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# **Diabetes Management in Tortola and the BVI**

By  
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**An Interactive Qualifying Project**

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**of the**

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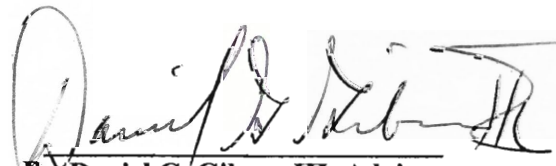
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## **Abstract**

The purpose of this Interactive Qualifying Project (IQP) was two-fold: to study and enhance the education efforts on Type II Diabetes, and to determine feasibility of a Tortola Project Center, in the British Virgin Islands (BVI). This entailed building contacts, and establishing the appropriate paper trail. We conclude that a project site in Tortola would be beneficial to WPI.

## **Executive Summary**

This project investigates the possibility of developing and implementing a Type II Diabetes prevention program for the primary and secondary schools in Tortola, British Virgin Islands as well as to determine the feasibility of having a permanent Tortola Project Center. Extensive research and analysis of the past, current and up-coming health and wellness education program within the schools was done in conjunction with the British Ministry of Education and Ministry of Health Education. Discussions involving future projects and projects sites were also discussed and researched with governmental authorities. Using curriculum techniques from the Drug Abuse Resistance Education (D.A.R.E.) prevention program used in the United States, a sample outline for a diabetes prevention program was designed, including classroom demonstrations and lesson plans, as a model. Meetings with local governmental authorities and businesses were met with to introduce Worcester Polytechnic Institute and the Interdisciplinary Global Studies Department to the island as well as to determine the proper procedure needed to set up future projects on the island.

## **2.2 Diabetes**

Diabetes type II, non-insulin dependent, is a disease that most often occurs in adulthood. The people who are most at risk for developing this disease are in general inactive, obese, and have long periods of excessively high blood sugar levels. This disease does not just come out of the blue, it requires years to build to a point where the body is not producing enough insulin and the body's tissues are refusing to use the insulin. Recent studies among 3,234 people in the high-risk category many were able to reverse their diagnosis by changing their diet and exercise regime to reflect a 5-7% loss of weight. (NIH, May 2002)

This form of diabetes is the most common form of diabetes and although referred to as adult onset it can strike people of any age. The disease begins with a resistance to insulin whereby the body's tissues refuse to accept insulin, and no can longer use it. In the early stages the pancreas responds to this increased blood sugar level by increasing its output of insulin. As the disease progresses the pancreas can no longer keep up with the demand and glucose levels skyrocket in the blood. Once things have progressed to this point a strict diet and medication are required to keep things under control. (NIH, May 2002)

This disease is almost entirely lifestyle dependent. Not properly exercising and obesity go hand in hand with this disorder. High blood pressure and cholesterol levels also contribute the onset of diabetes, but these can become a problem in many cases due to not exercising or unbalanced diets. Family history of diabetes is one thing you can't control that will increase the risk of acquiring diabetes.

It has also been found that a large majority of cases occur in the section of citizens known as minorities including African Americans American Indians, Asian Americans, Pacific Islanders, and Hispanics. (NIH, May 2002) This statistic carries into the Caribbean as well due to their historical status as British cash crop islands with African slaves doing the brunt of the work. This is especially significant in Jamaica, and similar numbers carry in Tortola. Tortola recognized these high levels 5 years ago and implemented an island wide awareness program which has lowered levels on the island to more containable levels. Similar programs have been attempted on Jamaica headed by Professor Errol Morrison, University of the West Indies, but “my words have fallen upon stony grounds.”

Prof Morrison recently gave a report to the Jamaican government explaining how a disease that once affected less than 1 in 100 adults in the 1970’s is projected to affect 25 in 100 within 20 years. He attributes the drastic rise on his island to bad eating habits, especially from the increase of fast food establishments on the island. Even with the words of education against fast food, and obesity leading to serious disease the Jamaican people continue to increase in girth and continue to get sick. Prof Morrison doesn’t believe he had any kind of success educating his people. (Observer, 2001)

This form of Diabetes should not be confused with Type I, which is known in lay terms as Diabetes. Type I diabetes is usually diagnosed early on in a person’s life, generally in childhood but as late as young adulthood is possible. One theory to the cause of this disease is that the Beta cells of the pancreas have been destroyed by the immune system rendering the pancreas unable to produce insulin. Treatment of this form of diabetes is usually with insulin shots, or insulin pumps. Diet, exercise, and controlling

blood pressure are also factors contributing to the health of people with this disease.

(NIH, May 2002)

This form of the disease seems to have a genetic component or might result from immune insult, and nothing but currently known treatments of insulin can be used to stop the disease. A person never is cured of this disease, nor is any lifestyle deficiencies of exercise, or diet linked to the onset. Once diagnosed care must be taken to ensure a balanced diet, exercise, and insulin treatments are properly used to regulate the level of sugar in the blood.

While Type I and Type II Diabetes are very different diseases, Gastrointestinal Diabetes, affecting late term pregnant women, has been linked to later acquisition of Type II Diabetes. In this disease hormonal imbalances, or shortage of insulin during pregnancy cause episodes of Type II Diabetes in the woman. While these symptoms generally go away shortly after the baby has been born, a higher chance of later acquiring full blown Diabetes Type II has been found in women suffering from Gastrointestinal Diabetes. (NIH, May 2002)

If this form of diabetes goes untreated the developing baby can be harmed. Due to the extra glucose in the mother's blood the baby will also have higher blood sugar levels which can cause a condition known as macrosomia. Macrosomia basically means fat baby, and is a serious condition that can cause damage to the baby's shoulders during birth. The added sugar in the baby's blood will also cause his body to produce more insulin, which can cause abnormally low sugar levels at birth. These low levels can make it difficult for the baby to breathe after birth. The excessive insulin can also lead to

obesity in the baby as well as causing him to be at risk for developing Type II Diabetes later in life. (ADA, 2003)

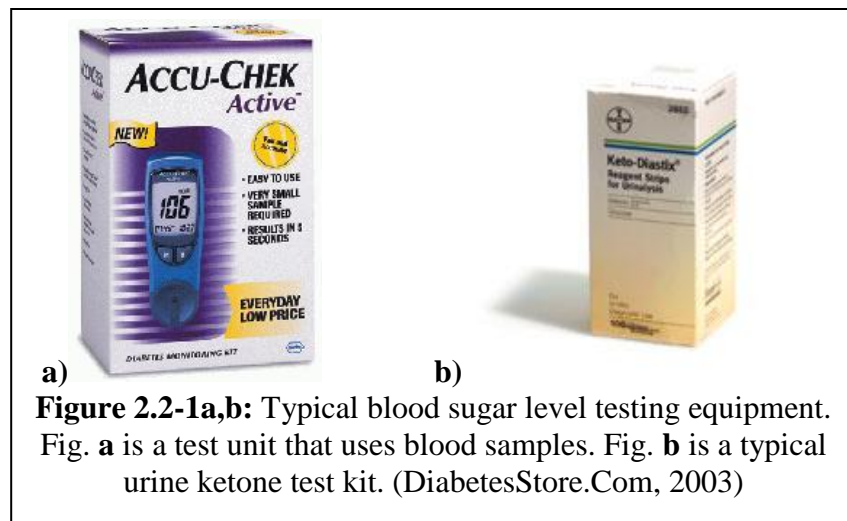
Since it has been clinically proven that Diabetes Type II can be reversed our aim is to see what aspects of the education program worked amongst the general population of Tortola through surveys and interviewing. With this information on hand it may be possible for future IQP groups to move to Jamaica where the situation is extremely critical.

Diagnosis of this disease requires medical testing, which is recommended to begin once a person has reached the age of 45. Waiting for symptoms is not a good idea because many people never experience the symptoms of the disease. In fact nearly 6 million Americans have this disease and do not even know. There are also cases where symptoms are severe and a blood glucose level test very easily validates Diabetes Type II is the cause. Some symptoms to look for are increased thirst, increased hunger, fatigue, increased urination, weight loss, blurred vision, and sores that do not heal.

Regardless of the form of Diabetes that a person has acquired, keeping track of his blood sugar level, and how his body processes food becomes an important part of treatment. The best test to determine blood sugar levels over a 3-month period is the hemoglobin A<sub>1C</sub> test. This test allows doctors to see how their proscribed treatment plan has been working, and allows them to adjust accordingly if it is not. This test should be performed at least twice a year, but if previous tests have shown high levels of blood sugar level then this test is likely to be performed more often. A normal level reported from this test is 7 percent, an 8 or greater indicates severe health complications such as eye disease, kidney disease, and nerve damage is possible. (NIH, revised March 2002)

While the  $A_{1C}$  test is great for doctors in determining the course of treatment, daily checks of blood sugar level are very important. Typically one uses a machine that uses a drop of blood to check the blood sugar level. Exact numbers vary between different people, but somewhat standard goals are 80-120 mg/dl before a meal, and 100-140 mg/dl at bedtime. Blood sugar is usually checked before meals and bedtime, but again a doctor may prescribe more, or a different regime of testing based on personal factors of the patient. Even with daily testing the  $A_{1C}$  test is still recommended to ensure proper treatment. (NIH, revised March 2002)

These daily tests come in two basic flavors, litmus like urine samplers and blood testing units. (Refer to Fig. 2.2-1a,b) Urine samplers work by dipping the test strip in urine, and comparing the change in color to the chart included with the strips. The test typically cost around \$20 for a box of 100 strips. Blood samplers use little cartridges that suck blood up by capillary action. To use these, a diabetic pricks his finger or suitable place on his body and places the cartridge over the wound to collect a sample. Once a sample is taken the cartridge is placed in a test unit that measures the blood sugar level directly. Blood sampling cartridges for this test cost around \$25-30 for a box of 50, and the test units range from \$15-70. (DiabetesStore.Com, 2003)





Keeping blood sugar at appropriate levels is all about finding what works for a body and sticking to that daily plan. It is important to eat at the same time everyday and trying to eat the same amount of food with each of these meals or snacks each day. Skipping meals is not desirable because it throws the cycle off. Once a cycle of food intake becomes consistent, medicating at the same time is also important. Exercise is also a big part of treatment especially with Diabetes Type II. One should try to work out at the same times each day as well. The aim of creating this cycle is to ensure the body gets into a normal regime of getting sugar in the blood and appropriately controlling it. The more stringent the cycle the more likely one will be able to properly control levels throughout the day. (NIH, March 2002)

Exercise is a big part of controlling blood sugar because it directly is involved with clearing glucose from the blood. As cells use their glucose, the decline of intracellular glucose causes an influx of blood glucose by (facilitated) diffusion. It is important for diabetics to have proper equipment. Dry, clean, well fitting shoes will allow optimal blood circulation. Bad circulation is common amongst diabetics, and injury to the feet can be exacerbated by the loss of feeling (neuropathy). One should be especially concerned if sores appear on the feet. Immediate medical attention is required. (NIH, March 2002)

Proper hydration is important during exercise. Drinking 2 cups of water before beginning and every 20 minutes of activity is a good idea. Upon conclusion of exercise, 2 more cups is recommended, and all this water should be taken despite not feeling thirsty. The workout should not immediately go into hard strenuous activity but should build up

to peak level slowly over 5 to 10 minutes and should end the same way slowly concluding the exercise. (NIH, March 2002)

Knowing blood sugar before, during, and after exercise is also important. If a person has a fasting blood sugar level of 300 mg/dl he should not exercise, and if the level is around 100 a small snack should be eaten before exercise. One of the most important things is knowing the signs of low blood sugar, hypoglycemia. Not only should the diabetic know, but also if exercising with friends they should know how to treat this, potentially serious condition. Hypoglycemia occurs if a person's blood sugar drops below 70 mg/dl. To treat this immediate consumption of glucose tablets, fruit juice, regular soda, or hard candy is necessary. If symptoms do not improve immediate medical attention is required. (NIH, March 2002)

Symptoms of hypoglycemia include feeling weak or dizzy, increased perspiration, irregular changes in heartbeat, and feeling hungry. (NIH, March 2002) Severe symptoms of low blood sugar include convulsions, moderate psychosis, and unintelligible speech. When a diabetic friend of this group slipped into symptoms like these early in the spring once, his behavior became completely erratic and the paramedics had to be called. (Personal Anecdote) Upon their arrival we heard how close he had come to slipping into a coma he might never had awakened from. Since then, everyone in his living group learned the symptoms of hypoglycemia and its immediate treatment.

## **5.0 Conclusions**

With the close of our project we found that while the scope of diabetes holds many opportunities on the island of Tortola, many other possibilities for future projects on the island also exist. These points are brought to conclusions in the following sections, and come to the ends that: Type II Diabetes is a serious problem on Tortola, and a project center on Tortola would be helpful in aiding this and many more causes.

### ***5.1 Feasibility of Tortola Site***

Despite the desire for assistance from WPI there are some issues that must be resolved in order to make a site feasible. First off, a suitable structure must be found to house the site, or at the very least serve as an office of administration. Secondly, the government would likely be involved greatly in final approval for foreign intervention. Finally, our own IGSD must be convinced to further research and make the decision to expand its breadth around the world.

#### **Permanent Structure for Site**

Once of the hardest things to accomplish would be establishing a permanent structure on the island to house the administrative aspect of a project site. Such an office would be important to facilitate constant communication with the local organizations seeking aid. This site could also be used to house computer labs and Internet resources

for the project groups to use. The major problem with construction is cost of land, and permits required from the government to build and own land as a non-local resident.

This makes using existing resources much more logical, and one such resource that is perfect is the local college, H.Lavity Stoutt Community college, where we have already had productive discussions and received help from the Registrar, Ms. Emma Baker. Ms. Baker is a Tortola native but spent 20 years in various capacities at Texas Christian University in Fort Worth, TX, so she is familiar with US colleges. With such a link academic resources are already available for project groups to use, and a WPI liaison could hold an office at the school allowing a permanent faculty member. The other option with this configuration is to use faculty at the college as the WPI faculty running the site. This would help link schools allowing not just project site potential but classes abroad as well.

### Logistics of Project Site

For a project site to be successful there are logistical aspects to consider. These include: transportation, living, and security. Having a car to use would save large amounts of money for students due to the cost of using taxis (\$18 US per trip, no matter the distance). Also the place we stayed was not the most economical place we could have been, although its central location was of value. While we had no real issues with crime on our stay, security is still something that must be addressed for any permanent site to be considered. For the most part securing living and transportation would be of great help in ultimately establishing a project site.

However, we concede that Tortola is a hazardous place to drive because of the hills, switchback roads, and British-inspired driving on the left, but with right-drive cars. Furthermore, IGSD regulations prohibit driving in the furtherance of an IQP.

Housing is also something that would need to be worked out, or at least rentals cataloged for students to choose their dwelling. One of the benefits of the house were in was its location in Road Town, as well as coming with a car. Unfortunately we were not aware of the car until late in our stay, and already forbidden from renting we didn't want to push our luck with using it. Unless something could be worked out with the college for dormitory use it seems likely project groups will be forced to rent apartments. This will amount to at least eight hundred dollars a week, making location of housing important for a successful project. We were lucky to be mostly dealing with organizations within walking distance of our house. With less strict rules allowing students to use automobiles, location would be less of an issue.

Lastly longstanding security of the project site, and the students' general welfare must be addressed. From our experiences safety on the island is almost assured. On Tortola one can walk anywhere, at any time and not be in any real danger. It is safe to say that problems will only arise if students to place themselves in bad situations. In the unfortunate event that trouble occurs, the police station is within walking distance in Road Town, and foot patrols are constantly conducted around the island. Unlike some Caribbean islands with reputations for crime, drugs, and hotheaded inhabitants, Tortolan decorum and gentility is more like that found in Canadian cities than in Caribbean hotspots. Those few locals that might wish to take advantage do not want to deal with the harsh consequences of getting caught.

When all aspects are integrated together a site on Tortola becomes very feasible. All expenses averaged four thousand dollars per person for our group, including airfare but excluding tuition. With a host of projects (refer to Sec. 4.7) available for students, and an enriching environment to see directly how technology and society mingle it seems logical for WPI to establish a site in Tortola.

## ***5.2 Necessity of Continued Research***

The major aim of our project was to assess the diabetes situation on the island of Tortola, and what we found was alarming. It is evident that only a small handful of individuals understand the severity of diabetes and its epidemic level. While the government has begun to add healthy lifestyle education to its curriculum, it was never aimed directly at diabetes and its preventability. What is most surprising is the lack of governmental statistics on the rates of affliction for diabetes on the island. The situation is not a good one, and requires much more statistical research and educational efforts if the problem is to be brought to heel.

### Knowledgeable Individuals

The only individuals who completely understand the problem of diabetes on the island are the doctors that deal with patients and the organizations that hold awareness events. This encompasses the Diabetes Association, the Rotary Club, and the head doctor at the island's only hospital. While the government is informed about the disease and its implications, they lack statistics on the problem, and don't consider it to be paramount. If

proper statistics could be collected to record the incidence, morbidity, and mortality from the disease, more concern over this epidemic could be generated.

### ***5.3 Acceptance of WPI Intervention***

Although many of the people and government on Tortola are not aware of how serious of a problem Type II Diabetes is on the island. Any time our group needed a meeting, questions answered, or any type of help, people were more than willing to assist us. Discussions with authorities in the Ministries about what an IQP is and the IGSD department greatly interested them and fostered cheerful anxiety for future work with WPI and its students.

#### Diabetes Association's Needs

Currently the local Diabetes Association is attempting to increase the awareness of diabetes in order to prevent the conditions found in Jamaica. They realize that the failure of Jamaica's Diabetes Association to address the problem early on allowed outrageous and almost uncontrollable increases in the disease. When the Tortolan government finally finds a building for the DA or commissions its construction, the DA will have the facilities to educate, treat, and prevent diabetes from growing out of hand.

The Diabetes Association has relatively few members to deal with the problem at hand. Steady streams of volunteers to aid in running education, fundraising, and treatment efforts would be of great value to the Association. Students would be of even greater value when the Diabetes Association has been able to acquire a building. Project

groups could be trained to educate, aid in self-diagnosis, and refer patients for evaluation by health care providers. The skill set acquired would be useful for any student considering medical school, or a profession in health care.

Educating the locals of Tortola to the severity and preventability of diabetes is the primary objective of this Association. With proper briefing of project groups concerning areas where the Association needs assistance, students would be able to help the organization teach, treat, and grow. All this help would be gratefully appreciated, and would help stem the rising tide of diabetes flooding in the Caribbean.

#### Rotary Club Help

The Rotary Club much like the Diabetes Association is a volunteer organization whose purposes are general community building events and interventions. With this organization students would be able to help run educational events, as well as civil improvements and developments. Life long friends and connections can be built with interaction with this group of citizens. Members range from the local fisherman to the managers of islands only telecommunications company. As with every person we encountered assistance is always appreciated, and in fact from a cold contact Sara Ibbitson and Nicole McHamon were able to participate in a health awareness event on Virgin Gorda.

On a small community based island like Tortola, everyone is a potentially valuable information resource. Our experience time and again could be described as "grapevine networking," where contacts with one agency or merchant generated many



more. Our attendance at a Rotary Club health fair generated one such interaction that aided us and the Rotary Club's programs: the health pamphlets (Refer to App. X) prepared by our group to be distributed to the attendees of the Virgin Gorda health event. These simple pamphlets filled with basic information were greatly appreciated, because attendees had never previously been given information packets to read.

As a whole project teams working with this organization, like all others, would be able in seven weeks to work on the little things that need to be done, but often get lost in the bureaucratic maze and lack of communication between agencies, both governmental and NGO (non-governmental organizations). It is important to say these organizations are very well structured, with great missions in the works, but they are limited by cost issues of resources and labor. What is even more costly is preparing volunteers to perform the tasks at hand. Having students prepared in a PQP program, tailored to the task at hand, will bring about great achievements.

### Ministry's Desires

In order to obtain permission to visit the schools and work as students on the island, we needed to insure that we were allowed to do so by the government. During our first contact with the Ministry of Education we explained our purpose on the Tortola, the intended goals of our project, and about WPI's students and IQP projects in general. We also reviewed some diabetes related health statistics and some information on previous diabetes research done on the island. During that same first meeting, the Ministry was so excited and anxious for our project, Ms. Adams personally contacted Immigration and

arranged for the visa requirements effectively waiving the two-month application process.

All Ministries feel the pain of their people, and want to make sure they are helping them with every action they take. One of the largest problems the Ministry sees is the lack of manpower, and finances to see quick turn around of their new programs. It can be very frustrating to have your people crying for a new hospital and high school when they tax revenues are inadequate and unlikely to increase. The process of preparing budgets was so much on the officers' minds that it was difficult to schedule meetings and acquire information until the second full week we were in the BVI.

In fact, on our arrival in Tortola was marked by elections and the propaganda that always follows. The largest concern with the people was the budget, and where moneys collected from taxation were going. Promised a new high school and hospital, the locals are not happy they haven't come to fruition. These projects obviously require capital and labor to develop, however taxes are considered high as it is, and labor is not generally cheap. Civil engineering students on MQP would greatly be able to contribute to the planning and possible construction of such projects offering priceless experience to these students.

### Student Benefits

Student projects offer the best solution for at least the labor aspect of planning and development. All fields of engineering can be utilized to help improve everything from the unsafe roads to the unsafe electrical equipment regularly employed. The best learning

from their textbooks and classes will find application in hands-on experience useful to both the students and the agencies they serve. I (Brian McKeon) know from experience that an engine is a simple concept when reading through a repair manual or an ME class, but getting all the nuts and bolts in place is where an engineer is born.

With WPI's intervention students could spearhead the initiatives of the various Ministry agencies with a more missionary labor force. This would save the island money by not having to work directly with commercial firms. Students would be rewarded not only by helping the nicest group of people we've encountered, but by one of the most beautiful places on this world. Camaraderie and empathy abound on Tortola, in an environment where student efforts will be genuinely appreciated. .

#### Mutual Benefits of Future Tortola Projects

All the organizations contacted and worked with were quite taken aback students from far away Massachusetts were interested with the problems of Tortola. The possibility that more students could venture and offer assistance where needed was equally appreciated. So much can be done to help the Diabetes Association, Rotary Club, and the government in general with simple volunteer labor forces of students. Not only does this need exist but also is greatly welcomed and appreciated. WPI students would be given the ideal IQP experience of weaving society and science, while helping a nation of caring individuals experience the benefits technology and kindness can bring. MQP students in all fields would be able to gain the hands on experience of labor that schooling cannot teach.

It is unfortunate that the establishment of any new organization takes time, but at the very least independent sponsored project teams should continue their efforts in the BVI. We believe that IGSD should look seriously into a project site in Tortola if the achievements of subsequent independently sponsored IQP groups warrants it. One day we hope to see WPI in Tortola on a permanent basis and as alumni our first order of business will be seeing this dream come to fruition.

#### ***5.4 IQPs in the BVI***

The next IQP in the BVI would logically further our research on the lack of general awareness to the problem of Diabetes, and further the grassroots efforts started on our IQP. While it is true the average citizen of the BVI knows very little about Diabetes there are local organizations that wish to educate the locals. Organizations such as the BVI Diabetes Association, and the Rotary Club have the infrastructure in place to help, by need manpower. With WPI's assistance it will be possible to continue spreading their good works throughout the entire BVI, and not just Tortola.

Help is desperately needed based on the continuing rise in cases of Diabetes, and the disregard of the severity of this affliction. The Diabetes Association is constantly reminded of how things can get out of control, by their neighbor Jamaica. On Jamaica the problem was never taken very seriously and now it has the highest rate of new cases, and no means of controlling the spread. Their Diabetes Association disbanded, due to lack of interest in the problem by the citizenry. With the aid of students, the existing

organizations might be able to spread their services, and hopefully spread enthusiasm for a healthy Diabetes-free lifestyle. (Rhymer, personal communication, 2003)

The simple truth is that only a few key people in the BVI understand the problem, and the general public has no idea of what Diabetes is. Even those who have the disease do not properly treat themselves, often not even checking their own glucose levels on a daily or even weekly basis. This is just one of the reasons why Diabetes is climbing out of control in the BVI. The other cause seems to stem from the growing trend to Americanize the islands.

Most food products are shipped from America. The once fertile farms are shutting down as the youth move into the cities and off their family farms (Rhymer, 2003) Once domestic production was able to feed the island, but now it is only a hobby for most locals. Increasing the intake of processed foods, and eating fewer vegetables due to their cost is detrimental to eating healthy. Changing the trends of the youth would not be an easy task, and so the potential root problems can only be bandaged, not healed. Studying how a country moves into the modern American lifestyle is a very promising research opportunity. It would be interesting to see how many modern conveniences contribute to death as well as life.

## **5.5 *Last Thoughts***

This project suggests that the problem of diabetes in the Caribbean is much larger than our research had first estimated, and it is continual growing to be more of an issue as Americanization of the island continues. As the cost of food increases due to importation rather than domestic production, people are exacerbating the problem by eating less healthy well-rounded meals. While civilian organizations are aware of the increasing problem and trying to educate the people of the island to diabetes, the majority of individuals including government officials are ignorant to the problem and, the disease and its implications.

A situation of this magnitude warrants further effort to aid in the education, and statistics-gathering programs currently being implemented. The government's healthy lifestyle pilot programs, and existing health education curriculum teach primary school students a variety of topics on hygiene, disease prevention, and nutrition. Specifically however, the program does not include information on diabetes at all. Diabetes prevention could be added to the existing programming by simply mentioning that a healthy lifestyle from early in life can prevent the onset of diabetes. Bolstering this information with the symptoms and long-term effects of diabetes would provide a good start.

Our hope is that the Ministry of Education will read through this document and try to experiment with the DARE based curriculum outlined in this report. We know of its success with drug prevention in the US and its process of positive character building is always very effective in educating. By no means should this process be one sided, but

instead we implore WPI to allow more project group the opportunity to aid in this process if help is requested, not just in overall diabetes research but also, in the host of infrastructure building, and conservation efforts spoken on in this report. A solid bridge of support will be beneficial to all parties involved and help make paradise a little better.

In the future perhaps a permanent project site could be constructed on Tortola, allowing students the opportunity to see exactly how developing technologies affect society. One needs to understand that in some situations we become subjugated by the assumed necessity of technology, but quickly learns a less stressful life is the result of freedom. Tortola is developed enough to have the comforts of life, but is not riddled with full-blown urbanized, and over developed areas. While the locals do wish to see things like increased cellular capabilities they haven't seen how opening the doors to telecommunication companies can turn nature into cellular antennas.

Engineers from a very urbanized concrete jungle can appreciate how simple changes can make great functional improvements to existing structures and better the living conditions for the citizens. Concrete encased sewer pipes in existing trenches, and making insulated conductors standard on city power lines are simple projects for engineers-in-training

The Diabetes Association and Rotary club could use individuals to participate in their events and in mostly in educating their people about diabetes and health related issues in general. As these groups consider programming they could communicate requests to our school to send students to aid in various activities. Pre-med students with real world experience in basic operations of healthcare would benefit from having an edge over strictly theory students. Such a service looks good on a transcript to medical

school and later when applying for a job as a doctor. In short this island offers unheard possibilities for students to grow and apply their knowledge for societies benefit.

As a final note we would like to thank all the wonderful people of Tortola who helped us on our way. Whether in direct connection with the IQP or in the aspects of our daily lives all touched our lives in unforgettable ways. Final implications of our research are that healthy lifestyles are being promoted, but more can be included about diabetes. Statistics about incidence and rate of increase are lacking, and can only be estimated by the numbers of individuals who seek out doctors. More can be done here to properly assess the situation with hard statistics, and any present statistics from standing reports are not known by many people on the island, and are probably not accurate. It is more than feasible for more research to be conducted here; it is necessary.



## ***Protocol and Etiquette***

Much of our project dealt with communication and meetings with the Ministries of Education, Health, and Immigration. One has to keep in mind they are governmental agencies of a foreign sovereign land. This requires business casual dress, and proper decorum in conducting orderly business with the Ministry. We immediately noticed an excessive level of bureaucracy in dealing with any government office on Tortola. British inspired government is starchy because of the long established rules of governmental order.

### Dress and Decorum

Dress should be appropriate for dealing in an executive office, recommending slacks and collared shirts for males. Females should wear business friendly attire of the same caliber. Formal meetings may require a tie as well. Males do not usually wear suit jackets, however women in suits are rather common.

Despite the fact that we met with some of the island's most respected and authoritative figures, the discussions were casual no matter how serious the topics of conversation. If offices could not be reached by phone, stopping by the office was just as, if not more than, effective for scheduling meetings with the various offices.

### Bureaucracy of Government

Proper procedure to make contact with the offices of government is important to consider. This is true even if dealings with the Ministry are just to acquire visas from the Ministry of Immigration. These offices are extremely busy, quick scheduling of meetings are fortuitous rather than regular occurrences. Planning is important to allow for coordinated meetings amongst groups of several officers. This obviously has advantages over chains of meetings.

Early sending of letters of intent to the Ministries of interest is extremely important. These letters should be concise briefs of intent to the required office, to establish initial contact. Ministries will be responsive and can be offered further literature, as they desire. These letters should seek to establish meetings in advance so that joint efforts can be better scheduled and all parties briefed sufficiently. All government officials we encountered were very friendly and willing to discuss matters frankly. However, for this to work efficiently written briefs prior to meetings are recommended.

These letters can be delivered upon arrival to the island as we did. However, the best approach is to schedule all serious meetings well in advance to departure so that no party's time is wasted in strings of unnecessary meetings. This will also eliminate the waiting between submission of letters and ability to schedule meetings. Such preparation also opens the door past the chain of secretaries likely to be encountered by cold visits. This chain is necessary to filter the insignificant inquiries from legitimate business but can be cumbersome frustrating. We have found that a filter goes up for outsiders who are still off-island, but once the contact learns that a group is on the island, he will point you in the right directions.