthusiasm to be a part of this team. I have been particularly captivated by our proposals as I have strong interests in global health, particularly the care and health of



indigenous populations, as well as the health effects brought about by limited access to modern facilities. I am certain that Guyana, my first research expedition, will pose many inevitable challenges but equipped with my current experience, they will not be insurmountable. Having independently organised trips of my own around Europe from the age of 16, travel is a passion of mine, which this expedition would certainly suffice. The often challenging environments I have faced in my work as an Auxiliary Nurse and an Event First Aider with the British Red Cross will serve me well in this expedition where effective teamwork and a strong commitment to the job at hand are key to making a success of, and enjoying, such a fantastic opportunity. At the beginning of the expedition I will have recently started my third year as a medical student.

The skillset provided from this stage of the curriculum will be restricted, but still useful enough to be of use to the team and to have a profound understanding of the impact that this study will have. Along with the rest of the team, I am determined to improve the WHO's lacking of current information on the health of this fascinating country.

12 – Expedition Budget & Funding Breakdown

1. Total Contributions

| Funding Body | Amount | Predominantly spent on: |
|--|----------------|--|
| Principles Excellence Fund | £500 | International Travel |
| Lord Mayors of London Award | £200 | Equipment |
| SES Rivers Foundation Award | £5,000 | In-country travel and expenses and equipment |
| Nomad Expedition Medical Kit Competition | £300 | Medical Kit |
| Maynards Trust | £400 | Exped Laptop and Electronics |
| AUSA | £800 | Equipment |
| Fundraising via CrowdFunder | £1,255 | Post-expedition expenses. |
| Personal Contributions | £4,400 | Flights and Travel Insurance |
| Total | £12,855 | |

2. In-Country Travel and Expenses

| Initial Expenses to Travel Expert | AU Paid | Actual Expenditure (\$) | AU Balance (\$) | Notes |
|--|--------------------|-------------------------|-----------------|--------------------------------------|
| Caiman House | \$ 3,220.00 | 3220 | 0 | |
| Rewa Lodge | \$ 883.20 | 883.2 | 0 | |
| EPA App fee | \$ 115.00 | 115 | 0 | |
| EPA Permit Fee | \$ 300.00 | 0 | 300 | Process was not completed |
| Hotel Acc. Tropical View | \$ 70.00 | 190 | 0 | \$120 paid by Travel Experts |
| Road Transfer - Terry - GT> Yupukari | \$ 600.00 | 600 | 0 | |
| Transfer from K/mang to Annai - RV | \$ 35.00 | 35 | 0 | |
| one way tickets \$145 x 4 from Annai to Georgetown | \$ 580.00 | 475 | 105 | Bus service was used instead |
| Transfer from Georgetown to St. Cuthberts - 20/11 | \$ 200.00 | 250 | 0 | \$25 pd by TE + \$25 paid by UG Rep. |
| Rima Guest house 4 nights | \$ 280.00 | 304 | 0 | diff. to be paid by AU |
| Sub total | \$ 6,283.20 | 6072.2 | 405 | |
| Travel Experts admin fee | \$ 400.00 | 400 | | |
| AU total Paid | \$ 6,683.20 | 6472.2 | 405 | |

| Additional Expenses to <i>Travel Expert</i> | |
|--|------------------|
| Plastic bowl, Storage box, Scale etc. | \$ 50.00 |
| Transportation cost for purchasing items | \$ 5.00 |
| Printing Questionnaires | \$ 33.00 |
| Transport for printing + delivery to Yup | \$ 10.00 |
| Difference in rates by Rima | \$ 24.00 |
| 4 Kaieteur Tickets | \$ 590.00 |
| Taxi for Debra to Ogle - pay Kaie tix 17/11 | \$ 10.00 |
| St. cuthberts village tax 50 cents each | \$ 2.00 |
| Breakfast 19-21 Nov. | \$ 48.00 |
| | \$ 772.00 |

Collective Total:
367 + 6472 = \$6839
(£4513.74)

Balance unpaid AU fund \$ 405.00
Balance due to Travel Experts \$ 367.00

3. *Post-Expedition Expenses*

We are fortunate to have remaining funds of £1,053.65. This sum has been allocated towards costs which we will face in the process of completing our research project. These costs include peer review, publications, conferences and transcribing our audio files. Although the expedition is complete, the above expenses will collectively form a significant value. Attached below is a quote from our transcribing service, totalling **£524.08**:

13 – Communication and Expedition Legacy

From the moment we started to plan this project we wanted to ensure that this wouldn't turn into a 'parachute' expedition; whereby we dropped into Guyana, collected data and left without engaging or producing a more long term positive legacy. In order to produce this legacy we are aiming to promote research in the University of Guyana and engage with the students in a proactive fashion that makes them interested, excited and motivated to be involved in research. We feel that in order to accomplish this we have to look at presenting research as more than just journal papers and data analysis. To do this we have decided to use other media forms to record our experiences of carrying out this expedition: to demonstrate the challenges and struggles as well as emphasise the satisfaction and results of doing this. After the expedition we produced a 15 minute video documentary laying out how we carried out the project and illustrating the unrivalled experience that was had on the expedition itself in Guyana.

We feel that by using more modern forms of media we will engage with the students, both British and Guyanese, on a more personal and informal level that they may not get from formalised lectures or documents. We filmed various interviews with team members during the expedition. We intend to film as much as possible, including some footage shot using a quadcopter, to enable us to give an honest and hopefully engaging demonstration of the challenges involved and we hope that by presenting this to students in Guyana and possibly elsewhere we will encourage more students to get involved in research.

In the run up to, and during the expedition, we would update our 300+ followers on our Facebook page and Twitter feed, with some posts reaching as many as 800 people. In order for the expedition to be as far-reaching as possible, we wrote regular blog articles for our expedition website. Word of our activities also reached the local newspapers which were very enthusiastic to interview us both before and after the expedition.

When we were in the villages themselves we would try and find time to give talks and presentations on healthy eating to the local primary schools and ran some after school events. On our return we have continued this and have given several talks at primary schools, inspiring them and hopefully changing the perception that not all science is done in a lab. In addition, I have recently been asked to give a talk at the Student Wilderness Medicine UK conference in Edinburgh on how to plan, execute and lead an expedition, whilst still studying for a full time degree.

The research we carried out is specifically looking at the health impact of westernisation on interior-based Amerindians compared to sub-urban Amerindians and non-Amerindian Guyanese. Therefore the results we obtained from this research will be available to the government and locals as a reference source, as well as reference figure as a comparison for any future long term longitudinal study.

Short-term benefits:

- Providing the government with research based evidence regarding the impact of westernisation on Amerindians in the interior compared to both city dwelling Amerindians and non-Amerindian; allowing for steps to be taken to reduce or produce more specialised policies to help the “at risk” groups
- Involve Guyanese students, who had previously not carried out any research of this nature, in a project to further their knowledge of the undertakings of a research project of scale.
- To provide the local communities with information following the collaboration of results to allow them to make better educated decisions and understand the risks associated with westernisation

Pathways to Impact:

There have been multiple studies showing a higher prevalence of non-communicable diseases amongst indigenous populations on exposure to a westernised diet and

lifestyle. As of yet this has not been researched in the indigenous Amerindian population of Guyana, a country situated in South America, on the Caribbean coast. As there are Amerindian communities residing in both jungle and urban locations there is an opportunity to compare quantitative physiological data of different communities and establish if there is any increased risk of non-communicable disease according to location and exposure to a westernised lifestyle.

The mean of each biomedical parameter (e.g. peak flow, BMI and hip to waist ratio) will be compared between the three populations (control, urban Amerindians and urban non-Amerindians) using a one-way analysis of variance (ANOVA) statistical test with appropriate post-hoc tests.

The first output from this project will be at the end of August (2015) where a report and presentation of findings will be given to the ministry of health and the ministry of Amerindian affairs in Guyana. Currently, three papers have been planned (one for each sub-project), but this number may increase depending on findings. The write up period planned for these papers is between September and December (2015). This project will first and foremost be beneficial for Amerindians in urban locations and those who move from jungle regions to areas where they may face a greater exposure to westernisation. Ultimately it will contribute to the knowledge of human geography by documenting differences in non-communicable disease risk and prevalence between indigenous Amerindians dependent on location and exposure to a western diet and lifestyle. A third study group (the non-Amerindian Guyanese) will be used to indicate any increased risk of non-communicable diseases amongst the Amerindian population, a trend seen in many other indigenous people on exposure to urban living and western lifestyle. If a trend is seen we hope the government will facilitate this to initiate and introduce new policies that can be specifically designed to protect the Amerindians and lower their risk, for example this may include using education to raise awareness of health risks associated with western diet and lifestyle.

Due to the low population density and topography of Guyana's hinterland (jungle regions), along cultural aspects, there are many challenges for implementing healthcare policies. Therefore, as a sub project, we will also be investigating geographic variations in access and utilisation healthcare services amongst Guyanese Amerindians. If this data is collaborated with cardiovascular health risk data collected it could provide information to the government that demonstrate the regions most in need of change and improved resources with a view to obtaining the greatest benefit to the communities of Amerindians living in the hinterland.

Guyana suffers from a large number of their science graduates moving abroad to participate in research projects and work in research related studies; therefore in order to encourage further research in the country our project will be used for educational purposes by Guyanese students. We will be working closely with the University of Guyana to carry out the research and 7 second-year medical students from the university will be collaborating with us to carry out the research. Furthermore, we will also be funding three of the students to join us in the interior

for the data collection from the remote Amerindians. Through working with local students we hope the project will have a more long lasting benefit and will ensure the project is not simply a parachute expedition by providing them with experience and new skills to develop their research acumen. Finally, we hope that by involving and developing the skills of a number of local students this will give them the means to encourage and pass on their knowledge to more students in the country.

We also intend to produce a documentary detailing our project from beginning to end: providing the University of Guyana with an in-depth educational tool to promote and teach the procedure needed to carry out a research proposal such as this; with the hope that this will increase the number of projects being carried out in the country by 'home grown researchers' from Guyana.

Due to the low population density and topography of Guyana's hinterland (jungle regions), along cultural aspects, there are many challenges for implementing healthcare policies. Therefore, as a sub project, we will also be investigating geographic variations in access and utilisation health care services amongst Guyanese Amerindians. If this data is combined with the data collected regarding cardiovascular health risk factors it could potentially provide the government with information of the areas that are in most need of better connections to healthcare and hopefully stimulate them to introduce measures to protect the Amerindian people.

14 - Acknowledgements

It is perfectly evident that without the support, advice and good will of a remarkable number of people, this expedition would never have even gotten beyond the very beginnings of the planning stages.

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