Improving Oral Health in a Developing Nation: Possible Interventions to the Reduce the Burden of Suffering due to Caries in Haiti

By

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ABSTRACT

Haiti is currently the poorest country in the western hemisphere. As such, the Haitian healthcare system is grossly underfunded and indicators such as life expectancy and infant mortality are among the worst in the world. The people of Haiti also suffer from a high rate of dental caries (also known as cavities, or dental decay); more than 50% of children are affected by it and very few receive treatment. This is a highly prevalent disease that is both preventable and manageable in more developed nations. Strategies already exist whereby a large proportion of caries can be prevented and treated in Haiti—they have been tried and tested in other countries. Specifically, I recommend that immediate efforts to improve oral health in Haiti focus on fluoridation of table salt and establishment of supervised brushing programs in elementary schools across the nation. As a supplement to these public health prevention strategies, it is also recommended that serious consideration be given to establishing schools to train local dental hygienists, and stemming the flow of newly educated dentists from leaving the country and providing incentives to allow greater access to dental care in outlying regions. This will require the allocation of funding to provide employment opportunities for young dentists as well as forging new partnerships (and strengthening any already in existence) between Haiti’s dental schools and their American or Canadian counterparts. It is my belief that the recommendations given here are supported by existing literature and expert opinion; it is hoped that this paper may serve as a basis for further study and funding of new initiatives to evaluate potential for large-scale implementation.
INTRODUCTION

Since becoming a sovereign nation the history of Haiti has been plagued by financial, political, and natural disasters, including the devastating earthquake of 2010. This pattern of destructive events has had a direct negative impact on all sectors of life in Haiti, but especially health and healthcare. Today, Haiti is widely known to be the poorest country in the western hemisphere. The life expectancy at birth is 63.2 years and the GDP per capita is an estimated $1300—placing Haiti in 186th and 209th out of 230 countries in the ranking. (CIA, 2015)

Like so many other aspects of the public sector, Haiti’s healthcare system is grossly underfunded and suffers from a lack of resources on multiple fronts—a shortage of trained health workers, inadequate infrastructure, and insufficient supply of modern equipment and materials. (Farmer, 2011) Many medical conditions that are easily treated in more developed countries are fatal in Haiti where treatment is not readily available. (Farmer, 2011) Fortunately, notable progress is being made to reverse these historical trends. For example, in March 2013, a state of the art teaching hospital opened its doors in Mirebalais in central Haiti; the project was planned and built as a partnership between Partners in Health (a large American NGO with a sustained interest in improving health care in Haiti) and the Haitian Ministry of Health (Partners in Health, 2014). This new hospital provides a venue where physicians are being trained to provide high quality healthcare while seeing roughly 700 patients each day (Partners in Health, 2014). Unfortunately, like so many other countries, Haiti struggles to achieve widespread geographic distribution of health services with 60% of the hospital’s patients coming from three neighboring regions. (Partners in Health, 2014) For rural Haitians especially,
obtaining even basic healthcare can still be nearly impossible due to large distances involved and the limited availability of transportation. (Farmer, 2011)

Dental care in Haiti suffers from the same problems as healthcare in general and is unable to keep up with the burden of suffering due to caries. Dental caries is a chronic disease that affects 60-90% of school children and nearly 100% of adults worldwide. (WHO, 2012) Caries represents a significant public health and economic burden to developing and underdeveloped countries in particular. (Yabao et al. 2005)

This paper will present a brief summary of the current state of dental care in Haiti and the burden of suffering due to caries—a highly prevalent, easily preventable infectious disease affecting the teeth and oral cavity. Literature will be used to illustrate some exemplary interventions that have been successful in other nations and may have potential for success in Haiti. Finally, major obstacles and some possible solutions will be discussed, and suggestions will be made for the direction of future dental public health efforts in Haiti. It must be recognized that the ideas and opinions presented here are based on non-systematic review of the literature and personal experiences volunteering and observing in dental clinics within Haiti as well as interviews with some of Haiti’s leading dentists. Notably, my time spent in Haiti was part of a practicum with a small American NGO called Haiti Health Initiative (abbreviated HHI).

DEFINING AND MEASURING DENTAL CARIES

Carious lesions develop when oral bacteria, residing on the surface of a tooth, metabolize sugar into acidic end-products which lowers the local pH and leads to
demineralization of the tooth enamel. If allowed to progress, the process continues until the enamel becomes so porous and weak that it dissolves away or fractures off; leaving a cavitation in the surface which exposes the softer dentin underneath. Porous canals in the dentin allow oral fluids and bacteria to have direct access to the nerves and blood vessels that reside within the pulp chamber of the tooth which leads to sensitivity and pain, as well as eventual infection and necrosis of the pulp. The infection may then spread into the bone of the jaws and even into soft tissues of the face and jaws which, in rare cases lead to large abscesses and even death.

As a side note, it is important to recognize that the vast majority of patients treated by dentists are affected by caries and/or periodontal disease. Fillings, root canals, extractions, and subsequently dentures and dental implants are different treatments which attempt to stop destruction and restore function that has been lost as a result of these two diseases. While caries is associated with diet, periodontal disease is associated with various systemic conditions including diabetes, heart disease, and obesity. There are other conditions that may merit treatment by a dentist, such as birth defects or oral cancers, but these are quite rare, relatively speaking.

Caries prevalence is a good indicator of dental health in a population for multiple reasons; it is a condition that affects children as well as adults, it is relatively easy to treat and prevent, and it is intimately linked to dietary intake—making it a public health concern beyond its direct dental effects. Additionally, and perhaps most importantly, caries is easily diagnosed and quantified in variety of public health settings; dentists and other qualified personnel can visually diagnose the presence or absence of caries with only an intraoral mirror and a good source of light. In epidemiology, caries is often quantified by
counting the number of teeth that are decayed (meaning that a carious lesion is present), are missing, or have fillings; this count is represented as dmft in children six years old or younger (the lowercase letters represent deciduous teeth, also known as baby teeth or milk teeth) and DMFT (capital letters for permanent teeth) in anyone twelve or more years of age. (Lo, 2014) For example, a child with two untreated carious lesions, four fillings, and one extracted tooth, would have a dmft score of seven. An adult with the same conditions would have a DMFT score of seven. The system can be modified to track tooth surfaces instead of teeth; with each tooth having 5 surfaces exposed to the oral cavity and many lesions and/or fillings affecting two or more surfaces, dmfs/DMFS scores may be much higher than dmft/DMFT scores. It is important to note that radiographs are not used in either of these scoring systems which means early lesions will often go undiagnosed. An example of some data from Haiti will serve as a helpful illustration.

BURDEN OF SUFFERING DUE TO DENTAL CARIES IN HAITI

In 2005, the Journal of Public Health Dentistry published the results of a 1999 national survey of caries in 12 and 15 year-old Haitian school children. A total of 1,218 children were examined; evidence of caries was found among 31% of the 12-year-olds and among 46% of the 15-year-olds (i.e. they had a DMFT score of one or greater). Mean DMFT scores for these age groups were also reported; the 12-year-olds had a mean score of 1.01 (SE 0.09) and the 15-year-olds had a mean score of 2.52 (SE 0.02). Although prevalence and extent of caries did not differ by gender, differences did exist along geographic lines; specifically, DMFT scores were significantly higher in rural areas than in Port-au-Prince (p=0.004). Also of note was the fact that fewer than 1% of children
had treated caries; meaning the vast majority of carious lesions detected had not been treated (Psoter et al. 2005). Data for the 15-year-olds in Table 2 from the same paper has been reformatted and included below for further illustration.

N (%), DMFT mean, and caries prevalence by gender and urban or rural residence in Haitian 15-year-olds in 1997

<table>
<thead>
<tr>
<th>Factor</th>
<th>N (%)</th>
<th>Mean DMFT (SE)</th>
<th>Statistical significance</th>
<th>Prevalence (95% CI)</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>247 (41%)</td>
<td>2.90 (0.39)</td>
<td>Ref*</td>
<td>46% (40%, 52%)</td>
<td>Ref*</td>
</tr>
<tr>
<td>Female</td>
<td>360 (59%)</td>
<td>2.28 (0.21)</td>
<td>0.330</td>
<td>46% (41%, 52%)</td>
<td>0.411</td>
</tr>
<tr>
<td>Total</td>
<td>607 (100%)</td>
<td>2.53 (0.20)</td>
<td></td>
<td>46% (42%, 50%)</td>
<td></td>
</tr>
<tr>
<td><strong>Urban-Rural</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Port-au-Prince (urban)</td>
<td>106 (17%)</td>
<td>1.71 (0.34)</td>
<td>Ref*</td>
<td>34% (25%, 43%)</td>
<td>Ref*</td>
</tr>
<tr>
<td>Port-au-Prince (suburban)</td>
<td>64 (11%)</td>
<td>2.97 (0.63)</td>
<td>0.098</td>
<td>52% (39%, 64%)</td>
<td>0.019</td>
</tr>
<tr>
<td>Urban**</td>
<td>312 (51%)</td>
<td>2.25 (0.26)</td>
<td>0.298</td>
<td>46% (40%, 51%)</td>
<td>0.030</td>
</tr>
<tr>
<td>Rural</td>
<td>125 (21%)</td>
<td>3.70 (0.58)</td>
<td>0.004</td>
<td>56% (48%, 64%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Total</td>
<td>607 (100%)</td>
<td>2.53 (0.20)</td>
<td></td>
<td>46% (42%, 50%)</td>
<td></td>
</tr>
</tbody>
</table>

* Referent category
** Other than Port-au-Prince

Data transferred and reformatted from Psoter et al. 2005

TREATMENT AND PREVENTION OF DENTAL CARIES

In seeking to reduce the prevalence of dental caries in Haiti, it is wise to consider how strategies successfully employed in other countries might be applied in Haiti.
Decades of experience in dentistry and public health have shown that significant reduction in prevalence of dental caries can be achieved in several different ways. Most common methods involve fluoride in some form or another—it continues to be the single-most effective prophylactic agent and is therefore an element of the majority of preventive strategies currently employed around the world. Some examples of fluoride use are central fluoridation of water or other consumables; use of fluoride rinses, drops, or tablets; periodic application of concentrated fluoride products; and tooth brushing (including supervised brushing programs) with fluoridated toothpaste. Examples of non-fluoride dependent programs include regular professional dental cleanings, use of antimicrobial oral products, or educational programs aimed at improving factors such as proper nutrition or improved oral hygiene.

With all of the different strategies available to address caries, it is important to recognize that the results of a preventive program can vary greatly in efficacy and efficiency based on a variety of factors including a community’s water supply, diet, health infrastructure, primary educational infrastructure, and more. In other words, the best caries control program for one nation may not be indicated in another.

EXAMPLES OF SOLUTIONS FROM OTHER COUNTRIES

Water Fluoridation in the United States

Second only to promotion of fluoridated toothpaste, the addition of fluoride to central water supplies is the method that has gained the widest acceptance and implementation in the United States. Currently, 43 of the 50 largest U.S. cities add fluoride
to their municipal water supplies. The first of such programs was instituted in 1945 in Grand Rapids, Michigan, but other cities quickly followed suit when rates of dental caries began to fall. (Jones, 2005) Since then, the Community Prevention Services Task Force has determined that the evidence strongly supports the use of community water fluoridation (CWF) to reduce dental caries. (Guide to CPS, 2013) They also found no evidence that CWF caused severe dental fluorosis. However, despite the many successes of water fluoridation, prevalence of caries in the USA remains high among minority children and in underprivileged communities, and is even rising in preschool children over the past two decades—partly due, perhaps, to the current popular trend of drinking unfluoridated bottled water instead of tap water. (Chou, 2013) As may be inferred, fluoridated water is ineffective if not consumed regularly—it is generally considered a poor strategy if a centralized water supply is not already in place.

**Salt Fluoridation in Jamaica**

One alternative method to CWF is to fluoridate another universally consumed product such as salt. Salt fluoridation was introduced nation-wide to Jamaica in 1987 and studies have shown a consistent decrease in the prevalence of dental caries among Jamaican children since that time. (Jones, 2005)

In the early 1980s a local dentist, Dr. R. Warpeha, observed the high rates of dental decay among school-aged children in Jamaica and thought of fluoridating table salt. The fluoridation of water would have helped only those Jamaicans who obtained their water from the Kingston city supply and thus would have missed the other 1.5 million residents
who used well water and run off rain water collected in storage tanks. Another advantage of fluoridated salt in Jamaica was that a single salt producer, Alkali Limited, provided all of the salt for the entire island. After consulting with other countries in Europe and South America who already had similar programs in place, the company spent a mere $3,000 to install the necessary equipment and the fluoridated salt program began. (Brown, n.d.)

Follow-up studies by Warpeha, Meyer-Lueckel nd others have shown reductions as high as 87% in the DMFT score of Jamaican school aged children, at least ten years after the institution of these measures on the island and the widespread acceptance by the public. (Meyer-Lueckel et al. 2009)

Fluoridated Milk in Chile

In 1962, Switzerland was the first country to demonstrate the success of adding fluoride to milk. More recently, the South American country of Chile has seen success by adding fluoride to powdered milk products distributed to children, aged 0-6 years, living in rural areas where water fluoridation is not feasible. In 1994, a pilot study evaluated the efficacy of this strategy in an entire town, using a nearby town as control. After four years, results showed “that it was possible to reduce the prevalence and severity of dental caries in the primary dentition, especially those born shortly before or during the program”. (Jones, 2005, page 673) Furthermore, once the pilot study was complete, rates of dental caries slowly began to climb again until three year follow up when rates were again comparable to rates in the town used as a control. (Jones, 2005 and Weitz, 2007)
On the other hand, a study by Ketley, West and Lennon published in 2003 reported no significant reduction in the DMFT scores of British school aged children who consumed fluoridated milk at school. (Ketley et al. 2003)

**Supervised Brushing in Jordan**

The single-most common vehicle for the application of fluoride is toothpaste. According to the World Health Organization (WHO), toothpaste is responsible for the largest reduction in the incidence of dental caries worldwide during the 1970s and 1980s. (Jones, 2005) However, multiple countries have shown an inequitable benefit noted between the upper and lower socioeconomic classes. This is most likely due to the inability of many individuals to purchase toothpaste for use on a regular basis as well as inadequate knowledge of proper brushing techniques. (Jones, 2005)

A study conducted in the developing country of Jordan and published in 2006 gives a good example of supervised brushing in schools as a method of reducing the incidence of dental caries among two age groups of school children. The results of this longitudinal case-control study showed that children in the two control groups had a 3.1 (six-year-olds) and 6.4 (twelve-year-olds) times greater relative risk of developing dental caries than children who were in the supervised brushing groups of the same age, after 4 years of monitoring. The control groups received oral hygiene instructions only while the study groups received hygiene instructions as well as supervised brushing time daily. There was statistical significance at a P value of 0.001 even after controlling for several variables. (Al-Jundi et al. 2006)
Several drawbacks of the study are mentioned by the authors. First, there was considerable expense associated with supplying dental hygienists along with cups and other disposable supplies to the different schools—naturally, the implementation of such a program on a large scale would be even more costly. Second, many teachers were not happy with the school day interruptions. Nevertheless, they concluded that a supervised brushing program would be quite effective if it included education of teachers, staff, and parents to help ensure the support of these important stakeholders. (Al-Jundi et al. 2006)

An article published in 2008 regarding a pilot program in Lisbon, Portugal supports this hopeful hypothesis. It reports the results of questionnaires filled out by 25 high school teachers who had participated in a school-based oral hygiene education program that had been ongoing for seven years—the program involved bringing dental hygienists into the schools during class time twice monthly in order to teach proper oral hygiene and administer fluoride mouthrinse. While teachers who did not actively participate in the hygiene activities believed that the program affected school activities, 92% supported the existence of the program and 88% disagreed that it was a waste of time. When interpreting these numbers however, the authors noted that they only had 25 respondents out of a much larger number of teachers who had been involved (they don’t specify how many) so sampling bias is likely. In other words, the individuals who had positive opinions of the program might be more likely to respond to the survey. (Assunção, 2008)

Further, a 2010 Nigerian study reported the results of a systematic sampling of 640 school teachers by a self-administered questionnaire. The results showed positive attitudes toward oral health despite widespread misinformation and bad habits. Over 90% of the teachers claimed to be currently involved with teaching oral hygiene to students.
The authors conclude that primary school teachers may be able serve as effective oral health educators if given some level of formal training to increase their knowledge of proper methods. (Ehizele et al. 2010)

When taken together, these three papers demonstrate that school-based supervised brushing programs show very real potential for significant reduction in caries rates among preschool and primary school-aged children. For optimal results, supervised brushing programs should include basic oral hygiene education of preschool and primary school teachers who can then pass on the information to their students.

Fluoride Tablets in the USA

One other fluoride-based preventive strategy worth mentioning is the prescription of fluoride tablets; this differs from the others in the sense that it is not a true population-based strategy and relies on clinical identification and management of high-risk individuals. Having said that, in areas of the United States where CWF is not available, many physicians prescribe fluoride tablets or drops as an alternative means of preventing caries. This is consistent with the US Preventive Task Force’s conclusion that fluoride supplementation for children younger than 5 years of age should continue. (Chou, 2013)

BEST OPTIONS FOR HAITI

Based on the lack of a reliable centralized water supply in Haiti, water fluoridation is not a good option. (Brown,n.d.) Furthermore, distribution of fluoridated milk or
prescription of fluoride tablets is not feasible due to the limited public health infrastructure. Therefore, salt fluoridation and school-based supervised brushing appear to be the most appropriate strategies for reducing the prevalence of dental caries in Haiti. In addition to being well-suited to Haiti’s lack of infrastructure, a review of literature and of lessons learned from other developing countries supports the efficacy of these options. Having said that, it must also be noted that the cariogenic potential of the Haitian diet has not fully been classified at this point in time and some potential may exist for diet modification in this regard.

Concerning salt fluoridation, we know that a cheap, population-based intervention such as this would be the most cost effective and practical means of reaching the largest numbers of individuals. Furthermore, Jamaica has demonstrated success in its salt fluoridation program with minimal apparent cost. (Brown, n.d.) It must be acknowledged however, that although Haiti and Jamaica are neighboring island nations in the Caribbean, Haiti has a population three times greater than Jamaica spread over a landmass three times larger, and only half the national GDP. (CIA, 2015)

Concerning supervised brushing, a school based supervised brushing program could be a valuable adjunctive program to increase awareness of proper oral health practices in the rising generation. It would also provide an organized venue for the distribution of basic preventive supplies (such as toothbrushes and fluoridated toothpaste) and information (education regarding proper diet and oral hygiene techniques). The World Health Organization has published multiple articles describing a new model of health-promoting schools that will serve as de facto centers of health education in developing
countries; one of the many roles mentioned specifically is promotion of oral health including supervised brushing. (Kwan, 2005)

**Strategy #1: Salt Fluoridation**

The use of fluoridated salt as a population approach to the problem of dental caries is a low cost relatively uncomplicated solution. However, this is better suited for well contained populations with similar food purchasing habits and uniformly low levels of fluoride in their water supply—two of the conditions that are suspected to have contributed to the success of this strategy in Jamaica. As mentioned previously, Jamaica’s sole manufacturer and supplier of iodized salt was able to supplement its existing supply with 250 mg per kg of potassium fluoride at the cost of only $3,000. Additionally, a well-planned public information campaign resulted in the support of the Jamaican public. (Brown, n.d.)

One of the possible side effects of salt fluoridation is fluorosis due to excess fluoride consumption which is usually manifested as white spots forming on developing teeth (extremely high levels of fluoride can lead to systemic effects including bones that are more susceptible to fracture, but this is not a concern with the concentrations used to prevent caries). (WHO, 2015) Ten years after the launch of the salt fluoridation program in Jamaica, an oral health survey showed a 4% rate of “very mild” to “mild” fluorosis with 96% of the children found to be fluorosis free. (Estupiñan-Day et al. 2001) In another study done after 20 years of fluoridated salt the prevalence of fluorosis was found to be high at 67% among 6 year olds and 39% among 12 year olds. This increase was thought to be the combined effects of the supplemented salt program along with the increased
use of fluoridated toothpastes. (Meyer-Lueckel et al. 2009) These numbers, however, must be interpreted carefully. The study focused on a parish in Jamaica that was “known” to have a high prevalence of fluorosis so the information reported is possibly quite skewed. Also, the authors admit that previous data did not account for teeth brushing habits and that there is no clear external validity of fluorosis scoring. (Meyer-Lueckel et al. 2009) It must also be mentioned that fluorosis is more likely to occur if fluoride is already present to some extent in the natural diet; for example, several natural water sources in rural Haiti (near the region of Jacmel) have been found to contain adequate levels of fluoride already. (Fryer, 2015) Fluoridation of salt in these specific communities would result in a smaller-than-anticipated reduction in caries rate and have a higher likelihood of causing fluorosis.

Strategy #2: Brushing in School

The experience of researchers in Jordan showed a statistically significant reduction in caries risk among study groups as compared to control groups; four year follow-up data showed that the controls (no supervised brushing) had significantly greater dmft/DMFT values and were at higher risk of developing new carious lesions – relative risk values of 6.4 for the six year-olds and 3.1 for the 12 year-olds. (Al-Jundi et al. 2006) Although this is only a single article supporting the value of supervised brushing in specific, there is a strong body of evidence that supports the importance of brushing with fluoridated toothpaste. Furthermore, it is widely accepted by dental professionals that children perform relatively poorly when brushing their teeth without direction.
Challenges associated with supervised brushing in Haiti will likely revolve around the logistics of implementation. The full cooperation and commitment of any nation’s entire corps of school teachers would be difficult to obtain. This is sure to be especially true in Haiti, where the public sector is disjointed and fragmented along multiple lines. (Farmer, 2011) This obstacle may be partially mitigated by engaging foreign volunteers working within any of the thousands of NGOs currently active in Haiti; this would be a temporary solution with the goal of transitioning full responsibility to local school teachers as soon as possible. Nevertheless, the program will obviously have little impact on children who are unable to attend school regularly due to poverty or other causes.

Both salt fluoridation and school-based supervised brushing programs hold potential as preventive solutions to controlling the problem of dental caries in Haiti. They have both been shown to be effective in reducing prevalence of caries in low-income nations where oral public health infrastructure is limited. These strategies will therefore provide an excellent starting point for reducing the caries rate in Haiti. Having said that, a comprehensive program to decrease the burden of suffering due to caries—specifically pre-existing lesions in advanced stages that will be unaffected by preventive strategies—will require increased infrastructure and capacity; especially an increased number of trained dental professionals.

BEYOND PREVENTION

Dental caries, like any chronic disease, often persists and compromises quality of life over multiple decades. Prevention must therefore be supplemented by treatment and
management. Salt fluoridation and school-based supervised brushing programs show strong potential to reduce caries rates but will never eliminate the disease altogether. Looking to the future therefore, Haiti must focus not only on preventive public health interventions, but also increasing capacity to manage existing disease. In short, Haiti needs more dental professionals.

There are two dental schools in Haiti—both located within the capital of Port-au-Prince—the national public dental school known as the Faculté d’Odontologie, and a newer private school known as the Université Autonome de Port-au-Prince (UNAP). It is important to note, however, that graduates from UNAP may be required to meet additional requirements prior to receiving licensure to practice dentistry in Haiti since the school is not accredited (Denis, 2013). This is commonplace in many developed countries where graduating students are required to complete national and/or regional board examinations. Therefore, the interesting thing is that graduates of the national dental school do not need to meet any additional requirements. In this light, it has been suggested that a uniform system should be put in place to ensure the competency of all dentists who wish to practice in Haiti (graduates from Haiti or abroad), but this has not been implemented at the time of this writing (Fryer, 2015).

During my practicum with HHI in March 2013, I was given the opportunity to discuss relevant issues with several well-informed and influential individuals within the sphere of Haitian dentistry. Two of these individuals were Dr. Denis and Dr. Doleyres. The former is the Vice-Dean of the National Dental School and President of the Haitian Dental Association, while the latter is the Chief Director or Oral Health within the National
Ministry of Health. One formal interview held with both of these two individuals proved to be especially informative.

As a representative of the NGO for which I was volunteering (HHI), I wanted to identify some possibilities for coordinated projects. I asked them what HHI could do to help them accomplish their goals regarding the improvement of oral health in Haiti. I also asked them what they saw as the biggest problems facing dentistry in Haiti. The conversation that followed was very enlightening. Eventually, the two of them settled on three main problems:

1. Inadequate resources at the national dental school
2. The inability to retain recent dental graduates within Haiti
3. A lack of oral health awareness among the general population

1 – Resources at the Dental Schools

The students at UNAP have very few resources and often have to find their own supplies. (Guichard, 2013) The situation at the national dental school appears to be similar. In order for a dentist to provide dental care of the highest quality, they must be trained in modern techniques; to be trained in these techniques, modern materials and equipment are required. Therefore, in order to improve the quality of dental care available to the Haitian general public, there is a need for partnerships with dental schools in more resource-rich countries such as the United States and Canada. These partnerships would be established with the intent to share expertise as well as resources—this is something
in which Dr. Denis expressed great interest. (Denis, 2013) Although interpreters are available, a partnership with a dental school in Quebec may be most helpful as the majority of the faculty and students would be fluent in French.

2 – Retention of Dental Graduates

During our interview Dr. Denis was emphatic that retention of recent dental graduates is a serious problem for Haiti. (Denis, 2013) In a country like Haiti, where greater capacity and infrastructure are badly needed, retention of young dentists merits direct attention. As I asked him about the root of the problem, he stated that most of them simply can’t find an opportunity to practice in Haiti—he emphasized that the decision to seek work elsewhere is forced upon them by circumstance. He explained that opportunities are mostly limited to graduates who have a family member or friend who is a dentist with an existing practice; loans to establish new practices are unavailable. In other words, although there is indeed a shortage of dentists in Haiti, there appears to be an even greater shortage of dental clinics.

If Dr. Denis’ assessment is correct, then the simple solution to the problem of retention would be to provide opportunities for employment. An example of a direct, hands-on approach would be establishing and operating one or more dental clinics, and hiring young Haitian dental graduates to staff them. A more indirect approach might be as simple as providing low interest or interest-free loans to qualified graduates interested in establishing their own dental practice.
Either type of job creation program mentioned above could also be used to improve geographical distribution of dental services. According to Dr. Doleyres, 70% of Haiti’s dentists are located in the capital city and the need for dentists in other parts of the country is very high (Doleyres, 2013). To address this, clinic facilities could be built in certain target communities or money available through a loan program could be made available only on condition that the practice be established in an underserved area of the country.

3 – Oral Health Awareness

Before a group of people can be motivated to address a public health problem, they must first become aware that the problem exists. In Haiti, and especially rural Haiti, it was my observation that many individuals who came for treatment at the mobile dental clinic knew very little about what causes dental caries or how to prevent it.

In the United States and Canada much of what an individual knows about dental health and oral hygiene has been taught to them by a dental hygienist—a profession that does not currently exist in Haiti. The details of how to brush one’s teeth effectively, what toothpaste to use, and what foods to consume or avoid, is often taught in a one-on-one setting in the dental office. With so few dentists serving the people of Haiti, it is hard to imagine them having time to adequately educate their patients regarding maintenance of oral health. The introduction of dental hygienists into Haitian dental clinics could drastically increase the number of hours available for in-chair education and therefore improve the oral health awareness of the general population.
Additionally, the introduction of dental hygienists to the dental workforce in Haiti would allow dentists to delegate activities (such as prophylactic dental cleanings) that do not require the full depth of their training. When I observed Dr. Doleyres in his private practice, I was struck by the broad scope of activities that he performed; many of which are almost universally done by dental hygienists or dental assistants in countries such as the United States and Canada. The delegation of these basic tasks to hygienists or assistants would increase the efficiency of dental clinics and the overall delivery of dental services in Haiti. In other words, more patients can be seen and more services can be rendered in a single clinic with less investment of money for and man-hours.

CONCLUSION

As one of the poorest nations in the world, Haiti has limited resources to invest in healthcare. As a result, there is a high burden of suffering due to various diseases; many of which are preventable. The body of this paper has focused on the prevalence of caries in Haiti, and suggested the application of specific strategies to reduce future caries incidence (prevention), as well as increase capacity to treat existing caries and reduce current prevalence. The discussion has cited data from published articles, outcomes of similar programs in other nations, and opinions of leading dentists within Haiti.

In regards to prevention of future caries, the most appropriate strategies appear to be fluoridation of salt supplies and implantation of supervised brushing programs in elementary schools. Both of these approaches have been shown to yield significant results with limited need for large investments in infrastructure. They are therefore cost-
effective. Regarding potential for negative impact, supervised brushing has virtually no risk of adverse effects while fluoridation of Haiti’s salt does have some potential for causing mild fluorosis. However, the benefit far outweighs the risk; with concentrations that are used for caries prevention, the manifestations of fluorosis due to such a program would be limited to white (or possibly brown) speckling of developing teeth. (WHO, 2015) Therefore, both of these strategies should be considered safe with little potential for negative side-effects. Additionally, both strategies have potential to galvanize partnerships between international NGOs and local leaders as they will require cooperation on a large scale.

In this light, it is essential to recognize that prior to implementation of these strategies, further study will be required in order to confirm the feasibility and effectiveness of these interventions in Haiti. Opportunities currently exist for public health students and/or volunteers to collaborate with NGOs and Haitian communities to look deeper into these solutions and evaluate their potential through pilot studies. For example, Haiti currently has multiple brands of salt available in the free market and salt producers currently have little incentive to invest even modest resources in order to add fluoridation. Future studies could try to assess the demand for fluoridated salt and the willingness of an informed population to pay slightly more for it. Further studies could aim to determine whether producers would invest in fluoridating their salt without charging more for it in hopes of gaining a larger share of the market. Along similar lines, it would be important to determine what role the government is willing to play; are they willing to pass regulation that requires fluoridation of salt? Do they have the will and means to
enforce such a law? Many questions such as these must be answered prior to implementation of these preventive strategies.

In regards to treatment of existing caries, Haiti must increase the capacity of its dental workforce. To this end, three main suggestions have been presented: improving the quality of dental education through partnerships with more resource-rich dental schools, increasing the retention of Haitian dental graduates by providing geographically specific opportunities for employment, and establishing a program to train dental hygienists in order to increase the efficiency with which dental services are provided to the public.

These ideas, like the public health strategies presented above, are supported by expert opinion and precedent in other countries, but require further study prior to large-scale implementation. Specifically, studies will need to evaluate cost-effectiveness and various options for financing new dental clinics and hygiene training programs. In order to secure funding from organizations such as the Pan American Health Organization (PAHO) or the Gates Foundation, these details must be addressed prior to implementation on any scale. Nevertheless, it is hoped that this paper and other local efforts may provide the basis for proposals to be presented to national, regional, and international agencies in order to obtain funding necessary to proceed to small-scale trials of novel solutions to long-standing problems.
REFERENCES


Guichard (2013, March 6). [Personal interview].


