

the Johns Hopkins Undergraduate Public Health Research Journal

# EPIDEMIC PROPORTIONS

Vol. 8, Issue 1, Spring 2011

*breaking*  
BARRIERS



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## ABOUT THE JOURNAL

Epidemic Proportions is a public health journal designed to highlight JHU research and field work in public health. Combining research and scholarship, the journal seeks to capture the breadth and depth of the JHU undergraduate public health experience.

## SUBMISSIONS POLICY

Any interesting student experiences locally or abroad such as research, volunteering, local work, or editorials are all welcome!

Please submit all articles to [ep@jhu.edu](mailto:ep@jhu.edu).

# LETTER

*from the*

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# EDITORS

Kevin Brown

There are always barriers—whether they are preventing us from achieving our goals, or whether they are preventing us from saving the life of another human being. Either way, there is a breaking point; a point at which despite all odds, barriers are broken.

My involvement with the Syringe Exchange Program at the Free Clinic of Greater Cleveland has come to define the way that I view the field of public health as a whole. Public health is as much an exterior battle as it is an interior battle— a battle that exists within ourselves and the way that we choose to view the world. As a syringe exchange worker, my task was to distribute sterile syringes, contraception, alcohol pads and addiction pamphlets to injection drug users in exchange for used syringes. In doing so, we are curtailing the spread of disease that invariably occurs among injection drug users who do not use sterile syringes. We are not giving up on ever stopping this terrible addiction; rather, we are protecting an at risk population while at the same time encouraging them to change their behavior. Having dealt with addiction in my own family, I am well aware of a simple message that may help to explain the relapses of many addicts: if you do not wish to get better, to make an effort on your own behalf, then you may as well continue to self destruct.

Many find needle exchange work to be controversial. And to be frank, it is just that. Some say that a needle exchange program is simply a crutch for addicts, a way by which to further the lethal habit that they cannot seem to kick. And to them, I ask: what of unborn children who contract HIV/AIDS perinatally from a mother who used unsterile needles? What of the wellbeing of those addicts who have yet to contract any disease? What of the program's efforts to provide addiction treatment? Why are we so quick to lose hope in our own race simply because for whatever reason, they are not able to properly care for themselves? Breaking a barrier is not meant to be easy; it is not come by effortlessly, nor does it come without cost. It's as if we are attempting to forget that this population ever struggled to exist by disregarding both its premature death and unnecessary morbidity. The Syringe Exchange Program accesses a population that otherwise would not have received help, an often times sick population whose addiction encourages them to avoid seeking assistance. In accessing this population, in crossing this controversial boundary, we are saving the lives of the world's forgotten.

Sometimes barriers exist within ourselves, such that change is simply not possible. In fact, as much as we may wish to create change, to cross boundaries, we must first learn to do so within ourselves. Barriers are not necessarily physical; in fact, many of them are not. A barrier is nothing but a limitation, one that can prevent us from doing even the most intuitive of things. As frustrating as it may be, we as human beings are often times our own barrier. My co-editor, Michael Suen, can speak very well to this point.

# LETTER

*from the*

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# EDITORS

Michael Suen

My first experience with this occurred during the summer of my freshman year in high school, when I first began teaching a four-month creative writing program in inner city Chicago. I went into the program with many hesitations—the neighborhood I was teaching in was notorious for a mixture of drugs, crime, and poverty. As a brace-faced, fourteen-year-old Chinese American, I knew I was going to stick out like a sore thumb. Further compounding issues was the fact that all of my twenty-six students would be at various levels of writing and reading comprehension; there were the students that had failed seventh grade twice, and were reading at a third-grade level, and there were also students, like a fifth grader named Tatiana, that had skipped two grades, and were reading like a high school sophomore.

The first few weeks were brutal. I was nervous about teaching students that seemed to be unlike me in every way. But more importantly, I was nervous about myself. My nerves and my insecurities reflected in the bored expressions of my pupils, and the lack of classroom interaction—I was not connecting with them, and the results really showed. Week after week was unsatisfying, until one day, one of my students overheard me talking about quitting the program with a co-worker, and said, “I think you’re a great teacher.” As romanticized as it sounds, those few words were really the turning point for me. Once I began to believe that I was good at what I was doing, I became more involved, and began shedding many of the fears that had held me back in the beginning. It took just one vote of confidence for me to begin breaking down the barriers of my experience, and connect with my students on a higher level. While it’s important to reach out and connect to as many populations as possible to break barriers, the most important barrier I had to break was the one within myself.

In this issue, we present the barrier breaking work of many members of the Johns Hopkins community. Whether in the classroom, in the laboratory, in the operating room, or in a developing country, these men and women are true examples of the importance and relevance of overcoming obstacles to create change. We as editors hope to inspire change in you, our readers, through presenting the admirable work of many of your peers.

*Kevin Brown*



*Michael J. Suen*

# COVER LETTER

## MAKING THE CASE *for* Public Health

When *Epidemic Proportions* began in October, 2003, a group of eleven students embarked on a journey that still continues today. As one of those eleven, I am honored to have this opportunity to write a few words of reflection for the journal. The thoughts of my classmates deserve to be heard just as much, as they have certainly seen and done more than I in the ensuing years. But in the space granted here, I offer a few remarks on the need to better integrate public health into the mainstream of health policy.

I often hear the question, “what is health policy?” from students in a health policy course I teach at Harvard College. It reminds me of a similar question my classmates and I used to ask at Johns Hopkins, “what is public health?” My answer to the students characterizes health policy not as a traditional “field” in academics, but rather as a stepwise “process” that begins with identifying and measuring a health-related societal need, and weaves into designing, implementing, and evaluating policy solutions. It is a process that, in recent decades, has centered around the issues of access to care, cost of care, and quality of care. Each step may well have its own textbooks, classes, and frameworks for thinking. This answer is not unlike what I learned in college about public health—a process of scientific discovery and social change aided by cross-disciplinary thinking and methodological rigor. However, while public health traditionally focuses on interventions at the community level, health policy focuses more on regulations at the federal, state, and individual levels. Greater attention towards community interventions

would help health policy achieve its goals.

Public health and health policy shared a landmark achievement when President Obama signed the comprehensive health care reform legislation into law on March 23, 2010. In this historic bill that expands coverage to millions of Americans, the focus on public health was unprecedented. The bill establishes the National Prevention, Health Promotion, and Public Health Council to oversee federal efforts for prevention and wellness; it creates a Prevention and Public Health Fund for research, outreach, screenings, and vaccinations; and it initiates a grant program along with a task force on Community Preventive Services to support prevention and wellness in rural and underserved communities. In Medicare, Medicaid, and employer-sponsored health insurance plans, the bill also eliminates patient cost-sharing for basic preventive services. These and other laudable provisions have put public health at the heart of access to care and quality of care—two of the three pressing health policy issues facing our nation.

But on the third issue—how to control health care costs—public health is largely absent from the health policy conversation. As a current Ph.D. student in the field of health economics, I study how providers, delivery systems, and insurers can curb the growth of health care spending (while not losing sight of improving quality). In current discussions surrounding the reform of physician payment, the paradigm of thinking is squarely on changing the physician’s financial incentives at the point of care. Should we use pay-for-per-

formance on top of the fee-for-service system? Should we use prospective payment—episode-based payment, bundled payment, or global capitation? Thus, the current paradigm of cost control is all about what happens after the patient has reached the physician. Not surprisingly then, it is a paradigm dominated by economic models, the concept of efficiency, and a holy grail of cost-effectiveness or “value” in medical care. I love this paradigm; intellectually stimulating and conceptually rich, it offers aspiring health economists like me many opportunities for research. But my time in the Public Health Studies major at Hopkins begs a different question: what can we do for cost control in the days, months, and indeed years before the patient seeks care?

This question is difficult to answer. We lack robust, systematic evidence that tell us what saves money for the health care system outside of changing provider incentives. Indeed, there is even real disagreement in the social science community over whether prevention itself saves dollars. Intuition can lead us both ways: while medical care avoided is surely money saved, prevention may only delay health care use, all the while creating more opportunities overall for needing care by lengthening life. While this is, by all means, a socially preferable outcome (as prevention also improves the quality of life), it just may not be cost-saving over the life of an individual.

In May, 2010, physician thought leaders from Harvard Medical School, Dartmouth College, and the University of Washington convened a conference in Boston to come up with new models of health care delivery “for better care, better health, and lower costs.” Participants split into four working groups. My group was charged with “Shaping New Models of Service Delivery,” and included leaders from hospital networks, physician organizations, medical schools, insurers, and research foundations. For two days, our discussion revolved around physician payment and ways of organizing physicians and hospitals to accept payments together. While eternally stimulating, the discussion failed to escape the confines of the payment paradigm. Our lone public health voice, Dr. Denise Koo of the CDC, enriched the conversation by urging us to think about communities and lifestyles. But even at our table of like-minded colleagues, her comments embodied the uphill battle that public health has historically fought. Cost control, in the end, was perceived to be a matter

of physician payment.

This experience and others offer me three general lessons, with which I close. First, in the world of health policy implementation, the issue of cost (not access or quality) dominates. Federal and state budgets alike are ultimately constrained by rising costs. In a time of severe budget deficits, the imperative of cost control is a nonnegotiable prerequisite for pursuing access and quality—which have been the traditional goals of public health.

Second, evidence on the potential of public health to help control costs is urgently needed. In this era of payment-centric cost control, public health solutions—whether in the sphere of nutrition, lifestyle, or community intervention—require a new evidence base to inform policy. Specifically, they require causal evidence of impact on costs, the kind that randomized and prospective cohort studies offer. Causal evidence translates into actionable policy.

Third, we need more people like Denise Koo—public health practitioners who are not afraid to seat themselves at the health policy table and offer the principles of public health and its critical interplay with health policy. It reminds me of a lesson from Dr. Alfred Sommer, former Dean of the Bloomberg School of Public Health, in a talk he gave at the Homewood campus in 2006 (a quote from Woody Allen): “90 percent of success is showing up.”

I give my sincere congratulations to the current staff of Epidemic Proportions for your incredible work, and my best wishes to you and your peers for continuing to brighten the future of the field.

Zirui Song, JHU '06

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*Ph.D. candidate in Health Policy (Economics), Harvard University*

*Editor-in-chief of Epidemic Proportions, Fall 2003–Spring 2005*

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# RESEARCH



# The Reproducibility of Measuring Aortic Strain and Pulse Wave Transit Time through Magnetic Resonance Imaging

Ryan Kahn, Class of 2012

*Public Health Studies*

Project Collaborators: Gisela Teixidó-Turà, MD; João A.C. Lima, MD; Elzbieta Chamera

## Introduction

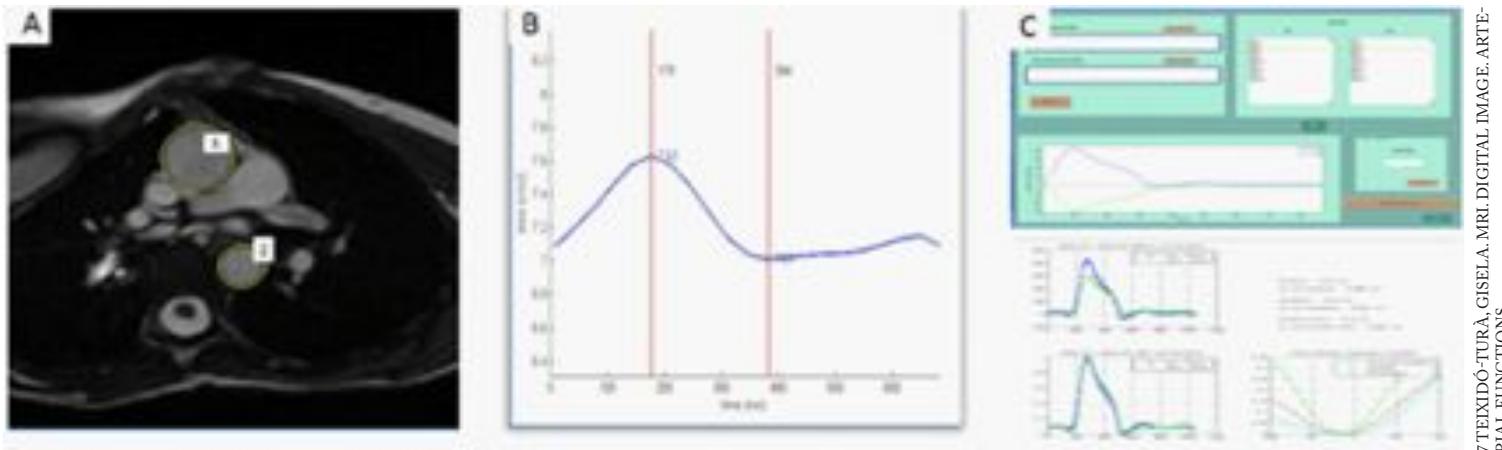
With over 910,000 deaths in the United States alone attributed annually to heart disease,<sup>1</sup> early detection of cardiovascular risk factors has proven to be crucial in efforts to drastically decrease the number of people afflicted. Aging has been found to cause cardiovascular decay with a decrease in vascular distensibility and stiffening of the aorta.<sup>2</sup> Arterial stiffness, which often goes unnoticed in individuals with no previous symptoms of heart disease, is an early indicator of cardiovascular disease beyond traditional risk factors.<sup>3</sup> Therefore, the early detection of aortic stiffness can lead to identification and prevention of cardiovascular disease in patients who may not exhibit common risk factors such as hypertension or high cholesterol.

The aorta delivers blood from the left ventricle to the peripheral tissues and distributes oxygenated blood throughout the body by

systematic circulation.<sup>4</sup> During the systolic phase, the aorta distends and accommodates a large proportion of the stroke volume (SV), or volume of blood pumped from one ventricle of the heart during beats. The arterial wall then recoils during the diastolic phase. With a decrease in aortic distensibility, there is a lower proportion of SV stored in the aorta during systole. Ultimately, there is an increase in pressure in systole and a decrease in pressure in diastole, leading to an increase of pulse pressure (PP).<sup>5</sup> Increasing evidence has begun to show that an elevated PP is a risk factor of coronary heart disease.<sup>6</sup> Therefore, detection of aortic stiffening is a critical indicator in the early detection and prevention of cardiovascular disease. The use of imaging to detect aortic compliance plays a large role in the advancement of public health as well as cardiovascular health through both clinical screening and long-term follow-up.<sup>5</sup>

Aortic arch pulse wave velocity

(PWV), or the rate at which a flow or pressure wave travels down a vessel, along with the relative changes in ascending aorta (AA) area are the most specific and sensitive indicators of age-related aorta stiffening.<sup>3</sup> Magnetic resonance imaging (MRI) has the ability to assess aortic and ventricular geometry with direct high-resolution measurements of aortic strain, distensibility, and PWV.<sup>3</sup> Because of the limited availability and high cost of MRI techniques, it is important to determine whether this method is a valuable resource in measuring arterial stiffening. However, the effectiveness of MRI in the measuring of aortic strain and PWV has yet to be validated on a large scale. In this study, the precision and reproducibility of the MRI readings of aortic area and PWV are measured to determine whether the use of MRI to detect aortic strain will be an efficient and accurate measure of the early indication of heart disease within the near future.



7 TEIXIDÓ-TURÀ, GISELA. MRI. DIGITAL IMAGE. ARTE-  
RIAL FUNCTIONS.

Figure A. (1) Arterial Function's cine ring used to the ascending aorta area and (2) descending aorta area. Figure B. The different values of area in both the systolic and diastolic phase. Figure C. Arterial Function mode of analyzing the PWV of the aorta

## Methods & Materials

The aortic MRI images of the cases were obtained from an outside study. They were then processed in ARTFUN. INSERM U678, a custom-made software program that assessed aortic area for both the aortic distensibility calculation as well as the PWV. ARTFUN uses a ring to trace the ascending, descending, and abdominal aorta, allowing for the measurement of the maximum and minimum area between the systolic and diastolic phases.

As mentioned previously, the change in aortic area is necessary for the calculation of aortic strain. Aortic strain is defined as:  $\%Strain = (A_{max} - A_{min}) / A_{min}$ ; ultimately, Strain is essential in the calculation of distensibility. While the rate of a pressure wave to travel down a vessel, PWV, is calculated by measuring the difference in time of the pulse wave between the ascending and descending aorta.<sup>8</sup> Thus, in order to measure the difference in time, the Bramwell-Hill Equation was used: Aortic PWV =  $D / \Delta t$ , where D is the distance

between the ascending and descending aortas and  $\Delta t$  is the transit time.<sup>3,9</sup>

After extensive training with ARTFUN, the minimum and maximum of the ascending, descending, and abdominal aorta as well as the change in time of the pressure wave between the segments of the aorta were measured for random cases. These results were then cross-referenced and analyzed with Dr. Teixidó-Turà's calculations of the same cases. Through a statistical analysis utilizing Bland-Altman plots and Intraclass Correlation Coefficients (ICCs), the variance and reproducibility of using MRI techniques to measure aortic strain and PWV were calculated.

**Results** are found on the next page.

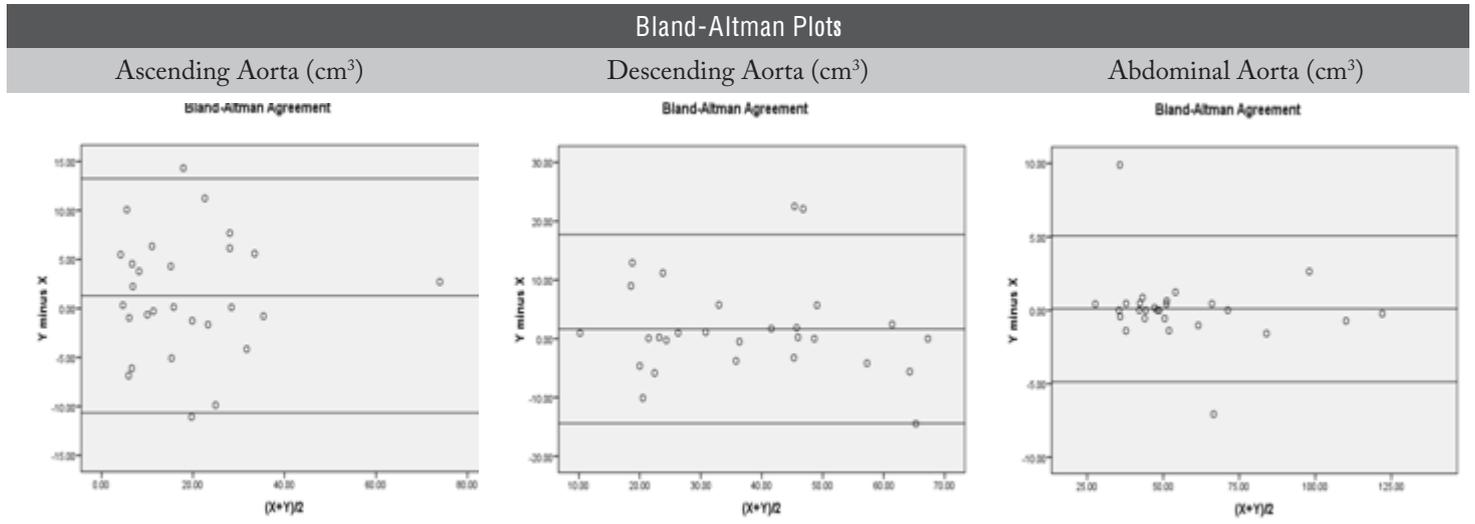
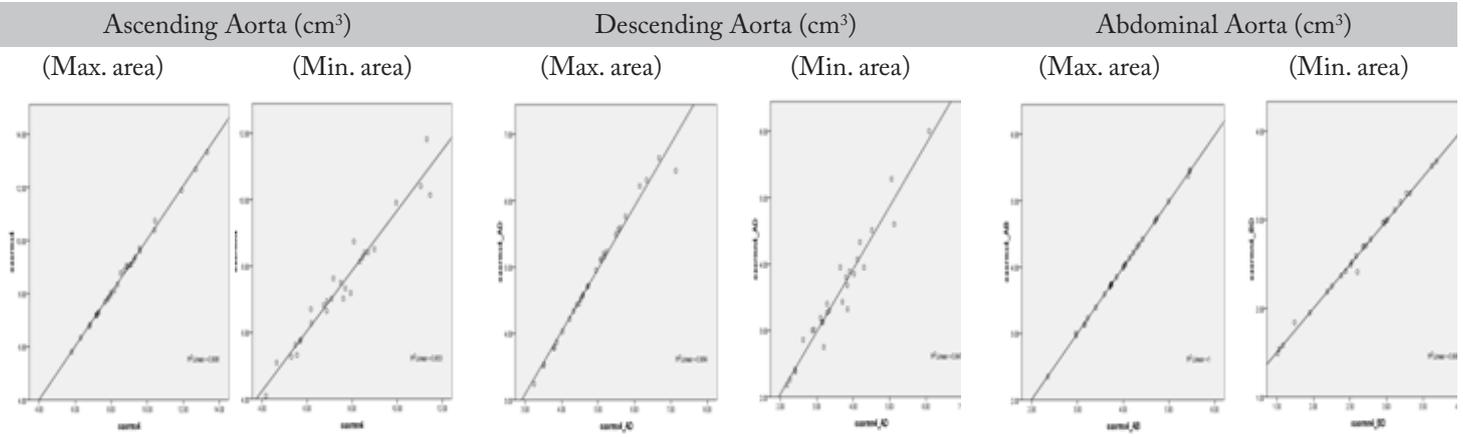
## Discussion

The ICC of the abdominal aorta area was much more precise than that of the ascending and descending aorta. The ICC measurements of the min/max ascending and descending areas were precise with (.99/.92) and (.99/.97) respec-

tively, while the max/min area of the abdominal aorta was (1/.99). There was also minimal deviation in the calculation of abdominal strain (0.99). The ICC calculations of ascending and descending aortic strain were slightly lower but were still precise and close to one. All PWV measurements were highly reproducible with the lowest ICC of 0.98.

Although this study was performed on a small scale with only 30 samples, the reproducibility of using MRI and ARTFUN in measuring aortic stiffening was evident. The calculations were obtained from the two researchers of different experience and credentials. MRI and ARTFUN in measuring aortic stiffening was evident. The calculations were obtained from the two researchers of different experience and credentials. However, the ICC of the area, strain, and times were very close to one, indicating that the measurements had the accuracy and ability to be reproduced on a large scale. The reproducibility of all abdominal aorta measurements were almost ideal but measurements of the ascending and descending

## Results



Area	Intraclass Correlation Coefficient (ICC)	CI95%
Max area, ascending aorta	0.99	0.99-1.0
Min area, ascending aorta	0.92	0.83-0.96
Max area, descending aorta	0.99	0.98-0.99
Min area, descending aorta	0.97	0.93-0.99
Max area, abdominal aorta	1.0	1.0
Min area, abdominal aorta	0.99	0.99-1.0

Strain	ICC	CI95%
Strain ascending aorta	0.74	0.51-0.87
Strain descending aorta	0.77	0.55-0.89
Strain abdominal aorta	0.99	0.98-0.99

Pulse Wave Velocity	ICC	CI95%
Time between ascending and descending aorta	0.98	0.96-0.99
Time between descending and abdominal aorta	0.99	0.98-0.99

aorta showed slight variation. The discrepancy in those results can be attributed to the movement in and expansion of the ascending and descending aorta compared to the abdominal aorta, as the abdominal aorta has less distension between systole and diastole. Therefore, it can be more accurate to track. The variation for measuring the ascending and descending aorta can be improved using a greater sample size. Nonetheless, the results prove that this method of calculating aortic strain is in fact reproducible.

Whether MRI can be used to calculate aortic distensibility still needs to be researched on a larger scale before it can be authenticated. The results from this study, however, prove that MRI itself is sufficient in indicating the critical underlying cardiovascular risk factor for age-related aortic stiffening. The measurements of aortic strain via MRI and ARTFUN can therefore have a major contribution in the future improvement of public health.

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# Does Food Availability Play a Role in the Nutrition of Baltimore Inhabitants?

By Kristin Deuber, Class of 2011

## *Public Health Studies*

Data collected for Baltimore Healthy Eating Zones, an obesity-prevention program aimed at Baltimore City African American youth led by Dr. Joel Gittelsohn, PhD, MS.

### **Background and Rationale**

Many of the causes of heart disease, cancer, and cerebrovascular disease result from behaviors and habits developed during childhood and adolescence. Risk factors that increase an individual's chances for developing such diseases include high blood pressure, high cholesterol, and obesity. Members of the communities surrounding Oliver Recreation Center and Cecil Kirk Recreation Center in the Greenmount East neighborhood of Baltimore, Maryland, are at a considerable risk for developing diet-related health problems. The most recent data available, from 2008, determined the leading cause of death in the Greenmount East neighborhood to be heart disease, responsible for 25% of deaths that year. In 2008, contenders for the leading cause of death in this community include cancer and cerebrovascular disease, responsible for 18% and 7% of all deaths, respectively. Rates of mortality are consistently higher in Greenmount East than in Baltimore City when compared across

all age groups.

These risk factors were the prime catalysts behind the start of the Baltimore Healthy Eating Zones, a multi-faceted project, led by Dr. Joel Gittelsohn at the Bloomberg School of Public Health, that promotes healthier food choices, consumption behaviors, and environments for African American youth in various city neighborhood recreational centers. During the summer of 2009, the project gathered participants for the study-African American, low-income, ages 10-14-from Oliver Recreation Center and Cecil-Kirk Recreation Center. Later, throughout the summer of 2010, participants completed "food frequency surveys," assessing what they ate in the past week, and their exposure to intervention materials in local food sources during the prior year.

As one of the most difficult goals of this intervention, influencing behavior change depends primarily on education. In order to supplement the education pertaining to healthy eating behaviors and develop more effective intervention

models, Baltimore Healthy Eating Zones also assessed the dietary environment of participants. Comprehensive inventory checklists were completed in July 2010 for all food sources within a quarter-mile radius of each recreation center, and a subsequent assessment evaluated the food-purchasing environment and the availability of specific (health) foods. These environments are likely to be the most convenient and frequently visited stores by each neighborhood's African American youth.

The food source surveys provide insight into the effectiveness of the summer 2009 intervention, by evaluating the storeowners' changes in inventory based on advocacy of healthier foods. Evaluation of the food sources provides further insight into the varieties of foods available to the neighborhood, given that the majority of the neighborhood depends on local food sources for most of their nutritional needs. By examining the types of foods that are available, correlations can be drawn between the food environment and nutritional status of

the surrounding population.

In targeting children and adolescents, Baltimore Healthy Eating Zones has the potential to influence the lives of youth at a critical point in their lives, during which they are capable of developing lifelong behaviors and habits. Intervening at this transitional period fosters healthier nutritional habits among the community's youth and ultimately reduces the risk for diseases later in life.

This study summarizes the environmental food source data from all sources within a quarter-mile radius of Cecil-Kirk Recreation Center and Oliver Recreation Center, and proposes possible associations between the food environment and the nutritional health of the residents in surrounding neighborhoods.

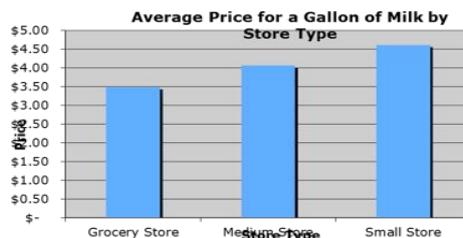
## Methods of Food Source Assessment

### *Environment*

The Food Source Environment portion of the survey evaluated the features of the food sources. We asked storeowners if they accepted 'WIC' (Women, Infants, and Children, a federal grant program to supply women and children with supplemental foods) and food stamps. Observationally, we noted the typical age demographic of the customers and the ethnicity of the storeowners. Classifications for food sources ranged from supermarkets and farmers markets to pharmacies.

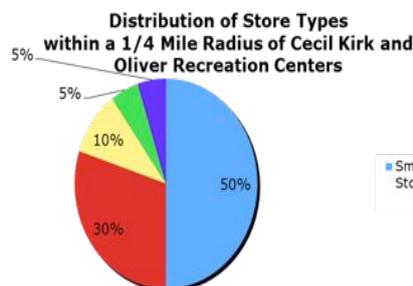
We further distinguished special features of these food sources on a checklist, differentiating between service specialties, such as carryout

or delivery, and extraneous offerings such as alcoholic beverages and vending machines.



### *Availability*

A list of several healthy foods was used to record their availability during our inventory assessment. By browsing the store, we observed and documented the available inventory, and determined whether certain items correlated to our health list. The variety of fresh fruits and vegetables available was recorded separately as 1-2, 3-5, 6-10, or 11+. Milk availability was noted separately as whole milk, 2% milk, 1% milk, skim milk, and low fat chocolate milk. The price of low fat milk was recorded in US dollars on a per gallon basis. The assessment of each store was completed by noting the availability of a variety of specific foods, snack items, and condiments.



## Results and Discussion

Of all of the food sources within the quarter-mile radius, 25% of them served carry out. Of all

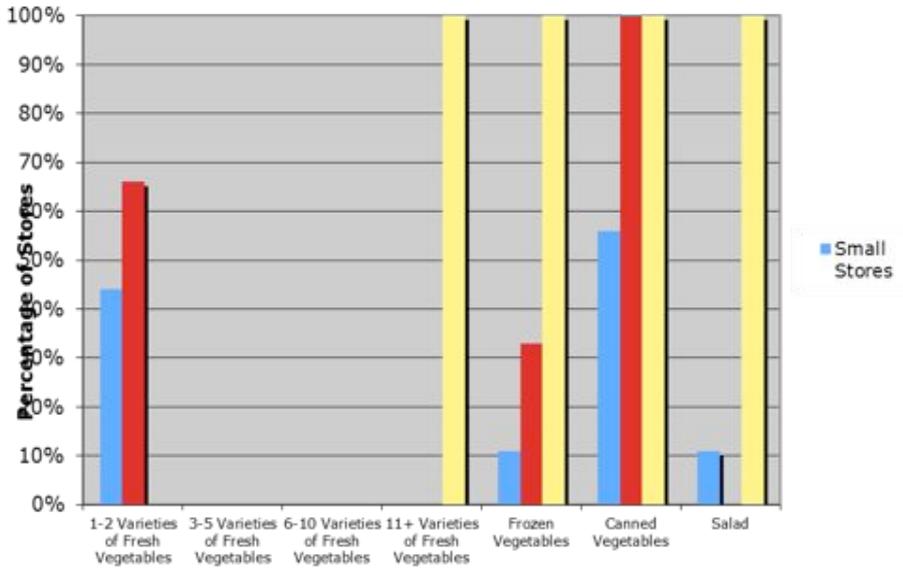
sources, 10% sold alcohol in addition to food. Forty percent of the stores sold the majority of their products from a glass-enclosed case, preventing consumers from being able to read nutrition labels before purchasing. The large majority, approximately 75%, of surveyed stores accepted food stamps, and 35% accepted WIC.

Representing only five percent of the total food sources in the range, grocery stores were the least prevalent type of food source within the quarter-mile radius of Oliver Recreation Center and Cecil-Kirk Recreation Center. Similarly, gas stations and pharmacies represent five percent and 10%, respectively, of the types of food sources. On the other hand, small stores consist of 50% of the food sources within the areas surrounding the recreational centers, and medium stores represent another 30%. Thus, it is likely that individuals living in the low-income neighborhoods surrounding Oliver Recreation Center and Cecil-Kirk Recreation Center will utilize a small store (as opposed to a grocery store) as their primary food source, simply due to their prevalence and convenience.

### **Vegetable Availability**

While the single grocery store stocked more than 11 varieties of fresh vegetables, only 44% of small stores had fresh vegetables and only 66% of medium-sized stores had fresh vegetables. Of the small and medium-sized stores that did have fresh vegetables, only one or two varieties were available. Frozen vegetables, canned vegetables, and salad were all available at the grocery

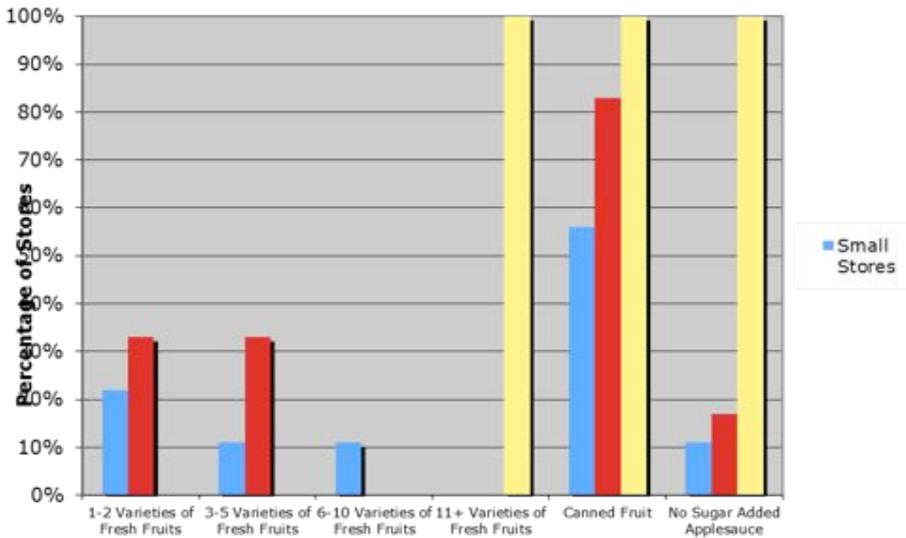
**Vegetable Availability by Store Type**



store, but frozen vegetables were only available at 11% of the small stores and 33% of the medium stores, canned vegetables were only available at 56% of the small stores, and salad was available at only 11% of the small stores. These findings illustrate a limited supply of fresh and non-perishable vegetables in most small and medium stores, and further highlight the limited nutritional availabilities in these communities.

**Fruit Availability**

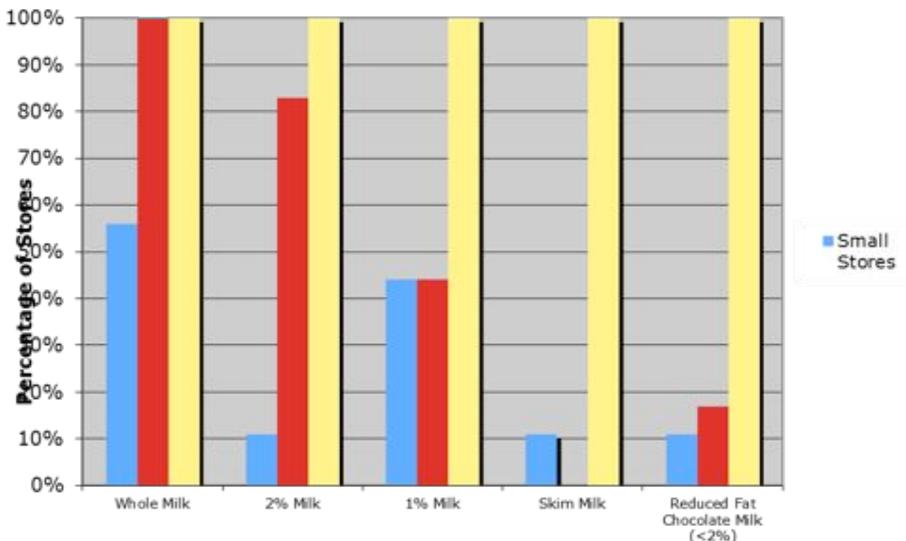
**Fruit Availability by Source Type**



More than 11 varieties of fresh fruit were available at the grocery store. Amongst small stores, 22% had one or two varieties, 11% had three to five varieties, and 11% had six to 10 varieties of fresh fruit available. The remaining 67% of the small stores did not stock fresh fruit. Thirty-three percent of the medium stores had one to two varieties and 33% had three to five varieties of fresh fruit. The remaining 33% of medium stores did not stock fresh fruit. Canned fruit was available in the grocery store, in 83% of medium stores, and in 56% of small stores. These statistics indicate that even non-perishable fruit was not stocked sufficiently in small and medium-sized stores.

**Milk Availability**

**Milk Availability by Source Type**



Whole, 2%, 1%, and skim milk were all available in the grocery store. Whole milk was available in all of the medium stores, but only in 56% of the small stores. Two-percent milk was available in 83% of the medium stores and in 11% of the small stores. One-percent milk

was available in 44% of the medium stores and in 44% of the small stores. In dramatic contrast, skim milk was available in only 11% of the small stores.

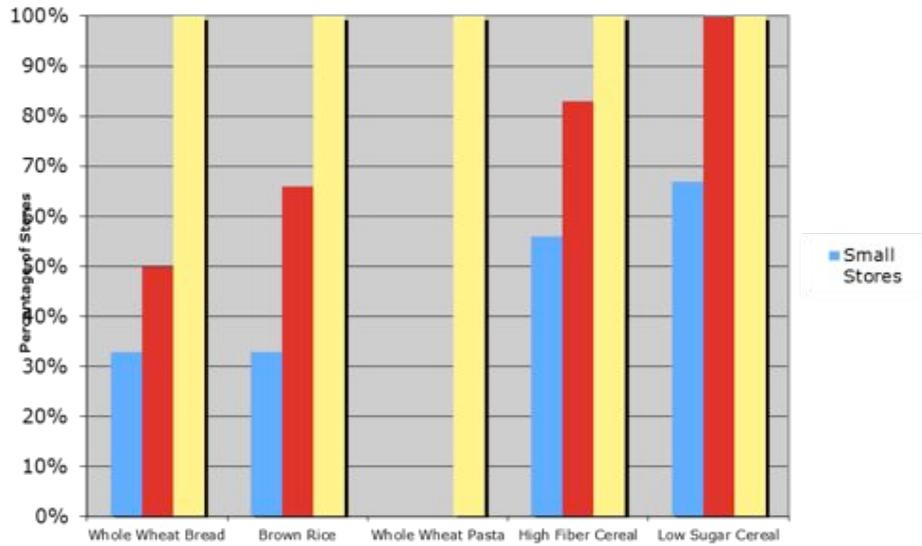
### Protein Availability

Surprisingly, none of the stores within a quarter-mile radius of either recreation center sold lean or extra-lean ground meat. Fresh fish was available in the grocery store and in 17% of the medium stores. Without the availability of lean protein, it is unlikely that families will purchase protein without excess fat and calories. Deli meat sandwiches were not available at the grocery store, but were sold in 33% of the medium stores and 22% of the small stores. While deli meat is often lower in fat and calories, the condiments added to the high-cost sandwiches at prepared-food locales contribute large amounts of excess fat and calories. These results help highlight the disparity in protein availability for these various food source types.

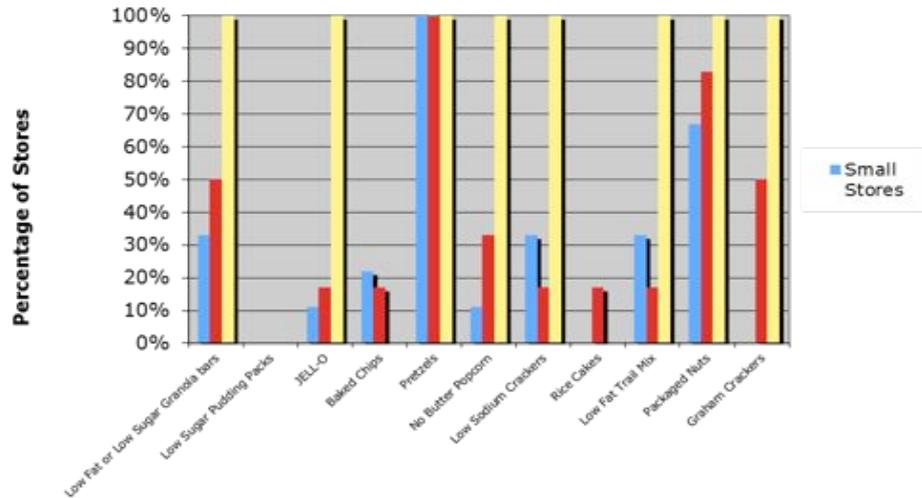
### Grain Availability

Whole wheat bread was available at the grocery store, at 50% of the medium stores, and at 33% of the small stores. Brown rice was available at the grocery store, at 66% of the medium stores, and at 33% of the small stores. Whole wheat pasta was only available at the grocery store. High fiber cereals, such as Raisin Bran, Fiber One and Shredded Wheat, were available at the grocery store, but only in 83% of the medium stores and in 56% of the small stores. Low sugar cereals,

**Bread and Grain Availability by Source Type**



**Snack Availability by Source Type**



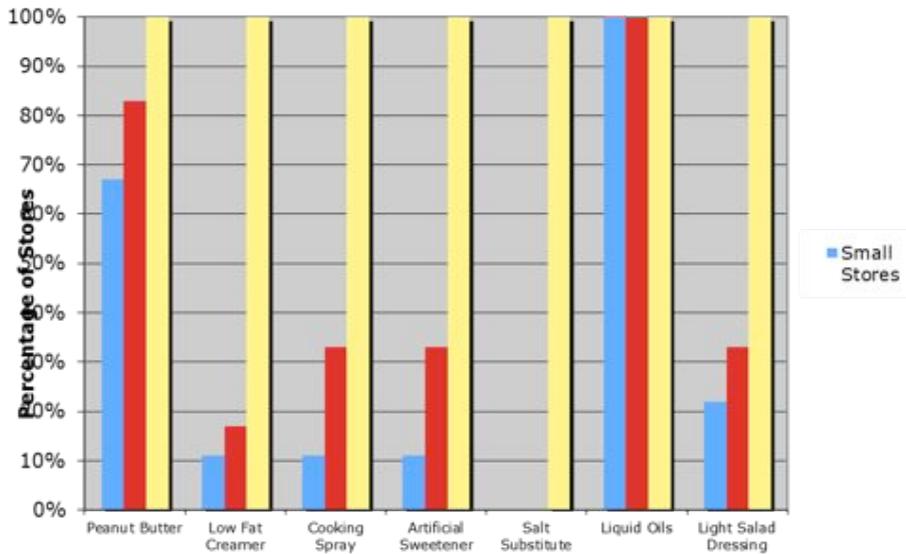
such as Cheerios and Chex, were available at the grocery store and in all of the medium stores, but in only 67% of the small stores. These results indicate that breads and grains with higher nutritional content were far less prevalent at small and medium stores.

### Snack Availability

Our assessment of snacks in the grocery store, as well as in medium and small stores, included a list of relatively low fat and low sugar snacks. Low sugar pudding packs

were not available in any of the stores within a quarter-mile radius of either recreation center. Baked chips were not available in the grocery store, but were sold at 17% of the medium stores and at 22% of the small stores, a high prevalence in small stores that we had not expected. Pretzels were available in the grocery store and in all of the medium and small stores. Other healthy snacks exhibited similar prevalence; the lack of healthy snacks in the medium stores and small stores suggests that neighborhood inhabitants have limited ac-

Condiment Availability by Food Source



cess to healthy snacks at their local food sources.

### Condiment Availability

Each of the following condiments were available at the grocery store. Peanut butter was sold in 83% of the medium stores and in 67% of the small stores. Low fat creamer was available in 17% of the medium stores and 11% of the small stores. Cooking spray and artificial sweetener were each available in 33% of the medium stores and 11% of the small stores. Salt substitute was not available in any of the medium or small stores. Liquid oils were available in all of the medium and small stores. Light salad dressing was available in 33% of the medium stores and 22% of the small stores. These highlights suggest the lack of availability of common low calorie, low sugar, low salt, or low fat products within the local neighborhood food sources, thus limiting access for residents.

### Conclusion

The areas surrounding Cecil-Kirk Recreation Center and Oliver Recreation Center likely represent an overarching trend throughout Baltimore City's low-income neighborhoods. Small and medium stores, which offer higher prices and smaller selections of nutritional foods compared to the area grocery store, populate these areas. For example, the lack of availability of low fat milk (less than 2% milk fat) in small stores is striking: according to the original data (not shown on the chart), only 44% of the small stores sold low fat milk, and of those who did sell low fat milk, the prices were exceedingly higher than the prices of low fat milk at larger grocery stores. While the nature of this study limits causal associations, without convenient access to larger stores with a wider selection of healthy foods and lower prices, the inhabitants of the Cecil-Kirk and Oliver neighborhoods are unlikely to consume products such as fresh fruits and vegetables, skim milk, and whole wheat bread (among

other foods), which are not available in the conveniently located small stores.

This poses barriers to anti-obesity efforts within the city. Potential interventions include not only the promotion of certain foods within small and medium stores to encourage consumers to purchase healthier options, but also efforts to improve the consumers' food environment. A common reason that small and medium stores often do not stock healthy foods such as fruits, vegetables, and fresh meat and fish, is because these items are perishable. Providing storeowners with means by which they might store such items at monitored temperatures would allow storeowners to assist in changing the food environment of their consumers. In addition, perishable food tends to be more expensive than non-perishable foods. These price differences are exaggerated within the small and medium food store environment (as seen in the distribution of milk prices between small and medium stores versus large grocery stores), forcing storeowners to sell perishable items at higher prices. Allowing storeowners to purchase healthier (perishable) foods at subsidized prices might offer one way to encourage small and medium storeowners to increase their supply of healthier foods.

By increasing availability and affordability of healthier products in easily accessible locales, consumers will have greater opportunities to make healthier food purchasing decisions. Promotion of healthier options in small and medium stores will also facilitate consumers' decision making. Ultimately, the supply

of the healthier foods in small and medium stores and demand by the consumers will generate a cycle of healthier food purchasing (and selling) behaviors.

# The State of Health in a Post-War Era: The Bosnian Example

By Tamara Arnautovic, 2011

*Public Health Studies*

Data collected by: Zavod za Javno Zdravstvo, FBiH, The Institute for Public Health, Federation of Bosnia and Herzegovina

## Introduction: War, Politics, and Health Care

Dr. Safet Omerović stood somberly in front of media at the opening of the first annual “Health Care Days” in Sarajevo, Bosnia and Herzegovina on Tuesday June 8, 2010, and stated that Bosnia needed to “focus on primary care”. While his statement may seem deceptively innocent, Omerović underscores a long-standing concern of the country. Four years into the implementation of the Public Health Institute of the Federation of Bosnia and Herzegovina’s new health-care system, the Department of Health deemed that a shift towards focusing on methods to improve and equalize the quality of healthcare across all 10 cantons of the Federation is necessary. Though, fifteen years have passed since the devastation of the Bosnian war, the Department of Health and the Public Health Institute are still recuperating from its aftermath. In conjunction with the Department of Health, the Public Health Institute of the Federation of Bosnia and Herzegovina intends to model the country’s health care system off

of a family-medicine centered approach. Current figures reveal that 16% of the population is uninsured. Coupled with the dire economic recession that faces the country, this post-war nation struggles to provide adequate support for its people.

In comparison, pre-war Yugoslavia enjoyed a universal health-care system. After the Bosnian war ended in 1995, the country fragmented into two distinctly recognized territories: the Bosnian Federation and the Serbian Republic. This politically-motivated separation, coupled with a lack of continuously updated population data, resulted in severe consequences relative to the country’s ability to accurately assess, correct and provide for the state of health care. The Public Health Institute is therefore only responsible for the Bosnian Federation (FBH) portion of the country. Furthermore, the FBH established 10 cantons within itself, all of which currently operate as separate countries. There exists a great disparity between the level of development, wealth and education amongst the cantons. Of these striking inequalities, most apparent

are the differences in health-care accessibility.

In order to address these concerns, the Public Health Institute began several years after the war to annually collect data across the 10 cantons pertaining to the state and accessibility of primary health-care. Data collection has recently been completed for the 2009 cycle; the current work focuses on analyzing these findings and determining which strategies yielded or did not yield positive results in their respective locales. The goal of such comprehensive surveys is to offer conclusive data for government policy changes, in order to more equally distribute health care services throughout the country. The following article will attempt to provide insight into the inner workings of the Bosnian Federation’s health-care system, the current state of health of Bosnian residents, and will suggest methods in which small-scale changes could elicit large-scale improvements.

## **Bosnian Health-Care: A Closer Look**

The Bosnian system of health-care is decentralized: all cantons have autonomy over their own constituents in terms of decision-making pertaining to preventative health-care. Nonetheless, decisions related to strategy, coordination and guidelines are regulated federally. Three categories of health-care providers characterize the Bosnian health-care system: primary care providers, specialists and hospital-workers.

The Bosnian government and the Ministry of Health's main goal is to promote primary care by introducing 'family medicine' (FM) as the new standard of medicine. The implementation of the FM model in Bosnia is being facilitated through the training of 'family medicine teams' comprised of doctors and nurses that specialize in family medicine. Clinics that provide family medicine services have also been refurbished with new equipment. By introducing the FM model, the Ministry of Health plans to improve cost control and initiate changes in the health financing method. Results are expected to suggest that the FM model is more accessible to patients while concurrently offering a myriad of health promotion and prevention-oriented services. Another anticipated outcome of the FM model is improved patient satisfaction through better promotion of patient-doctor communication, enabling greater selection and improvement of health-care continuum fluidity.

From an organizational perspective, this process has three main

phases: 1) restructuring primary care medicine, 2) strengthening health-care management and the quality of political dialogue and 3) monitoring and evaluating progress achieved. In the first phase, 248 clinics underwent evaluation and renovation. Approximately 264 family medicine clinics received a new standard set of equipment and furniture. The results of this phase showed that 64% of health-care professionals work under the principles of family medicine, whereas 36% of health-care professionals still operate under the principles of general medicine. The second and third phases are a continuous process that will require consistent effort from all parties involved.

### **Determinants of Health in Bosnia**

A large part of the work that the Institute of Public Health does is evaluating the main factors that determine the well-being of the Bosnian population. The following is a compilation of results from the 2008 survey of the major determinants of health:

#### *1. Socioeconomic Status*

Results measuring the standard of living in the Federation indicate that 15% of the total population lives under the general poverty line. The single most influential factor contributing to living below the poverty line is in the number of children per family. The poorest families have three or more children, and typically have a head of the family that has completed only a primary level of education. In addition to the surprising data

on families of low socioeconomic status, 44.5% of the working-age population is unemployed, adding conflict to the issue of health-care accessibility, and placing strain on the overall health-care system.<sup>8</sup>

#### *2. Lifestyle Habits*

Statistics from research concerning risk factors and its effects on the health of different age brackets of the population demonstrate that smoking, lack of physical activity and poor diet frequently led to the most damage. In fact, chronic diseases such as heart disease, related malignancies, and diabetes, all of which have been correlated to the mentioned unhealthy lifestyle habits, are the main causes of death in the Federation.<sup>8</sup>

#### *3. Poor Nutrition*

To combat the increasing rates of malnutrition, the Public Health Institute of FBH launched a large-scale research project that focused on the assessment of problems related to micronutrient deficiencies in diets, as well as on promoting healthier lifestyles. A previous study of nutritional habits was conducted on children aged 0-5 and adults aged 25-64 found comparable percentages of malnutrition to those of well-developed countries. However, a somewhat higher percentage of children experienced stunted growth, underscoring the necessity of promoting a balanced diet in early childhood, and breastfeeding in young mothers. Notably, 17% of children aged 0-5 are overweight or obese. This statistic represents an increase of 5% in the same age

group since the year 2000, a startling trend that is not unique to Bosnia.<sup>8</sup>

#### 4. *Smoking*

Based on the results from the survey, smoking represents the biggest risk factor to the population's overall health. More than a third (37.6%) of adults smoke: 49.2% of the male population and 29.7% of the female population are smokers. Another study aimed at examining the smoking and drug habits of school-aged children, found that 14.3% of children aged 13-15 smoked. The school-aged children were asked at what age they first started smoking; 36.6% reported that they started before they were 10 years old.<sup>8</sup>

#### 5. *Air Pollution*

Fuel exhaust from cars and the heating of homes during winter represent the two largest contributors to air pollution in FBH. The basic indicators used to measure air pollution are SO<sub>2</sub>, smoke, and nitrogen oxide (NO). Sarajevo is known to have a chronic and serious smog problem, especially during the winter months. From 2004 to 2006, smog concentration levels exceeded the allowed threshold level of 30 ug/m<sup>3</sup>.<sup>8</sup>

#### 6. *Handling of Waste Matter*

About 270 kg of waste matter is produced per capita each year. The primary concern with solid waste is its uncontrolled disposal in legal and illegal dumps. More hazardous types, such as medicinal or indus-

trial wastes, are usually collected indiscriminately with municipal waste. In the Sarajevo canton alone, 69.4% of untreated infectious waste is collected with the municipal waste. The study also found that most active landfills did not meet hygienic standards, and thus posed a serious threat in spreading infectious diseases.<sup>8</sup>

#### 7. *Quality of food*

Maintaining an acceptable level of food quality is a rudimentary concern. In 2008, two epidemics of spoiled food were recorded and affected 83 individuals. Of the 10 most common groups of illnesses reported to the Department of Health in FBH, alimentary toxicoinfections are ranked seventh. In 2008, the laboratory for control of food analyzed 4,474 food samples and 358 water samples. The most common causes of chemical and microbial content in food and water were due to an increase in number of total circulating bacteria and the incorrect classification of heavy metals.<sup>8</sup>

#### 8. *Traffic Accidents*

Traffic accidents, injuries, and deaths steadily increased in 2008 as compared to previous years. The number of traffic accidents is quoted at 25,287 in 2006 to 29,578 in 2008. The number of traffic-related deaths concurrently is quoted at 206 in 2006 to 243 in 2008. This growth suggests the need for a Federal ministry-level safety intervention that would measure and control traffic accidents, as well as an intervention from the public

health level by means of introducing prevention campaigns.<sup>8</sup>

### **Conclusions and Possible Preventative Measures**

It is evident that the long-term transitions currently taking place in Bosnia directly affect the sustainability of its health-care systems and the health of the overall population. Demographic changes in the Federation are reflected by steady declines in birth rate, and by the consistent slight increases in mortality rates over the past several years. Despite growth in average income, pensions and numbers of employees, disparities between the wealthy and the poor continues to increase in Bosnia. All of the above factors contribute to the deterioration of the socioeconomic status of the overall population.<sup>8</sup>

From an epidemiological standpoint, residents of FBH most often die of circulatory system diseases (53.9%). The second most common reason of death is cancer (19.7%). Almost two thirds of all deaths are caused by these two groups. Also high on the list of most common cause of fatality are endocrine-related and metabolic diseases and malnutrition (4.0%).<sup>8</sup>

The major diseases registered in 2008 are characterized by an influx of chronic diseases. This is seen as being a direct consequence of the high prevalence of risk factors that cause the development of chronic diseases, such as smoking, obesity, poor diet and physical inactivity. Prevention programs have been deemed necessary to prevent these risk factors from further harming the health of the nation.<sup>8</sup>

Furthermore, mental disorders represent an important public health problem because of their significant usage of the health-care system.viii Leading mental disorders registered are those in the neurotic category, with stress-related and somatic disorders (41.3%) being the most prevalent. Concern regarding the mental health of the population is an important consideration that is being exacerbated by decreasing birth rates, unhealthy lifestyle habits (alcoholism, use of psychotropic substances, etc) and the poor overall socioeconomic status of the region.<sup>8</sup>

Considering the many economic and political challenges that have and continue to face Bosnia, the nation has progressed in implementing a functioning health-care system. The future is promising so long as the FM model continues to be put into practice throughout the Federation – especially rural regions – and politics are not permitted to hamper the Ministry of Health and Institute of Public Health’s careful methodology. The continued support of the international community, in terms of monetary aid would further help improve and expedite this transitional health-care process.

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# Sexual and Reproductive Health of Peking University College Students: An Examination on Education, Beliefs, & Practices

By Karen Hong, Class of 2011

*Public Health Studies*

## Abstract

Understanding the education, beliefs, and practices of Peking University students could potentially help with designing pertinent and effective SRH curricula, educating the public about sexual minorities, and removing barriers to accessing SRH services. After a review of *The Chinese Journal of Human Sexuality*<sup>1</sup>, it was evident that college students' sources of SRH knowledge, beliefs, and practices were not thoroughly examined within the last year in sexual and reproductive health (SRH) research. A survey was given to 176 Peking University students on SRH, which suggest that there are better methods for disseminating information, weak SRH knowledge, little acceptance of sexual minorities, and few attempts to access SRH services.

One of the most significant findings includes the inaccurate perception of HIV transmission. Also, there is a largely negative perception of HIV-positive people. These results reveal that more SRH education is indeed needed to create a more tolerant and informed

population of Peking University students.

## Introduction

Identifying SRH issues in China for social workers and researchers to implement solutions on SRH issues that affect China is a rising issue. Currently, there is scarce information identifying sexual and reproductive health (SRH) issues in China<sup>2</sup>. One of the most alarming factors is the lack of SRH education for youth in China<sup>3</sup>. This survey asks ground-breaking questions about attitudes towards sexual minorities and access to Chinese SRH facilities. The intent is to raise the awareness on various culturally sensitive topics such as the growing lesbian, gay, bisexual, and transgender (LGBT) community, the existing sexual and domestic abuse, and the causes of HIV/AIDS. According to *The Chinese Journal of Human Sexuality*<sup>1</sup>, the issues of sexual minorities are currently being ignored in China. Rape and domestic abuse victims do not have a strong forum in China to express their voices, and the drastic growth

of AIDS patients in China since 1989 underscores the importance in facilitating dialogue about HIV<sup>4</sup>.

The goal of this study was to generate more information on the current state of Chinese SRH. SRH is defined as “the reproductive processes, functions and system at all stages of life [and the] the right of access to appropriate health care services that will enable women to go safely through pregnancy and childbirth, according to the World Health Organization<sup>5</sup>. Furthermore, this research study also defines SRH to include being knowledgeable about safe sex practices and the prevention of Sexually Transmitted Infections (STIs), such as HIV/AIDS. This study broadens the discussion on SRH in China since it is still a newly developing area of public health research. Through this research study, it will be possible to discover better ways of disseminating SRH knowledge, identify sexual minority discrimination, and acknowledge whether access to SRH services is adequate. If it is identified that there are issues in these areas, then they will be more specifically defined for

public health workers to implement programs for improvement. While personal sexual practices of study participants have been surveyed in the past, there is little information about ease of access to SRH services in *The Chinese Journal of Human Sexuality*<sup>1</sup>.

With China's rapid economic and social growth in the last thirty years, it is most likely that perspectives on SRH issues have also dramatically changed. Thus, this research study inquires on taboo topics but also provides an up-to-date assessment on the current education, beliefs, and practices of Peking University students, with an aim to help identify key topics that urgently need to be addressed in Chinese SRH. Furthermore, the study also defines SRH to include being knowledgeable about safe sex practices and the prevention of Sexually Transmitted Infections (STIs), such as HIV/AIDS.

## **Materials and Methods**

In order to carry out the study, the survey included SRH knowledge questions, SRH education preferences, attitudes toward the LGBT community, attitudes toward rape and domestically abused victims, and the ease of access of SRH services for college students and their willingness to use those SRH resources. The main method of creating the study survey was a literary review of *The Chinese Journal of Human Sexuality*<sup>1</sup> (February 2009 to January 2010), provided by Professor Hu Peicheng of Peking University Medical School who is also Editor-in-Chief of *The Chinese Journal of Human Sexuality*.

The main method of formulating the SRH educational knowledge questions was taken from Peking University SRH course. Furthermore, personal interviews with Dr. Wang Yang, Daisy Wang, and Linda Arnade were used for enhancement of the knowledge in study design and to learn about the education, beliefs, and practices of Chinese college students through open-ended questions.

### *Instrumentation*

An original survey was designed for this research study. The study was originally written in English, and then translated into Chinese. The survey attempted to measure general information about the participant, the education, the beliefs, and the practices of Peking University students. In terms of general information about the participant, pictures of the demographic and identify sexual orientation were acquired. Current sources of education, preferred sources of education, and ability to answer SRH questions correctly were measured educational wise. In terms of beliefs, the survey measured the sympathy that students feel towards the LGBT community, people that are HIV-positive, and victims of sexual and domestic abuse. In terms of practices, the survey measured the number of students that access SRH services to identify popular SRH services and barriers to accessing SRH services.

### *Validity and Reliability*

In terms of content validity, the general information and beliefs sec-

tions were strong, but the practices and education sections were weak and weakest, respectively. There was adequate coverage of the topics of general information and beliefs to interpret the results. However, the practices section asked an open-ended question where students answered vaguely, making it difficult to come to a valid conclusion. For the education section, only a few specific questions were asked, thus interpretation of a student's overall SRH knowledge could not be assessed with validity. More breadth would be needed in this section for more content validity.

The reliability of the survey was not thoroughly tested. Thus, it is not possible to determine the repeatability or stability of the survey. In the future, should the survey be conducted again, an internal consistency test should be added in the form of additional questions similar to original survey questions but stated with different wording. By comparing the correlation of the responses to the two similar questions, the reliability could be better determined.

## **Results**

### *Description of the Sample*

The population for this study is defined as all Peking University-affiliated students, or students taking courses at the Peking University campus who completed the study survey during the sampling time frame from April 26, 2010 to April 30, 2010. For this survey, 176 participants were sampled with almost an even number of participants that identified as male or female. A

### College-level SRH Course Education

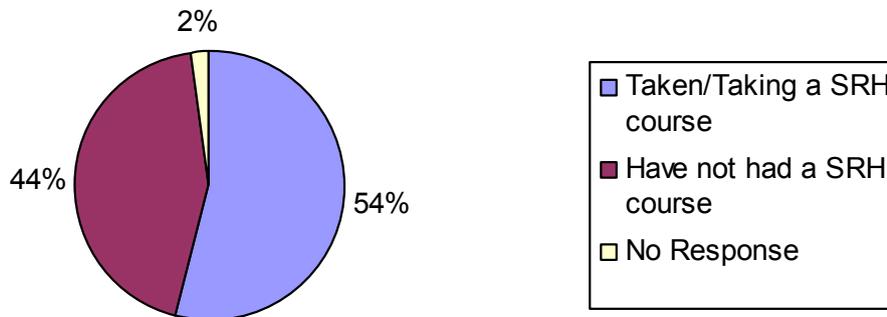


Figure 1. Percentage of respondents who have and have not taken a college-level SRH course.

### Sources of SRH Knowledge (People)

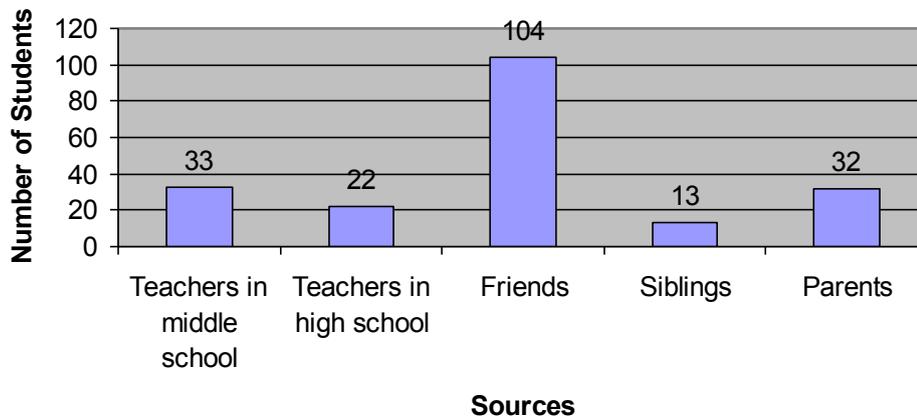


Figure 2. Number of students that prefer each type of source as their way of gaining SRH knowledge.

majority of participants identified as between the ages of 20-24. Almost all of the participants were only students at Peking University, and not affiliated with another university. There were about the same number of students who responded from natural sciences, social sciences, and humanities majors and a portion who were still undecided on their major. Slightly more than half of the participants identified as having taken a SRH college source according to the Figure 1. Finally, almost all students identified as straight in sexual orientation.

#### Education Preferences Results

Friends were by far the most popular source in terms of people as education sources, and it was evident that books/magazines were the most popular media source for SRH education. Out of the answer choices offered, participants most preferred way to access SRH knowledge through course lectures as illustrated in Figure 2.

### Are Women Born with All the Eggs They Will Ever Produce? (Course Group)

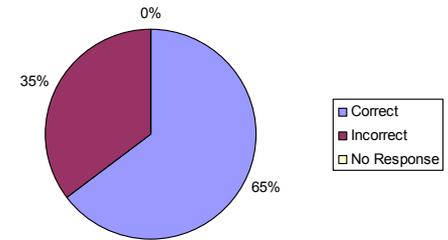


Figure 3. Percentage distribution of SRH college course respondent's accuracy in identifying whether women are born with all the eggs they will ever produce.

#### Educational Knowledge

The sample that was currently taking a Peking University college course in SRH answered a question on female reproductive anatomy correctly about five times more than the random sample. In addition, there were a higher percentage of students in the SRH college course who answered a question on female reproduction correctly than the random sample of students as shown in the Figure 3.

Only 17% of participants were able to identify blood, semen, and vaginal fluids as methods, and the only methods, of HIV transmission as shown in Figure 4. 83% of respondents answered the question incorrectly or partially incorrectly. Identification of breast milk as a HIV transmission fluid was not tested on the survey. A majority of participants knew that using one condom is more effective than using two condoms at once as form of pregnancy prevention.

#### Perceptions of Sexual Minorities Results

Reluctant acceptance of sexual minorities was shown from the surveys. According to the survey results, 35% of the participants reported that if they discovered their friend was lesbian, it would have a slightly or extremely negative impact on their friendship. Also, 39% of the participants reported that if they discovered their friend was gay, then it would have a slightly or extremely negative impact on their friendship. 40% of the participants reported that if they discovered their friend was bisexual, it would have a slightly or extremely negative impact on their friendship. 66% of the participants reported that if they discovered their friend was transgender, it would have a slightly or extremely negative impact on their friendship. 71% of the participants reported that if they discovered their friend was HIV-positive, it would have a slightly or extremely negative impact on their friendship. In addition, 19% of the participants reported that if they discovered their friend was raped, it would have a slightly or extremely negative impact on their friendship. 16% of the participants reported that if they discovered their friend was domestically abused, it would have a slightly or extremely negative impact on their friendship.

#### Practices of Accessing SRH Services Results

97% of the participants reported they have never used SRH services, with Figure 5 showing that 40% of students do not feel comfortable accessing SRH services alone. Figure 6 shows that 59% of students claim to not access SRH services because

### Perception of Domestically Abused Victims

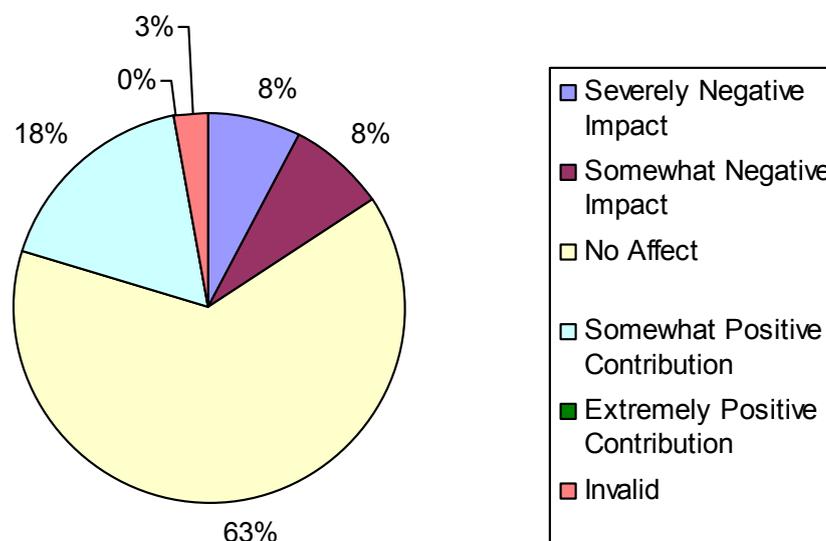


Figure 4. Percentage distribution of perceptions of a friend should they tell the respondent they have been domestically abused.

### Comfort in Accessing Services

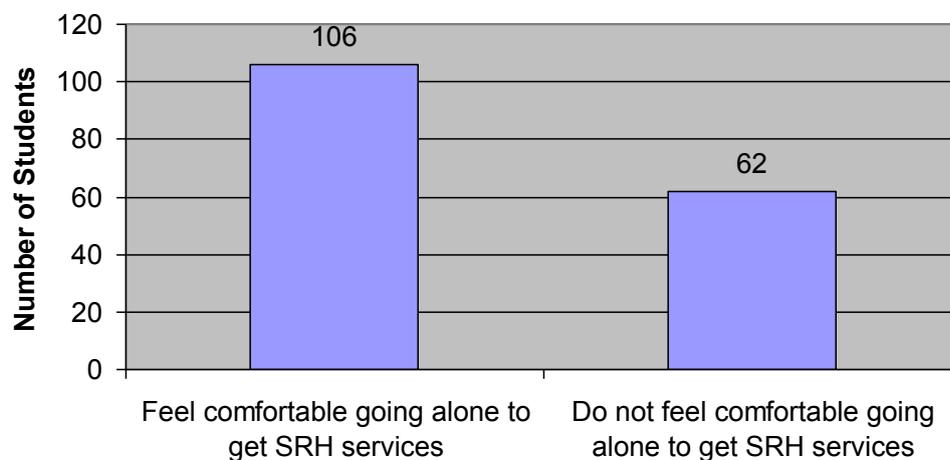


Figure 5. Number of respondents that feel comfortable or do not feel comfortable accessing SRH services alone.

they do not know where to go. According to the Figure 6, the one other prominent reason was that the participants felt they had no reason to access SRH services. The two major services that participants would access if they used SRH services would be family planning services and birth control services,

respectively. When asked what source they would use to receive SRH services, a large majority of participants cited “hospital.”

### Discussion

The motivation of this study was to gain a better understanding

of the education, beliefs, and practices of Peking University students in SRH. With the western influences becoming more prominent and the economic growth affecting the population's traditional ways of thinking in China, it is critical to educate the young population on the perspectives of youth on SRH. This research study hypothesized that there are better methods for disseminating SRH information, weak SRH knowledge, little acceptance for sexual minorities, and few attempts to access SRH services. In general, the study's findings agreed with these statements.

#### *Education Preferences*

The education data suggested that while friends are currently the main source of SRH information for participants, participants preferred to learn SRH in a formal learning environment. This preference toward formal learning environments may be because this is the traditional way to teaching SRH. In a study on migrant workers aged 15-49, chief methods of distributing contraception education was through lectures and material distribution.<sup>6</sup> Subjects may have had a hard time imagining any other methods for learning about SRH. Also, SRH is not heavily emphasized in middle school, and even less in high school; this is a possible explanation for the significant number of students rely on friends for advice on SRH. The problem with this trend is the unreliability of the information that students are receiving. Because parents and teachers traditionally discourage dating before college, participants

are less likely to use traditional adult or professional figures as a SRH resource.<sup>7</sup> Furthermore, parents are often uncomfortable talking to their children about these issues because they themselves were not well-educated on SRH.<sup>7</sup> All these factors explain why friends are the most frequently accessed SRH resource probably because they are easily accessible and participants felt safe confiding in them.

Dr. Yang, a doctor that works in the Department of Dermatology and Venerology of Peking University First Hospital, believes that the internet plays a crucial role in the attainment of information.<sup>8</sup> Given this, it is surprising that the internet ranked fourth as the most frequently used source, well below friends, books, magazines, and television. This may be due to the wording of the source description, which was not inclusive of all websites, but only SRH websites. Stating "SRH websites" may have been too formal, and participants may not relate this to the informal forums, blogs, and chat rooms that participants may more frequently use to access SRH information online. In Huang's study about migrant workers, it was found that the top 2 ways to acquire contraception knowledge was through publications and television programs,<sup>6</sup> which were the second and third highest ranking sources of SRH knowledge in our study, respectively.

When participants were asked about how they would have liked to learn about SRH as a teenager, the second most popular answer was that they did not feel that SRH education was necessary (Figure 2) because this issue was not impor-

tant to them as a teenager. This may be true for Chinese youth because they tend to be involved in their first relationship during the college years according to Dr. Yang. Furthermore, this seems to be a popular sentiment of the Chinese culture that SRH doesn't need to be talked about because once one becomes sexually active, one just "knows" other idealistic options. For example, if "friends" was listed as a preferred option, perhaps that would have been the most popular choice. Thus, while it is possible to speculate on the results of these two questions, there is not enough consistency to draw firm conclusions.

#### *Educational Knowledge*

From the question about female anatomy, it is possible to see that a larger percentage of participants who took the Peking University SRH course answered the questions correctly. However, it is disappointing not to see almost all the SRH college course participants get the questions correct because the right answers were mentioned in their SRH course. Thus, it indicates that although the SRH college course increased the percentage of correct responses to the questions, many of the participants did not attend class on the day the answer was mentioned, or many did not retain the information they learned.

One of the most important findings of the survey was that 72% of participants could not identify at least half of the possible ways of HIV transmission listed in the survey and 83% of participants could not identify all of the HIV transmission methods (Figure 4).

This is a large majority that cannot be ignored. As HIV is a rising problem in China<sup>4</sup>, it is necessary for youth to understand how HIV is transmitted and not transmitted. Dr. Yang stated that a majority of her HIV cases were primarily caused through needle sharing or blood transfusions<sup>8</sup>, so it is not yet a major concern as a STI. College may not feel as affected by HIV because they are in monogamous relationships, and therefore have a low risk of contracting HIV. It is true that in a survey conducted at four Beijing universities, out of the 236 participants who had sexual partners, a majority (58.5%) have only had one partner.<sup>10</sup> However, because students are unsure how HIV is transmitted, they tend to be wary of HIV-positive people.

### *Perceptions of Sexual Minorities Results*

Overall, it seems that there is an overwhelming amount of negative feelings towards the LGBT community. There are only a small percentage of participants for all the sexual minority groups that would have thought their friendship was stronger if they found out their friends was part of the LGBT community. Since most of the participants identified as straight in sexual orientation, it is possible to see why they would be uncomfortable with people of different sexual orientation. Lack of information about these minority groups may cause participants to feel uncomfortable around someone who identifies as lesbian, gay, bisexual, or transgender. However, it is important to note that a large

percentage of people were neutral, indicating that participants would not change their feelings about a friend should they reveal they are lesbian, gay, or bisexual. Conversely, revealing a transgender friend yields a more negative response. This may be because lesbians, gays, and bisexuals are more comparatively more discussed in contemporary Chinese culture than transgender population. Being less understood, they would also be less accepted by participants.

Along with transgender population, a significant portion of participants also reported that they would react negatively toward HIV-positive friends. Similar to the transgender category, participants had less neutral responses than with the lesbian, gay, and bisexual categories. Thus, it seems that transgender population and HIV-positive people might be the most misunderstood sexual minority populations.

In contrast, the perception of domestic violence victims and rape victims was more positive than towards the LGBT and HIV-positive community. In these cases, a majority of participants said that they would be neutral if they found out their friend was a victim (domestic violence victims and rape victims, 63% and 68% respectively). This seems like a reasonable result because, unlike the LGBT community, being a victim of domestic violence and rape are not perceived as a lifestyle choice. Victims may even incur more sympathy from participants. This is consistent with the larger percentage of participants, in contrast with the LGBT categories, that reported that there would be a degree of positive contribution to a friendship

should they find out their friend is a victim. This is one explanation of the response from participants.

### *Practices of Accessing SRH Services Results*

In terms of accessing SRH services, Dr. Yang seems correct in stating that not many college students will get professional help with SRH-related issues<sup>8</sup>, as 97% of respondents indicated that they have not used SRH services. Dr. Yang listed the lack of privacy as the primary reason why patients avoid accessing SRH services<sup>8</sup>, which would be one explanation why 40% of students did not feel comfortable accessing services alone (Figure 5). Linda Arnade, a NGO worker at Beijing Aizhixing Institute, expresses that one of her biggest concerns with SRH in China is the lack of SRH services and medical discretion<sup>11</sup>. Not only is access to a hospital sometimes difficult for citizens, but there is no real anonymous HIV testing in China. While it is possible to give a fake name to take a HIV test, if the patient tests positive, they are required to report their true identity for government purposes<sup>12</sup>. Perhaps for the participants, SRH services are not yet relevant for them. Thus, they do not know where to access services (Figure 6) because they never had an urgent reason to do so. After all, if the college students are not looking to get pregnant, or may not be sexually active, then they probably would not seek SRH services. However, participants do not seem embarrassed to do so if they should need it. Despite this observation, it is not possible to predict

what participants would do in a real situation, since an overwhelming majority of the participants have never accessed SRH services. Thus, their projections of what they would do in the future are only a measure of possible SRH practice, not actual SRH practice.

### *Limitations of the Study*

The design of the survey had limitations because the primary literary review consisted of only the twelve most recent journal issues of *The Chinese Journal of Human Sexuality*.<sup>1</sup> This implies that there is a large volume of data related to this study not reviewed. However, after a PubMed search using a variety of combinations of the key words “China,” “Sexual health,” “reproductive health,” “college students,” and “education,” there were no significant studies that had contradicting conclusions from the journal review conducted. Furthermore, *The Chinese Journal of Human Sexuality* is the currently the most reputable SRH journal in China. While it would be ideal to do an even more extensive review of *The Chinese Journal of Human Sexuality*, given the rapidly changing SRH education, perceptions, and practices of youth<sup>12</sup>, it is not pertinent to go too far back into past articles because the older the research, the more likely the data is outdated. Therefore, given the time frame of the research study, a 12-month review of *The Chinese Journal of Human Sexuality* was deemed sufficient. The narrow focus of the literary review does not place significant limitations on the survey because it does not hinder

the researcher’s ability to interpret the results. The intention of the survey is to receive an initial idea of beliefs, practices, and perceptions of Peking University students so that further detailed research can be done on any of these areas in the future. Therefore, for the purposes of this short study, the data and information provided is sufficient for an examination of the research question.

### **Conclusion**

Overall, the hypothesis was correct in predicting the trends for the areas of education, beliefs, and practices. However, the following steps could be taken to improve upon this survey and produce more reliable results for further analysis.

First, to better compare SRH education sources and preferred SRH education sources, the answer choices for these two questions should be identical. The answer choices should be a comprehensive list that combines all answer choices from the two education source questions. That way, it will be easier to effectively examine what sources of information participants use to gain SRH knowledge, and what sources are preferred. Second, based on the survey, it is evident that participants were largely uninformed about HIV transmission. Further HIV/AIDS questions should be asked to explore the extent of HIV knowledge. For the perceptions section, it is recommended to ask subjects if they have ever had a friend tell them they were LBGT or HIV-positive in real life. This way, the hypothetical factor is taken out of the equation, and the study would be

accurate in assessing the perceptions of subjects. Finally, for the practices section, it is recommended to ask subjects if they have accessed SRH services, or they are sexually active. If the barriers to getting SRH services are examined for a population that most needs these services, it would give a more accurate measure of what prevents college students from accessing SRH services. This is because it will identify the barriers for a population that actually need to use SRH services. Since a large portion of the participants in this study did not even feel they need to use SRH services, it is not as effective in identifying barriers.

### **Acknowledgements**

I would like to thank Dr. Yang Wang, Daisy Wang, and Linda Arnade for taking the time to interview with me. I would like to thank my advisors, Ms. Lisa Folda and Dr. Xiaomei Wang for their support and guidance during this project.

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# Voltage Control of Protein Transcription in *S. Cerevisiae*

By Arjun Khakhar, Noah Young, Justin Porter, Daniel Wolozny, Henry Ma, Ang Andy Tu, Andrew Snavely, Jonathan LeMoel, Roberto Passaro, Kristin Boulter and Zheyuan Guo

## Introduction

Suppose Gabe, a fictional graduate student in the Biology Department, is out for some fun on Friday night. A yeast biologist, Gabe orders his drink of choice: a cold beer. As he takes his first sip, he realizes that he left his cells on a shaker back in the lab. At first, he's disappointed that he will have to leave his friends and return to the lab, but Gabe has cleverly engineered his strain of yeast for just this sort of crisis. He takes out his cell phone and texts the lab server: "Tube1\_Stop". The server sends an electrical signal to leads in the beaker, and within a few hours the yeast stops budding. On Sunday night, Gabe sends another text: "Tube1\_Start" and when he arrives in the lab on Monday morning, he has the right number of happy cells he needs to start his experiments.

Gabe engineered this strain of yeast to sense an applied voltage and to respond in a very specific and deliberate manner. Though useful for avoiding a late-night trip to the lab, the implications of such a system are even more far-reaching. Voltage signals are the language of computers; through electrical

engineering we can create, modulate, and process these signals with astounding speed and precision. However, simple "real-world" tasks like processing waste, producing useful chemicals, and adapting to an environment are grand challenges for electronic systems. In contrast, cells do such things as these with ease. Electronic systems have favorable control properties, while biological systems excel at actuation. What Gabe's hypothetical system does that is so revolutionary is that it uses electronic systems to control biological systems. It opens the doors for living organisms to understand the language of computers.

This past year, the Johns Hopkins's iGEM (International Genetically Engineered Machines) team, an undergraduate research group, made foundational advances in computer-to-cell communication. The team has been developing an award-winning transcriptional sensor for voltage in *Saccharomyces cerevisiae*, a microorganism that has been critical in the history of studying human genetic characteristics in homologs.

Last November, the iGEM project at Hopkins joined many others through group networking

around the world at the iGEM Jamboree. The projects at the jamboree ranged from engineering functions for DNA to act as a template for synthetic protein scaffolds (Slovenia), to developing a rapid detector for *Schistosoma*, a parasitic worm that can cause chronic illness to the body's internal organs (Imperial College London). All of the teams focused on the unifying notion of biology as an engineerable substrate, with obtainable parts such as bolts or washers, easy assembly processes similar to Legos™, and easy modeling processes similar to resistors and capacitors.

iGEM's mission is to make biology more like computer programming, where the programmer does not need to be familiar with each transistor in the machine, but at the same time must have an idea and understanding of code. This idea is crystallized in the notion of a BioBrick, described by iGEM's Parts Registry as "a standard for interchangeable parts, developed with a view to building biological systems in living cells."

Widespread engineering of biology has profound public health implications for society. Would it be easier to develop biological weap-

ons? Could an engineered strain of an otherwise safe organism (like yeast) find its way into the environment, causing harm to people or the ecosystem? Ideally, iGEM would make biology as simple and as safe as a Lego™ brick. To this end, our project included an investigation of the open source movement's foray into biology. In one instance, we observe the positive effects that open-sourcing code has on the software community: the more accessible the code, the less prone the application is to bugs and viruses. Open-sourcing DNA, the biological source code, can potentially quicken research to the point where malicious actions of any potential bio-hackers can be mitigated.

In addition to showcasing the work of young researchers in leveraging the power of the BioBrick concept for society's benefit, the iGEM Jamboree also serves as a source of inspiration. In fact, it was a project presented by Valencia universities in 2009 that initially inspired the Hopkins project this year. The Valencia teams used an applied voltage to open the voltage-gated calcium channels (VGCCs) of a small patch of *S. cerevisiae* cells on a 2-D electrode array. When these channels open, calcium floods into the cell through the VGCCs. In addition, Valencia "engineered in," or artificially expressed, aequorin, a protein that hydrolyzes a substrate to produce light in the presence of high calcium concentrations. This system achieves the necessary voltage sensitivity, but unfortunately, voltage only results in a single

output: light emission. We felt that to achieve generality and interchangeability, a theme of iGEM, this system needed to interact with the transcriptional machinery of the cell. From there, a voltage input could be transduced into an output of protein transcription.

Wild-type yeast possesses a mechanism to respond to calcium influx, which serves as a proxy for voltage through voltage-gated calcium channels. High calcium levels activate the enzyme calcineurin, which dephosphorylates the transcription factor Crz1 (pronounced "Crazy-1", so named for the observation that activation of this factor causes the yeast to go "crazy" in a general stress response). Once dephosphorylated, Crz1 is pumped into the nucleus where it binds DNA and initiates transcription.

Hundreds of genes have been shown to exhibit sensitivity to calcium stress via calcineurin and Crz1. In 1999, Stathopoulos et al. set out to determine the binding site that Crz1 targets. They focused on the gene *FKS2* in particular and found that when all but a specific 23-base pair sequence was removed from the *FKS2* promoter, calcineurin sensitivity remained comparable to that of the entire promoter. Reasoning that this small region contained the Crz1 binding site, it was named the calcineurin-dependent response element (CDRE). In 2002, Yoshimoto et al. took this work a step further with a bioinformatic approach. Yoshimoto looked for homologous regions among all yeast promoters known to induce a transcriptional

response in the presence of active calcineurin. This analysis yielded a small library of seven and eight base pair sequences. Crz1 is believed to bind these regions with differing affinities. Given the length of this sequence as well as the size of the yeast genome, Crz1 has enough binding sites to activate every gene several times over. However, for a Crz1 binding event to result in transcription, the site must be properly situated within the gene's promoter. Specifically, it must be a viable upstream activating sequence. Only genes with a Crz1 binding site arranged this way are affected by calcineurin.

## Methods

Our team worked with a number of plasmid constructs—loops of foreign DNA that act somewhat like genetic programs—to capitalize on yeast's natural voltage-mediated behavior. The first construct contained four consecutive copies of the CDRE from *FKS2* described by Stathopoulos. Under the regulation of this promoter was a gene for red fluorescent protein. A second construct contained the PMC1 promoter (which in turn contains a binding region described by Yoshimoto) regulating yellow fluorescent protein. A final modification to our cells dealt with their calcium vesicles. Since yeast can naturally sequester cytosolic calcium in vesicles, we used a knockout strain that lacked the calcium pumps to fill these vesicles. We believed that this would make

the cells ultra-sensitive to calcium influx.

Conducting our experiments was a highly multidisciplinary effort. Although the end goal was to be able to simply place electrical leads in a beaker (like Gabe), we wanted a precise measurement and voltage application device to characterize the voltage response in our engineered yeast. For this we turned to microfluidics, a branch of engineering that deals with micron-scale channels that conduct tiny volumes of water—sometimes containing cells—with great precision. Rather than putting a large voltage non-uniformly across a large population of mobile cells, a microfluidic device can direct the flow of cells through channels of merely a single cell width in diameter. Although microfluidic devices containing electrodes are common, most of them apply a specific voltage along a channel, typically for the purpose of propelling water through the tiny channels. We wanted to apply a voltage across a channel. Because of our unique needs, we designed our own microfluidic device and built it ourselves at the Johns Hopkins Microfabrication Laboratory. In two days, we managed to etch 100 micron-wide channels into a silicon wafer and pattern titanium and gold electrodes onto an oxide layer on top of the channels. Out of 24 devices attempted (12 on a single wafer), only three functioned, all with poor performance. In the interest of time, we decided to use a 96 well plate-compatible electroporator (coaxial electrode).

Using the electroporator and our engineered cells, we sampled outputs for different voltage ampli-

tudes and stimulus durations. Using confocal fluorescent microscopy, we showed that above a six volt threshold applied across half the well diameter, cells began to transcribe our fluorescent proteins. Due to the gating kinetics of calcium channels, channels tend to be all open or all closed for a given cell at a given voltage. In addition, applied membrane voltages in the range of tens of millivolts are needed to open such channels. However, we found that on a macroscale, transcriptional responses increase gradually with increased voltage and that much larger applied voltages are needed to alter the potentials of the thousands of cells in a well. Furthermore, the voltage can only be applied for 30 seconds because too long of a duration will cause the cells to succumb to stress, due to an inability to sequester calcium.

## Results & Discussion

Our findings indicated that voltage applied across yeast with the specialized construct we tested, can induce gene expression. Furthermore, our work resulted in a set of BioBricks. BioBricks refer to genetic material that conforms to the standardized format used by iGEM. It is easily integrated into components developed by other iGEM teams, which that allows genetic engineers to control gene expression using voltage.

We believe that voltage control could serve as a powerful platform for future innovation because it provides an interface between electronic and biological systems. Current methods for controlling cells' behaviors usually consist of

manipulating the cells' chemical environments with additives. For example, in the lab, scientists often induce their yeast cultures by adding galactose, and removing all glucose. For small-scale scientific applications, this method works beautifully. However, on an industrial scale—if a culture is the size of a small building, for example—this quickly becomes outrageously expensive. Instead of using these intermediates to speak in terms of biochemical signals, cells can be engineered to understand electrical signals. Imagine, instead, if a computer could directly interface with the cells, orchestrating their behaviors from division to use of nutrients to production of chemicals or pharmaceuticals.

We believe that our rudimentary system could be refined and extended to provide many more sophisticated levels of control than those we demonstrated in the lab. By leveraging the variety of calcium channels and the varying sensitivities of the many Crz1 binding sites, we can envision a system where cells' transductions will be sensitive enough to discriminate between four volts and five volts. Perhaps at four volts, cells will enter a senescent state, while at five they will begin to bud and divide rapidly. Or, to make things more complicated, perhaps the yeast have an internal clock that allows the yeast to discriminate between a four volt signal in the afternoon and a four volt signal in the morning. There appears to be an innumerable amount of ways to increase the complexity and sophistication of our system. Perhaps, one day in the not-so-distant future, when Gabe sends

“Tube1\_Start” to a lab computer, a four volt signal will be sent across a tube of cells, causing a biochemical cascade leading to transcription of a senescence gene—allowing Gabe to stay out at the pub with his friends. Our group takes pride in the role that it has played in developing the micro-devices, plasmid constructs, and engineering practices that will continue to change the way we think about our ability to truly engineer biological systems.

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# PRINCIPLES & POLICIES



# Gender Identity Disorder Diagnosis in the United States of America: Its Impact on the Dignity and Human Rights of Transgendered and Transsexual People

By Ana Paula Maia, Class of 2011

*B.A. Latin American Studies, Sociology, Political Studies*

*The notion that there are two and only two genders is one of the most basic ideas in our binary Western way of thinking. Transgender people challenge our very understanding of the world. And we make them pay the cost of confusion by suffering.<sup>1</sup>*

- Findlay, Yogyakarta Principles

In 1974, the American Psychiatric Association (APA) began to diagnose transsexuals with a gender identity disorder (GID)<sup>2</sup> after amending the United States' Diagnostic and Statistical Manual of Mental Disorders (DSM), which was used to diagnose homosexuals, transgendered people, and transsexuals alike with mental disorders. These same individuals continue to be diagnosed with and treated for GID today, even though the APA's methods have exhibited little scientific foundation or merit throughout the decades for which it has been in existence.<sup>3</sup> Despite the bias and inequality, the struggles of the transgendered and transsexual community are too often ignored; recent

calculations indicate that the condition occurs in about 1 out of every 250 to 500 male children, making transsexualism more than twice as prevalent in the United States as multiple sclerosis, cerebral palsy, or cleft lip.<sup>4</sup> Though noted as diseased, individuals diagnosed with GID are concurrently excluded from the basic institutions and benefits of the United States that are afforded to others classified as having a mental illness. This dichotomy is exemplified in the exclusion of GID from conditions listed in the Americans with Disabilities Act, and the Federal Rehabilitation Act.<sup>5</sup> Thankfully, setbacks for human rights in the United States have been offset by advances in various other countries,

where significant progress has been made in the institutional rights of transsexual people. This parallel challenges the legitimacy of the American DSM, which has long been considered a role model in the international medical community.

In 2006, the Yogyakarta Principles were published in order to provide a guide for the application of international human rights laws in relation to sexual orientation and gender identity discrimination. As the product of 26 different nations, including the United States, the Yogyakarta Principles oppose the very opinions perpetuated by the APA.

## **History and Definition of "Transgender"**

According to the Yogyakarta Principles, "gender identity" refers to is:

"each person's deeply felt internal and individual experience of gender, which may or may not correspond with the sex assigned at birth, including the personal sense

of the body (which may involve, if freely chosen, modification of bodily appearance or function by medical, surgical or other means) and other expressions of gender, including dress, speech and mannerisms.”<sup>6</sup>

However, this explanation of gender identity contradicts the binary gender system, a system in which no other possibilities for gender of anatomy are believed to exist save that of males and females. The binary gender system promotes heteronormativity, or the idea that “people fall into only one of two distinct and complementary sexes with each having certain natural roles in life.”<sup>7</sup> Most societies today are structured around the binary gender system, with little room for challenging the system by sexual minorities.

Self-identified transsexuals who reject the term “transgendered” to describe themselves do so because they feel that “their rights and interests are best pursued outside the umbrella usage.”<sup>8</sup> The foundation of this argument is the innate difference between transsexuals and others, who do not belong in the binary gender system. Today, the most widely accepted definition of “transgender” is: “the state of one’s ‘gender identity’ (self-identification as man, woman, or neither) not matching one’s ‘assigned sex’ (identification by others as male or female based on physical/genetic sex).”<sup>9</sup> It is important to note that “transgender” does not imply any specific form of sexual orientation, and although some transgenderists feel that “conventional sexual orien-

tation labels are inadequate or inapplicable to them,” “most identify as heterosexual, homosexual, bisexual, pansexual, polysexual, or asexual.”<sup>9</sup> On the other hand, the definition of transsexuality, as accepted by members of the transsexual community, is that of a condition wherein “a person with an apparently normal somatic sexual differentiation has the conviction that he or she is actually a member of the opposite sex.” This conviction is accompanied by a profound sense of loathing for one’s own sexual characteristics, and this feeling is described as “absolute, overwhelming, and unalterable.”<sup>10</sup> Some transgenderists may feel comfortable with their condition even if it is not accepted by the binary gender norms, while transsexuals want hormonal therapy and sex reassignment surgery to correct their “birth defect,” often so that they can participate in a society that imposes binary gender norms.

Apart from transsexuals who accept being labeled transgenderists, and publicize their past after sex reassignment surgery, other designations included in the umbrella term “transgender” include “transvestite,” “drag kings and queens,” and “androgyne.” A transvestite is someone who cross-dresses, or “someone who has an apparent gender identification with one sex, and who has been birth-designated as belonging to one sex, but who wears the clothing of the opposite sex because it is the clothing of the opposite sex.”<sup>11</sup> Often, transvestites are simply referred to as “cross-dressers,” and they usually identify as heterosexual, with “an admiration and desire to sometimes imitate the opposite sex.”<sup>11</sup> In contrast to

transvestites, drag kings and queens wear clothing and make-up of the opposite sex on special occasions, for performances or entertainment purposes. Drags are usually theatrical and comedic, and are usually more accepted by society than other transgenderists. An androgyne is “a person who does not fit clearly into the typical gender roles of their society.”<sup>11</sup> Androgynous behavior goes beyond constantly wearing clothes, jewelry, or make-up of the opposite sex, as an androgynous person identifies as being “beyond gender, between gender, moving across genders, entirely genderless, or any or all of these” identities.<sup>12</sup> The term “androgyne” is sometimes used as a medical synonym for an intersex individual, although the transgender subcategory of androgyny “can either be physical or psychological, not dependent upon birth sex, and is not limited to intersex people.”<sup>12</sup>

Solely for the purposes of this paper, the term “transgender” will exclude transsexuals, and when issues concerning both transgenderists and transsexuals are concerned, issues of “sexual identity” will be discussed, as that is the terminology used by most credible international organizations.

### **The Diagnostic and Statistical Manual of Mental Disorders**

The Diagnostic and Statistical Manual of Mental Disorders (DSM) is a document periodically published by the American Psychiatric Association (APA), with the intention of documenting the causes, statistics, and prognosis of all mental disorders. In addition, the DSM is used to broadcast research

concerning new treatment methods for those diagnosed with a mental disorder.<sup>13</sup> The DSM is the decisive resource for any professional who diagnoses mental disorders in the United States, but is also used by third parties involved in paying for the treatment of mental health patients (e.g., insurance companies, pharmaceutical companies, and policy makers). The importance of the DSM makes its classification of sexual minorities an even more pressing issue for the transgender community.

### The Yogyakarta Principles

Although human rights “principles of universality and non-discrimination have always applied to transgendered people,”<sup>14</sup> incredible abuses still occur throughout the world. For this reason, in 2006, the High Commissioner for Human Rights, Louise Arbour, expressed concern about “the inconsistency of approach in law and practice, on the grounds of sexual orientation and gender identity,” and added that there is need for a more comprehensive articulation of their rights in international law.<sup>14</sup> With these concerns in mind, and with the goal of providing a tool against “well-documented patterns of abuse,”<sup>15</sup> a coalition of human rights Non-Governmental Organizations (NGOs) started the project of drafting an up-to-date, all-inclusive document against the “diverse approaches, inconsistencies, and gaps in opportunities”<sup>1</sup> in the ways sexual minorities are accorded their human rights around the world.

There are 29 principles of international human rights in

the Yogyakarta Principles. Each principle contains “a statement of international human rights law, its application to a given situation and an indication of the nature of the State’s duty to implement the legal obligation.”<sup>16</sup> For the purposes of this paper, Principle 18, concerning the protection from medical abuse will be discussed further:

“No person may be forced to undergo any form of medical or psychological treatment, procedure, testing, or be confined to a medical facility, based on sexual orientation or gender identity. Notwithstanding any classifications to the contrary, a person’s sexual orientation and gender identity are not, in and of themselves, medical conditions and are not to be treated, cured or suppressed.”

Furthermore, Point F of Principle 18 adds that “States shall ensure that any medical or psychological treatment or counseling does not, explicitly or implicitly, treat sexual orientation and gender identity as medical conditions to be treated, cured or suppressed” (Points A through E concern the rights of children, and issues of sexual orientation in the medical community).<sup>16</sup> Both of these statements are in direct contradiction with the American medical community’s current edition of the DSM and its GID diagnosis, although Alice M. Miller,<sup>17</sup> the representative of the United States of America, signed the Principles in agreement. However, with a new edition of

the DSM currently being drafted, members of the transgender and transsexual community hope for change in favor of the elimination of the GID diagnosis from the DSM. As one transgendered commentator noted at the time of the launch of the Yogyakarta Principles, “I am now, under International Human Rights Law, officially human. And yesterday, I wasn’t.”<sup>18</sup>

### Conclusion

In 1999, it was decided that a new revision of the DSM must be made to expand the scientific basis for psychiatric diagnoses and classifications. Since then, “work groups” have been created to focus on issues that the fifth edition of the DSM Research Planning Conference outlined as priorities. Despite a growing transgender and transsexual rights movement, and the creation of the Yogyakarta Principles, none of the initial work groups of the new DSM were focused on issues that involve the GID diagnosis. Not until 2007 did a series of papers entitled “Age and Gender Considerations in Psychiatric Diagnosis,” commissioned and published by the APA, appear, but with no concrete conclusions that would affect the GID classification.<sup>19</sup> To further upset transgender and transsexual rights activists, when more work groups were established to conduct research for the fifth edition of the DSM, a sub-work group was finally assigned the focus of GID, under the supervision of Kenneth J. Zucker, Ph.D., a researcher who has been accused of “engaging in ‘junk science’ and promoting ‘hurtful theories’ in his career.”<sup>20</sup> Conse-

quently, there is a widespread belief that transsexual and transgendered people will still be labeled as having a mental disorder in the fifth edition of the DSM, which will be published in May of 2012.<sup>21</sup> American transgender and transsexual community rights activists called this a “huge smack in the face,”<sup>21</sup> but “are not terribly surprised that [the APA] is going to take the movement a step or four back, rather than forward.”<sup>21</sup>

Although the APA maintains that “the entire revision process of the DSM is scientifically based,” the transgender and transsexual communities are not convinced. To further complicate matters, the APA is conducting most of the research and re-evaluation process in secret, effectively cutting off input from the individuals whom the revised guidelines would most seriously impact. As a former head of the DSM task force, Robert Spitzer, explains, “Transparency is necessary if the document is going to have credibility, “and failing to provide this could mean, people will not have the opportunity to challenge anything.”<sup>23</sup>

In 2002, the Human Rights Campaign polled the opinions of Americans on transgender hate crimes, and discovered that 68% of the country believe that more laws to protect the transgender community from violence are necessary. The poll was critical in exhibiting the public’s growing acceptance of the transgender and transsexual community, and in displaying the wide gap between public and governmental attitudes and actions towards this important issue.<sup>24</sup>

On October 22, 2009, President

Obama signed into law the Matthew-Shepard Act, marking that date as the first day that transgender and transsexual persons gained official legal protections under federal law. The Matthew-Shepard Act extends the 1969 federal hate-crime law to include crimes motivated by “a victim’s actual or perceived gender, sexual orientation, gender identity, or disability.”<sup>25</sup> More specifically, the Act gives federal authorities a greater ability to engage in criminal investigations that local authorities sometimes choose not to pursue; and it provides \$5 million per year in funding for the fiscal years of 2010 through 2012 to help state and local agencies pay for investigating and prosecuting hate crimes.<sup>25</sup> These measures are the first real signs of progress the United States has made towards the protection of the transgendered and transsexual communities.

In December of 2008, a joint Statement on Human Rights, Sexual Orientation and Gender Identity was read in the UN General Assembly, just days after the 60th anniversary of the Universal Declaration of Human Rights. Delivered by the Ambassador of Argentina, this was the first statement condemning human rights violations based on sexual orientation and gender identity presented in the General Assembly. The 66 member states that signed the statement are representatives of countries that “are disturbed that violence, harassment, discrimination, exclusion, stigmatization and prejudice are directed against persons in all countries in the world because of sexual orientation or gender identity.”<sup>26</sup> Though this proclamation

was another progressive step towards the protection of the human rights of transgenderists, the Catholic organization, Holy See, and the Organization of the Islamic Conference expressed disapproval.<sup>26</sup> The Organization of the Islamic Conference presented an alternative document to the General Assembly one day after the Statement was read, “which affirmed ‘the principles of non-discrimination and equality,’ but claimed that universal human rights do not include ‘the attempt to focus on the rights of certain persons.’”<sup>26</sup> This alternative document was signed by 57 member states of the United Nations, and “in a sad display of ignorance, claimed that the [original] Statement could [have] lead to ‘the social normalization, and possibly the legitimization, of many deplorable acts including pedophilia.”<sup>26</sup> Furthermore, the state of Uganda made a proposal to delete the reference to sexual orientation and gender identity from a resolution adopted by the General Assembly to “condemn all killings committed for any discriminatory reason.”<sup>26</sup> Although this proposal was rejected, the close vote of 78-60<sup>27</sup> shows that intolerance based on gender identity is still likely to persist.

To impact the matters of international human rights, the decision of the United States, as the world’s superpower, has always had great influence. However, sending mixed signals of progress by signing the Matthew-Shepard Act, yet still allowing the medical community to promote the idea that transgendered and transsexual people are mentally disabled, allows other nations to follow the same model of

inconsistency in their institutions. Such actions have the potential to undo all of the collective work that has been done to create the Yogyakarta Principles, and to allow nations to continue discriminating against minorities based on gender identity. With the tools provided by the Yogyakarta Principles, and a progressive President in charge promising change, a new reform of the GID could finally allow the transgendered and transsexual communities the dignity and equal opportunities to human rights they deserve.

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# Alcohol Marketing and Our Youth

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**D**rinking games—ranging from beer pong, downing a drink every time Joey from Friends says “whoa,” to consuming 21 drinks on a 21st birthday—are all too common on college campuses throughout the United States. While the country has made impressive progress in reducing underage drinking since 1988, when all 50 states adopted 21 as the minimum purchase age for alcohol, we have made little progress in reducing drinking amongst college students.<sup>1</sup>

Just under half (45.7 %) of full-time college students between the ages of 18 and 24 binge drink—consuming at least five drinks, for men, or four drinks, for women, within two hours.<sup>2</sup> Binge drinkers within this age group have been shown to consume more than 90% of the alcohol purchased in the United States.<sup>3</sup> Additionally, most of these drinkers begin drinking long before college.<sup>4</sup>

While binge drinking may be considered an ordinary aspect of the college experience, the practice remains incredibly dangerous. The World Health Organization (WHO) estimates that alcohol kills 58.7 million people each year. The biggest burden of alcohol use is borne by people between the ages of 15 and 29.<sup>5</sup>

Among America’s youth, alco-

hol is the leading drug problem,<sup>6</sup> responsible for at least 4,600 deaths per year of persons under the age of 21.<sup>7</sup> Young people who start drinking at an earlier age—before 15—are four times more likely to become alcohol dependent,<sup>8</sup> seven times more likely to be in an alcohol-related car crash,<sup>9</sup> and 11 times more likely to get into a physical confrontation after drinking.<sup>10</sup>

## **Alcohol Marketing Plays a Role in Binge Drinking**

Studies show that for most individuals who identify with binge drinking while in college, high school was the starting point.<sup>11</sup> A variety of factors—including parental alcohol consumption, parent or guardian restriction of underage drinking (“warm” restriction is most protective),<sup>12</sup> economic cost<sup>13</sup> and accessibility<sup>14</sup> of drinks to young people, socio-economic status (white and wealthier students are most likely to binge drink),<sup>15</sup> and exposure to alcohol marketing—all shape the way that high school students drink.

As of 2007, the market for global alcoholic drinks was worth approximately \$979 billion.<sup>16-18</sup> In the U.S., the Department of Agriculture estimates that citizens spent \$167 billion on alcoholic beverages

in 2009.<sup>19</sup> The most recent estimate of the share of these expenditures credited to underage drinking dates from 2001, when it accounted for 17.5% of total spending on alcohol.<sup>20</sup>

The global alcohol business relies heavily on advertising and marketing. Alcohol is an increasingly marketed drug - marketing defines its cultural role and shapes expectations about its consequences.<sup>21</sup>

Exposure to alcohol advertising and marketing has been shown to increase the likelihood that young people will begin drinking or increase their alcohol consumption. This correlation between exposure to alcohol marketing and youth drinking behavior has been found repeatedly in a wide range of studies, regardless of levels of parental monitoring and socioeconomic status.<sup>22</sup>

The typical underage youth goes to college having experienced heavy exposure to alcohol marketing. Once in college, they are targets of even more marketing from alcoholic beverage producers, wholesalers, and retailers who sponsor social, sporting, and cultural events for a multitude of college campuses, in addition to their aggressive marketing campaigns in youth-oriented magazines and newspapers.<sup>23</sup> Websites and social networking sites

often target youth with advertising spots and posts detailing specific types of alcoholic drinks, and alcohol promotional events.

The Center on Alcohol Marketing and Youth at the Johns Hopkins Bloomberg School of Public Health monitors this exposure, and has documented a decline in youth exposure to alcohol advertising in magazines,<sup>24</sup> but has concurrently shown how easily youth can access alcohol marketing on the internet, and what little effect age restriction technologies have.<sup>25</sup> The Center has also found a whopping 71% increase in youth exposure to alcohol advertising on television from the years 2001 to 2009. Driving this surge was the rise in distilled spirits advertising on cable television—the most targeted form of television programming. Youth exposure to distilled spirits advertising on TV in 2009 was 30 times greater when compared to results from 2001.<sup>26</sup>

### Stemming the Surge

The primary protection against youth exposure to alcohol marketing is the alcohol industry's self-regulation of advertisement placement. In 2003, under pressure from the Federal Trade Commission to reduce youth exposure to alcohol marketing, trade associations representing beer and distilled spirits companies joined wine marketers in committing to advertise only where the underage audience composition is less than 30 percent.

This is not enough, given the troubling statistics on binge drinking on college campuses, and the persistent overexposure of underage youth to alcohol marketing. The

National Research Council and Institute of Medicine<sup>13</sup> as well as 20 state attorneys general<sup>27</sup> have suggested that a 15% standard, roughly proportional to the percentage of the population between the ages of 12 and 20, would be more appropriate.

We modeled what would happen if the entire industry adopted such a strategy for its television advertising in the year 2004. We found that youth exposure via television would have fallen by 20 percent, and the alcohol industry would have reduced its advertising costs by eight percent, while sacrificing virtually none of its reach to young adults between the ages of 21 to 34, or the more critical age group of 21 to 24.<sup>28</sup>

On a global level, the World Health Assembly recently adopted the first-ever Global Strategy to Reduce Alcohol-Related Harm. Marketing is one of 10 areas where the strategy encourages action by member states, specifically setting up “regulatory or co-regulatory frameworks, preferably with a legislative basis.”<sup>29</sup> Without a legislative basis, the U.S. is more reliant than many other countries on the self-regulatory actions of the alcohol industry.

Less exposure to alcohol marketing campaigns and advertising could translate to delayed initiation of alcohol use, less underage drinking, and less binge drinking by underage youth on college campuses. If we really care about the health of our youth, we need to limit the industry's practice of saturating youth-oriented media with alcohol ads.

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# The American Breastfeeding Crisis

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Medical groups throughout the world recognize breastfeeding as the optimal form of infant nutrition. Organizations such as the American Medical Association,<sup>1</sup> the American College of Obstetricians and Gynecologists,<sup>2</sup> the American Academy of Pediatrics,<sup>3</sup> and the World Health Organization (WHO)<sup>4</sup> recommend that babies breastfeed exclusively for six months, before being supplemented in diet with complementary foods for another one to two years. This recommendation has medical benefits for both breastfeeding mothers, and their infants. Feeding babies artificial milk, an increasingly popular convenience in contemporary households, leads to an increased risk of various short and long-term health consequences, including but not limited to ear infections, diarrhea, asthma, diabetes, and obesity.<sup>3,5</sup> For these added risks, new mothers are losing out on the many medical benefits of breastfeeding; the practice helps women reduce the risk of type two diabetes and breast cancer.<sup>5</sup> Breastfeeding is also economically and environmentally efficient. If rates of exclusive breastfeeding for six months increased to 90% for all U.S. infants, each year \$3.6 billion dollars would be saved and an estimated 911 infant deaths prevented.<sup>6</sup> Despite these significant advantages, only

75% of mothers in the United States initiate breastfeeding, while a paltry 13% exclusively breastfeed for the first six months.<sup>7</sup>

The WHO and the United Nations Children's Fund (UNICEF) began a worldwide effort to increase breastfeeding rates by developing "baby friendly" practices for hospitals to follow. Their recommendations include limiting infant formula to cases of medical necessity, and the provision of breastfeeding support.<sup>8</sup> Research demonstrates that hospitals certified as "baby friendly" can dramatically increase breastfeeding rates amongst their clients.<sup>9,10</sup> Despite the success of these practices, only 4% of United States births occur at baby friendly hospitals.<sup>7</sup> While all medical organizations strongly endorse breastfeeding, studies show that many individual obstetricians, pediatricians, and nurses are not fully informed about breastfeeding, and are thus inadequately equipped to persuade patients to choose this practice over the more convenient infant formula.<sup>11,12,13,14,15</sup>

Breastfeeding is particularly important to low-income mothers and their children, who have increased health risks related to environmental contamination, and structural limits to health care access and resources.<sup>16,17</sup> Low-income families are eligible for the

Women, Infants, and Children Supplemental Nutrition Program (WIC),<sup>18</sup> which offers healthy food to pregnant women, postpartum women and breastfeeding mothers, as well as children under five in families whose household income falls under 185% of the poverty line. Babies under a year-old may receive iron-fortified infant formula. WIC also offers breastfeeding education and support. While breastfeeding initiation, duration, and exclusivity rates among WIC-eligible mothers have increased, they remain lower than the national averages of other socio-economic groups.<sup>19</sup>

Our research sought to explore the infant feeding experiences of mothers enrolled in the Maryland WIC program. We conducted semi-structured interviews with 49 non-Hispanic black and 26 non-Hispanic white mothers who had met at least once with a WIC breastfeeding peer counselor. Mothers were interviewed at clinics in Baltimore City, Prince George's County, and Harford County. All mothers had an infant under one year old, and the babies ranged in age from six days to 12 months. On average, the mothers were 25-years-old with a high school diploma and had two children.

The interviews covered many topics including the mother's birth experience, and any breastfeeding

support or education she received prenatally, during her post-partum hospital stay, and from her infant's pediatrician. Fifty-seven of the 75 mothers tried breastfeeding at least once.

Studies have shown that the decision to breastfeed is often made early in pregnancy.<sup>20</sup> Receiving sustained prenatal education, support, and one-to-one counseling also increases the likelihood of a mother to initiate breastfeeding, and to have longer breastfeeding duration.<sup>21</sup> In our sample, 27% of mothers said that their obstetrician made no mention of infant feeding during prenatal visits. An additional 14% stated that their doctor asked for their feeding plans, but provided no information. Nearly half (49%) reported having been informed about breastfeeding by their physicians. The most common form of this information was a pamphlet or a statement that exhibited breastfeeding as the healthiest choice for babies. Only 10% of mothers reported that they had received one-to-one education or counseling pertaining to breastfeeding from their doctors.

Intervention-free childbirth, vaginal birth, and labor support from a doula all correlate with higher rates of breastfeeding initiation, as well as with longer duration of the practice; in contrast, caesarian births have been shown to reduce the rate of breastfeeding.<sup>22,23,24,25,26,27,28</sup> The WHO has established an ideal caesarian section rate of 5-15%. Any fluctuation from this range generally leads to increased health problems, and greater mother and infant mortality rates.<sup>15,19</sup> In spite of these warnings, the average national rate of caesar-

ian section birth is 32%, which is reflected in our sample: one-third of surveyed mothers gave birth via caesarian.<sup>30</sup> Those who had caesarian sections with previous children were not given the option of vaginal births for the safety of the baby. Amongst babies born by caesarian section, 25% were fed infant formula in the hospitals, without their mother's consent. One first-time mother who had a caesarian reported the following to the interviewer:

Mother: They rolled me out back into my room, and I was begging [to hold the baby]. [The father] put him on me and they let him. I couldn't feel him, but I was just looking at him. And then they took him. I told them I wanted to breastfeed. They told me there's really no way I could breastfeed because of the kind of condition I was in.

Interviewer: So they wanted to give him a bottle?

M: [Yes], and then they rushed him [away].

I: So did he have a bottle?

M: They gave him one ready-made, you know, and [when] I told them I didn't want him to have it, they got mad.

The attitudes of hospital staff have been shown to affect the breastfeeding decisions of mothers.<sup>32</sup> During post-partum stay, most mothers who initiated breastfeeding reported that nurses or other health professionals suggested infant formula as a supple-

ment. Even though a newborn's stomach is roughly the size of a marble, mothers in our study often worried about not making enough milk, with the advice they received at the hospital often compounding this concern. The adequacy of milk portion for the newborn is usually assessed by counting the number of his or her soiled diapers,<sup>20</sup> but mothers in our study who expressed concerns over this issue were commonly offered supplements without being informed of this evaluation technique. One mother reported the following to the interviewer:

J: Yeah, we had to give her a bottle because the breast milk that was coming out, it wasn't enough.

I: How did you know that it wasn't enough?

J: Because she would still be hungry, and the milk would have stopped completely coming out of the breast.

J: [The baby] would still whine and sniff around, so they were saying, "Give her as much that will come out, and whatever she wants after that. Give her the bottle."

Formula companies provide hospitals with diaper bags that contain formula samples and coupons, as well as pamphlets that contain baby care information. Distribution of these bags has been shown to reduce breastfeeding duration and exclusivity,<sup>33</sup> and nearly all mothers received one of these bags at discharge, regardless of breastfeeding intentions. One mother from

out study reported that the cans of formula in her bag were labeled “for the breastfed baby.”

Mothers in our study sample often regarded their baby’s pediatrician as a primary source of education and support for breastfeeding, but their pediatricians frequently did not meet this expectation. One-third of mothers in our sample reported that their pediatrician did not mention feeding at all during visits. Another 38% reported that the doctor simply asked how they were feeding the baby, without further input or recommendations. Only a quarter of the mothers said their pediatricians expressed verbal support for breastfeeding. Out of our study group of 75 mothers, only two reported that their pediatrician had offered hands-on support and referrals in response to the mother’s concerns about breastfeeding.

Breastfeeding support and education at all stages of pregnancy is the most effective way of increasing rates of the practice.<sup>21</sup> Despite official endorsements of breastfeeding made by medical organizations, individual health care professionals and hospitals continue to offer inconsistent support.<sup>34</sup> The practices and attitudes of some doctors, nurses, and health care facilities may actually discourage breastfeeding. Public health and medical policy should encourage steps such as developing protocols for consistent prenatal education, lowering the caesarian section rate, providing doulas as a standard element of birth practice, implementing baby friendly practices at hospitals, banning formula discharge bags, and developing standards for providing breastfeeding support and referrals

for pediatricians.

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# Reproductive Health Care Policy In Vietnam: Are The National Standards Measuring Up To International Standards?

By Nian Verzosa, Class of 2009

*B.A. Public Health Studies*

Earlier this year, U.S. Ambassador Michael W. Michalak spoke in front of American and Vietnamese dignitaries in Hanoi to celebrate an important milestone in U.S.-Vietnam relations.<sup>1</sup> This year marks the 15th anniversary of the formal normalization of American diplomacy with the Socialist Republic of Vietnam. In 15 years, the two countries have collaborated on a range of issues from trade and investment, to education and health policies.<sup>2</sup> While Vietnam has shown tremendous growth and progress in a range of sectors, I was particularly interested in studying their reform policies pertaining to reproductive health care (RHC) services in Vietnam.

The Vietnamese government developed and approved its first “National Strategy on Reproductive Health Care” in 2000, with the hopes that it would achieve projected RHC goals by 2010.<sup>3</sup> With the support of the United Nations Populations Fund (UNFPA), the Vietnamese Ministry of Health developed protocols and guidelines for five main services:

- 1.Safe motherhood
- 2.Family planning
- 3.Reproductive tract infections
- 4.Adolescent reproductive health
- 5.Safe abortion

Through the implementation of a two-phase system, Vietnam plans to update its current health policies and regulations to meet international standards—as set by the World Health Organization—as well as to improve the quality and sustainability of reproductive health care in Vietnam.<sup>4</sup> This marks an important public health achievement, given that before the National Standards and Guidelines (NSG) were approved, there were no uniform objectives or policies pertaining to reproductive health care practices in Vietnam. These guidelines serve as important factors in improving health care and providing a national foundation and standard for health education, training, and delivery.

Although the NSG signified an important step towards improv-

ing RHC services in Vietnam, the implementation of the NSG faces many constraints and challenges, particularly in the harmonization and integration of these standards within Vietnam’s current health care system.<sup>4</sup> Largely due to the vertical organization of the health department, and the lack of one organizing body dedicated to reproductive healthcare services, the implementation of the NSG led to coordination difficulties and a duplication of efforts. These difficulties resulted in an uneven distribution of resources and an asymmetric dissemination of information regarding new policies and guidelines. Most of the clinics and hospitals that adopted these new standards were in major cities like Hanoi and Ho Chi Minh City, while smaller hospitals generally suffered from a lack of necessary resources to implement these new standards. Not all RHC providers were trained to use the new standards, and among those trained, not all of them were familiar with the major components of the NSG.<sup>5</sup>

One of the points that UNFPA and the Ministry of Health might

consider as Vietnam reaches its RHC decade evaluation mark, is how they can make information and services more accessible to hospitals in remote parts of Vietnam. In future years, if these standards are not adopted in hospitals outside of large cities, there will be an increasing gap in services and quality of care within the health care system. A main issue that policy makers may also discuss as they evaluate their successes and challenges from the past decade, is how they can extend RHC training services to these small and often rural provinces.

Despite the UNFPA and Ministry of Health's success in creating policies that were culturally appropriate and suitable within the context of current medical practices in Vietnam, the implementation of the NSG still fell short as far as achieving an internationally recognized standard of care. A prevailing criticism received during the review process of the NSGs concluded that the NSG was "still too far from international standards in the use of medications of dubious or unstudied efficacy for their stated indication."<sup>4</sup>

As Vietnam becomes more integrated in the international community, and continues its rapid expansion and growth, it will become more and more important to work towards providing more integrated health care policies as well as an appropriate infrastructure. With foreign aid and investment, Vietnam has already made progress in modernizing its medical system, though there are still a substantial number of areas for improvement.

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# The Need for Pay for Performance Work in the U.S. Healthcare

By Teja Jayanthi, Class of 2010

*B.A. Psychology*

The United States health care system has experienced spiraling costs over the last few decades.<sup>1</sup> Spending on Medicare, Medicaid, and other health care funding programs are projected to increase over the next few years, and it is thus imperative to conceive of new ways to decrease costs. A method to improve the cost efficiency of the health care system is the proper implementation of pay for performance (P4P) plans for health care workers. Pay for performance refers to a method of incentivizing physicians and/or hospitals to provide a higher quality of care. As physicians are typically paid on a per visit basis, many believe they are not properly incentivized to provide the highest quality of care. The theory behind P4P is that by selecting a set of quality and performance standards, and compensating physicians if and when these standards are met, both quality of care and productivity will improve. Currently, however, P4P plans are poorly designed and are implemented in such a manner that they are not properly oriented with the leadership, organizational structure, and vision of the hospital itself. By exploring some counter-intuitive research on just what motivates people to work diligently, we can

conceive of new ways to make P4P work in the health care industry.

Before we determine what makes P4P successful in the health care industry, it is important to understand what motivates general employees to be productive. In his best-selling work, *Motivating People: How to Get the Most from Your Organization*, Fred Herzberg distinguishes between intrinsic/primary motivators, and secondary motivators for employees. He writes, "The growth of motivating factors that are intrinsic to the job are: achievement, recognition for achievement, the work itself, responsibility, and...advancement. The dissatisfaction avoidance or hygiene factors are: company policy and administration, supervision, working conditions, salary, status, and security."<sup>2</sup> One can thus conclude that while it may appear that people are motivated by money, their actual primary motivating factors do not stem from monetary desires at all. Herzberg's research leads to a rather counter-intuitive conclusion about P4P plans in that money is one of the least powerful ways to motivate an employee. If workers in the clinical setting, apart from physicians, are provided an adequate amount of recognition, autonomy,

and opportunity for growth, then a P4P plan has a higher chance of succeeding.

In a recent large-scale literature study published in the *Annals of Internal Medicine*, different P4P plans were evaluated to see whether or not financial incentives improved the quality of health care provided. Different types of compensation plans were examined, such as physician-level financial incentives, provider group-level financial incentives and payment-system incentives. The paper reviewed 17 previous studies on P4P in health care and concluded that there exist positive effects for the provision of financial incentives at the physician level, the provider group level, and the health care payment system level.<sup>3</sup> However, this study also identified a number of limitations, such as a general lack of research in this area, and the variety and complexity of the different P4P plans, which makes it hard to generalize results across the industry. Additionally, there is not a single study, which has examined the effect of implementing a P4P plan across an entire organization, most likely because there are not many health care organizations currently implementing such a scheme.

Perhaps it would be beneficial to evaluate a case study of a firm where a P4P plan is implemented ubiquitously. Gary Loveman, a former professor at the Harvard Business School, exemplifies Southwest Airlines and its 21 years of success to display how and why a corporation can succeed in spite of a competitive industry. Loveman writes that “employee productivity drives value. . . at Southwest Airlines . . . astonishing [stories] of employee productivity occur daily.”<sup>4</sup> In fact, on average, Southwest Airlines pays lower salaries to its employees, but nevertheless enjoys higher work productivity. Similar to the airline industry, wherein companies have a high rate of bankruptcy, the health care industry faces unique challenges. By increasing employee productivity while maintaining low costs, companies might succeed in avoiding such pitfalls. At Southwest Airlines, every employee, from pilots to janitors, is placed on a gain-sharing P4P plan, whereby individuals in managerial positions take lesser profits in order to share what they would have accrued personally with employees. The entire company works as a single unit to achieve the objectives determined by the management. Gain sharing, then, could be a beneficial model not just for physician compensation, but also for the healthcare industry as a whole.

The healthcare industry largely limits P4P plans to physicians, which is a mistake, given that physicians are not the only ones responsible for quality care. To deliver quality care, everyone from janitors to and administrators have to somehow be efficient in their

work. A companywide P4P plan, supported by management officials who are determined to empower their workers, would create a unified work culture that could overcome many of the problems persistent in today’s health care industry.

From bloated CEO salaries for private insurance companies to the improper compensation of doctors, the existing payment system for quality care is a problem. It is, therefore, crucial to reform the payment system to try to curb health care costs. To increase quality of care and efficiency in the health care industry, P4P plans that emphasize gain-sharing across the entire organization should be introduced.

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# FEATURES



# A Drive to Help: Women's Health Care in India

By Alice Drain , Class of 2011

*Postbaccalaureate Premedical Program*

Packing up the examination table, medicine bottles and speculums, I thought about what I had just seen. It was the first day of a cervical cancer screening and treatment program that I had recently worked to establish with Kutch Mahila Vikas Sangathan (KMVS), a grassroots collective organization of rural women in Kutch, Gujarat. Fifty-six women had come to this gynecological screening camp, and of these fifty-six, we had to recommend twenty-eight for medical treatment at Bhojay, the central charity hospital in the area. The number astonished me, and served as yet another reminder that numbers on a page fail to convey the reality of physical experience.

Throughout India, nearly half a million women are affected by cervical cancer each year. In marginalized areas like Kutch, where I was based, environmental conditions and social taboos take a toll on women's health. Approximately every 7-8 minutes a person dies from cervical cancer in India. Although 80% of cervical cancer deaths occur in developing countries, screening programs can change this trend. In 2009 the promise of preventive care led KMVS to begin its Cervical Cancer Screening and Awareness program.

Since its inception in 1988, KMVS has heralded a movement of social change by addressing critical issues that touch the everyday lives and livelihoods of rural women and their communities. This Non Governmental Organization (NGO) is made up of 13,500 women who are organized into collectives spanning over 150 villages. In the past, KMVS had worked on diverse projects such as protecting the traditional crafts of the area from exploitation, and getting women elected to the Panchayat; now, KMVS has turned its attention to cervical cancer.

Before the actual screenings began, my role was to integrate cancer education into the existing health education materials for midwives, adolescent girls, and pregnant women. Cervical cancer is cancer of the cells in the lining of the cervix. The early stages of cervical cancer may be completely asymptomatic. Therefore, a major issue in the development of screening programs is convincing women to get tested even if they don't have any symptoms.

As the date of the screening clinic approached, KMVS met with community leaders for official approval and led larger orientations with the women of the village using

the education visuals to raise support for the program. Many of the women with whom we spoke said that because of concern over privacy, the difficulties posed by travel to medical facilities, and the distrust in the quality of care available, they were hesitant to have gynecologic issues addressed unless conditions were serious. Once, in the middle of a field group discussion, an older woman lifted herself off her place on the floor and simply walked out of the meeting. Confused, I leaned over to my coworker and whispered, "Where is she going?" only to be casually informed that the woman had a third degree prolapsed uterus that had been developing for over a decade and did not want us to force her to have surgery. Later on in the gynecological screening camps, I would repeatedly see women with prolapsed uteruses the size of footballs hanging from their vaginas.

Such extreme cases are rarely heard of in the United States and the Western world because the use of screening methods, primarily the Pap Smear, has reduced the rate of cervical cancer by 75%. Like the Pap Smear, Visual Inspection with Acetic Acid (VIA) and Visual Inspection with Lugol's Iodine (VILI) tests can detect changes in the tissues of the cervix that indicate

the development of cancer before there are symptoms. Unlike the Pap Smear, VIA and VILI testing do not require a laboratory or intensive staff training and were thus ideal for our circumstances. Changes in the tissue will not always develop into cancer, but often do. Given that the major cause of cervical cancer, Human Papillomavirus (HPV), is known, and women who have it can be identified, it is a highly preventable and treatable disease if women have access to organized prevention programs.

One challenge in spreading public health awareness is the illiteracy in the villages, particularly amongst women. Although there have been improvements in education for women, and girls now

generally complete seven years of schooling, we still chose to use an illustrated power point story as a teaching tool. As another visual means of teaching, KMVS designed a painted “anatomy apron”. When slipped on over the presenter’s regular clothes, the apron accurately depicted, and thus taught, the size and location of the female reproductive organs.

Another challenge was the lack of infrastructure in the area. Despite having scoped out proper locations for cervical and breast cancer screenings, verifying that they provided privacy, water, and electricity, resources were still unreliable. I felt my chest tighten the first time the electricity cut out in the middle of an examination, but soon I was able

to respond calmly with assurance, reaching for the flashlight on a nearby table. Ultimately, a successful camp requires ingenuity and flexibility.

So much had led up to that first screening day, and while my coworkers seemed proud of what we had done, they did not stop for self-righteous congratulations, but rather briefly acknowledged the successful completion of the screening before moving steadily forward to pack up and head back. What I appreciated the most was their apparent drive to help, a drive so strong that one project alone would not satisfy it. I hope to carry this passion to strive toward future possibilities wherever I may practice medicine.



Image courtesy of Lisa Folda

# Arts and Ataxia: Inspiring Activism through Art

By Ashely Elimar Aaroe, Class of 2011  
*Neuroscience*

Most people consider dance to be a hobby, an art form, or a fun way to exercise. However, for some, dance can hold a more personal significance. For them, dance classes can mean the difference between walking and relying on a wheelchair; performances spur entire communities into taking action in the fight against crippling neurological diseases. Arts for Ataxia, founded by Johns Hopkins University Students in 2010, is seeking to do just that. Through utilizing the crowd-drawing power of our undergraduate arts groups, the group has promoted exceptional, unmatched local enthusiasm towards helping those with ataxia.

Ataxia is a neurodegenerative disorder of the cerebellum, in which one of several cell populations dies. The cerebellum, lying at the base of the skull, is essential for integrating the complex signals that regulate movement. When you see a tennis ball flying towards you, infer its speed and future location and eventually plan a precise movement to hit it back across the net, your cerebellum is hard at work. Fundamentally, the cerebellum acts as an error detector, suppressing ineffective movements and preventing future mistakes. In this way, the muscle memory that gives a bal-

lerina her skill and grace is in fact more accurately cerebellar memory. When the cerebellum does not function properly—due to trauma, tumors, genetics, or other factors—the result is a lack of coordination. This characteristic symptom is known as ‘ataxia’, originating from the Greek word for ‘without order’.<sup>1</sup>

There are 30 subtypes of ataxia, both genetic and idiopathic (arising spontaneously), that affect over 150,000 Americans today. Comprised of symptoms including irregularities in gait, eye movement, and speech, ataxia itself is sometimes indicative of a larger issue. Unfortunately, treatment options are limited and a relative lack of public awareness has impeded research progress.

The “Arts for Ataxia” initiative was largely inspired by the story of Dr. Tom Clouse, a former surgeon who reclaimed his life from the disease by learning salsa, swing, and tango. With great fortitude he progressed from the most basic skills, such as putting one foot in front of the other, to complex dance routines. The input of various auditory, somatosensory, and visual cues needed to dance with a partner may have allowed him to recondition his brain, compensating for the injured areas. While indisputably remarkable, such results are

not unprecedented. Dance classes for other movement disorders, such as Parkinson’s disease, have shown promise in laboratories across the country. Studies such as the ones developed generated by the collaboration of Brooklyn Parkinson Group with the Mark Morris Dance Company have yielded remarkable landmark results. The social and aesthetic qualities of dance potentially promote adherence to physical therapy, improve smoothness of movement, and alter perceived quality of life.<sup>2</sup>

The importance of public interest in fostering such groundbreaking research cannot be overstated. Fortunately, in a campus thriving with intellectual activity, providing the impetus for change is not difficult. The challenge is then inspiring these students to take an active role in educating others. The Student Ambassadors program, the brainchild of Sarah Ying, M.D, was established to do just that—engaging students in ataxia research, clinical experience, patient interaction, and community outreach. It has been the continual goal of the organization to promote ataxia awareness and education; to this end we have already seen phenomenal success.

Through holding gatherings at the Homewood campus, sending

members to medical meetings of the National Ataxia Foundation, and allowing students to participate in research and informational campaigns, our past activities have provided a solid foundation for us to build on with the “Arts for Ataxia” campaign. Last spring, the diligent work of Brian Liu allowed us to enter Pepsi’s Refresh Everything competition. With the enthusiastic support of many students, researchers, patients and family members, the group won a large grant which contributed to making “Arts for Ataxia” a reality. The central event of “Arts for Ataxia” was to be a picnic on International Ataxia Awareness Day.

On September 25th we saw attendance of over 700 students, researchers, community members, and representatives from the Chesapeake Chapter of the National Ataxia Foundation. The picnic featured inspirational presentations by Movement Ambassadors Jonas and Mary Cepkauskas, John Cernosek, and Carolyn Davis, as well as a talent competition featuring undergraduate performing arts groups. . Patients conveyed their excitement at the artistry and professionalism of performers such as Mr. Meadows, and the clear passion for the cause conveyed by students like Mr. Liu. Arts for Ataxia has raised significant donations towards the Clinical Research Consortium for Spinocerebellar Ataxia and the National Ataxia Foundation. Furthermore, we have engaged a number of local businesses in planning and sponsoring events related to our organization. After receiving generous donations from these companies, we were pleased to invite representa-

tives to enjoy the festivities and see firsthand what their support accomplished. The event also allowed- served to put students, eager for research, to networkin contact with laboratory personnel who work in the ataxia field. Through continuation of “Arts for Ataxia” events, we seek to recruit new students to our “Clinical Experiences” Program.

The effects of the Arts for Ataxia campaign will no doubt be far reaching as it progresses in the upcoming year. Hopefully, it will serve to launch a student-run pilot study on the effectiveness of dance therapy for ataxic patients. This study, sponsored by a student grant from the Provost’s Undergraduate Research Award, will prospectively provide the launching pad for a wide scale clinical study. In this way, the project will directly impact future clinical trials involving professional dance instruction.

It is our belief that the future holds exciting advancements in the care of ataxia patients. We hope that through the efforts of our organization, we inspire other student groups to take action in increasing awareness of rare neurological disorders.

# The Reality of Public-Private Partnerships in Honduras

By Joanna Chapin, Class of 2008

*Public Health*

## Millennium Development Goal #8: Develop a Global Partnership for Development

In the past few decades, global development concerns such as debt relief, access to generic drugs, and information and technology sharing have emerged as critical issues in need of public-private partnership efforts. In response to this need and the Millennium Development Challenge, The United States Agency for International Development (USAID) has invested over nine billion dollars since 2001 towards 680 public-private partnership initiatives in developing countries.<sup>1</sup>

In 2009, I began working as the first Community Research and Evaluation Director for Global Brigades (GB)-Honduras, an international health non-profit organization that seeks to empower student volunteers and rural communities by tackling global health and development issues in developing countries. Within my initial month, I received a call from a nurse at the Regional Health Center in the department of El Paraíso. She invited me and a few other GB staff to the first Non-Governmental Organization (NGO) partnership

meeting that was to take place the following week. I was both surprised and pleased to receive this call as I would be able to experience, first-hand, the intentions of the Ministry of Health reaching out to collaborate with private entities. The opportunity would also allow me to think critically about the role and reality of “public-private partnerships” in Honduras, particularly after the recent governmental overthrow.

June 28, 2009 left a huge mark on the country of Honduras. This was the day President Manuel Zelaya was stripped from his home before dawn by the Honduran Armed Forces in a legislature-mandated presidential oust. I hesitate to use the words “Honduran coup”—though most of the world remembers it as such—since the technicality of that term is still debated to this day. Apart from fighter jets streaming through the air, weeks of nationwide “toque de queda” (all-day/all-night curfew), as well as the controversial return of President Zelaya when he thereafter managed to spend months hiding at the Brazilian Embassy, the “Honduran coup” was a political headline. From a health and development worker’s perspective, however, the recent

developments only fueled the economic instability of a country where 51% of the population already subsisted below the national poverty line.<sup>2</sup> In the weeks following the “coup,” the majority of international institutions previously providing funding to Honduras withdrew their aid. The European Union halted its \$97 million contract with Honduras, the World Bank froze its \$270 million loan, and the Inter-American Development Bank paused a \$50 million agreement.<sup>3</sup> The significant cuts in aid affected both the public and private sectors, as important governmental agencies not only lost their own funding but also had to cancel contracts with partner NGOs that implement programs in the field. For over eight months aid was suspended, thereby forcing private organizations and companies to withdraw from public-private partnerships, cut programs and staff, and re-evaluate organizational and financial strategies. Sixty Cuban social service physicians staffing Clínica Santa Rosa de Lima were forced to depart the country, leaving one of the most specialized clinics in the country abandoned. Health and development work was at a stand-still. The unfortunate reality lies in the fact

that this was not a loss for political figures or elite business owners but instead for poor, rural Hondurans who were the main recipients of public health and development programs. Thousands of low to middle-income Hondurans were laid off government or non-profit jobs, augmenting the 44% national unemployment rate.<sup>4</sup>

Following the “coup,” the incapacitated public sector began to depend significantly on the private, particularly on NGOs or social enterprises that were able to preserve funding. NGOs and businesses had no choice but to take on the financial and logistical burden of the public sector hiatus in order to sustain the health and development work within communities of need. These alliances shifted from public-private partnerships into public-private dependencies. Whether a government begins to break down, or political heads lead with corruption, these realities in Honduras are often the unconstructive results of public-private partnerships in the developing world.

Another way through which I have personally encountered the strengths and weaknesses of public-private alliances has been through my role as the first Community Research and Evaluation Director of Global Brigades-Honduras. I initially spent several months training a bi-cultural and bilingual staff on the importance of collecting data, determining needs in communities, and developing program logical frameworks as well as basic monitoring and evaluation plans. I then embarked on a community needs assessment project to better understand Honduran communities

and create needs-based approaches towards community selection and prioritization.

Originally, Global Brigades was a medical relief organization started under the well-respected Catholic organization Sociedad Amigos de los Niños (SAN) following 1998’s Hurricane Mitch. After this disaster, hundreds of NGOs and faith-based organizations were formed in order to provide medical relief services. At this time, Global Brigades’ community selection process was based on contacts from their partner organization, SAN, as well as local nurse and mayor recommendations, in addition to geographical access and a community population requirement of over 300 members. These criteria are neither unreasonable nor uncommon, particularly given the fact that almost all communities had dire relief needs post-Hurricane Mitch. However, as the organization grew and started forming Water and Public Health Brigade programs that involved building potable water systems and health infrastructure projects, it had reached a pivotal internal shift: transitioning from medical relief to global health and sustainable development work. With this shift, solidifying a process for determining community needs and consequently selecting communities of high-need for project implementation became the essential next step.

During the next five months, I spent nine-hour days in trucks and land cruisers visiting over 90 of our medical relief communities in order to conduct key informant interviews with community leaders. I also spent time visiting regional and local health centers in search

of paper and pen health statistics that applied to our target communities. This process also involved meeting with other organizations and health professionals to discuss their experiences working in certain regions and communities. I worked with my fellow staffers to complete the community needs assessments, evaluating each community for health and socioeconomic indicators related to one or more of our GB-Honduras programs (Medical, Dental, Public Health, Water, and Microfinance). This process allowed us to understand community needs and to create several outputs, including community profiles<sup>5</sup> and a GPS community map<sup>6</sup> to engage and inform our stakeholders and volunteers.

While gathering and distributing information was the immediate result of the needs assessment process, the data served another important purpose of ranking communities and prioritizing ones of high-need. I spent the following two months developing a community ranking tool using indicators from the needs assessments to quantify needs in each community based on our focus areas of education, water, health, socioeconomics, and collaboration. This community ranking tool allowed GB to narrow its scope, using quantifiable information from the needs assessment and pairing it with qualitative testimonies from other organizations and internal GB staff. This collective process has now been used to select 16 “priority communities” of high need and collaboration where GB will implement programs over the next five years.

Since the selection of our 16

priority needs-based communities, however, GB has experienced considerable resistance from local municipalities with whom we collaborate through public-private partnerships. In development work, it is extremely crucial to have the support—financial and logistical—of local mayors who can advance a project through partnership. Ask any Peace Corps worker whether his experience was successful or severely hindered by the mayor of the region he was placed in, and you will have a direct testimony of the importance of municipal collaboration. Throughout the needs assessment process, Global Brigades had to find an appropriate balance in its public-private partnerships with local mayors by valuing municipal support while recognizing political sway. The reality is that most often the public municipal criteria for community selection for development projects is predominantly influenced by which communities have the most votes in next mayoral election or which communities produce the most high-profit coffee. “Need” is hardly even part of the decision-making process. Therefore, GB, as a privately-funded, non-profit organization, has had to create a method to consider municipal cooperation as a valuable collaboration factor, and yet continuously advocate for an evidence-based, needs-based approach to community selection and prioritization.

As our society continues to become globalized, partnerships are inevitable as we seek to pool resources and produce effective efforts. Nevertheless, health and development institutions must create a system of checks and balances

between the public-private entities and work to promote governmental stability, prevent corruption of health and development funds, and ensure a needs-based approach (in place of political favoritism) in the allocation of resources to poor communities. If this can be done, each institution’s strengths can be highlighted and their weaknesses can be redeemed by the partner. After all, each organization has its own niche, ability to access resources, and overall role in the progress towards achieving Millennium Development Goals. Together, these organizations have the potential to work cohesively towards the same end: assuring economic equality and improving quality of life for the underserved.

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# Among the Ancient Ruins

By Julia Hnin Lwin, Class of 2008

*Public Health*

Through the human-rights centered One World Foundation, young leaders from afflicted communities are given the opportunity to travel abroad and work with an NGO, tackling cases of human rights violations while concurrently empowering citizens through an education of basic civil rights. As a USAID Global Health Fellows Program Scholarship recipient and a member of the One World Cambodia 2010 Young Leaders Program, I was granted a fully funded internship in Cambodia at the Reproductive and Child Health Alliance (RACHA), a non-governmental organization (NGO) that seeks to improve maternal and child health across the country.

I was particularly interested in international maternal and child health (MCH). Having been introduced to MCH while working as a research assistant, I came to the conclusion that I wanted to expand experience in the field. My goal for the summer was to work with an organization to alleviate health issues among mothers and children. However, I wanted to gain a better understanding of programming, implementation, policies, and international aid dynamics. Fortunately, RACHA allowed me to pursue these concentrations. In fact, the organization allowed me to learn far beyond what I had initially

anticipated, and for that, I am very grateful.

Over the course of nine weeks, I was immersed in various facets of MCH in Cambodia. My first project led me to a floating water sanitation station in the middle of the Mekong River. Home to hundreds of floating houses, stores, schools, and clinics, the river's water is so muddy and dense that not even sunlight bounces off the surface. Needless to say, the villagers desperately needed clean water. This particular station was the first of its kind to serve as a clean water project. Through the clean water project, the villagers are able to drive up in their boats and buy five gallon tubs of clean water for approximately \$1 USD. The income from water sales allows the community to add new equipment, such as reverse osmosis machinery. The entire station was built within 3 months using local materials and with the help of community members. Over 6,000 residents are now benefitting from the station and even more residents are expected to benefit as the station continues to grow.

The station's incredible use of space and innovation illustrates the feasibility of public health solutions even in difficult target areas. The station is currently working to decrease cases of diarrhea, worms, malnutrition, and typhoid fever

by incorporating a sand filtration system on a floating and mobile apparatus. In partnership with the United States Agency for International Development (USAID), which funded the \$80,000 required for construction, RACHA has taken responsibility for the maintenance of the station as well as ensuring that community members are both educated about and aware of water sanitation issues and how the station can work to mend them. The water sanitation station is a very good representation of what RACHA stands for—international aid used wisely to create and sustain programs that will improve maternal and child health.

After an incredible introduction to RACHA's work, I looked forward to the remaining weeks that I had in Cambodia. Apart from the internship, much of my learning took place in museums and in the community. The Killing Fields serve as the primary tourist attraction in Cambodia and shed light upon the Khmer Rouge genocide. These memorials, built to honor the millions killed during the Khmer Rouge regime, paint a vivid picture of the past; one such memorial consists of hundreds and hundreds of skulls lining every level of the stupa – a memorial temple. The impact of this particular memorial can be felt from the moment visitors enter the



Image courtesy of Julia Hnin Lwin

temple. Walking around the fields, I was surrounded by enormous holes from which Cambodians had unearthed the thousands of victims killed during the Khmer Rouge regime, most of whom were ruthlessly murdered and disrespectfully thrown into mass graves. Pol Pot, the regime leader, who wanted a completely homogenous society consisting of solely farmers, attempted to achieve that desire by mass murdering the intellectuals and their families. As I walked around the fields, I noticed clothes that were half-buried and even saw human bones sticking out from the ground. Everywhere I walked, human remains lay underfoot. Many of the victims of the Khmer Rouge regime were college students targeted for their intellectual pursuits. As the Khmer Rouge continued to murder people, the victims expanded to people with eyeglasses and those that the regime believed to be enemies of Pol Pot's desired

society.<sup>1</sup> Guns, gas chambers, or any other quick killing methods were weapons of choice but also expanded to hoes, bamboo sticks, shovels, and other ordinary tools.<sup>2</sup> Soldiers held babies by one leg and swung them into what is now known as The Killing Tree.<sup>2</sup> Khmer Rouge regime ravaged the country to its core, leaving its citizens shaken, fearful, and hopeless.

Despite Cambodia's tragic history, organizations such as RACHA, that work to empower underserved citizens, instill in me a hope for the future. My remaining weeks in Cambodia revolved around trips into the provinces to participate in community health education classes, training of health professionals, and base-line data collection for new programs. RACHA staff and a volunteer health support member led the training, educating the attendees about properly covering raw and cooked foods, washing hands before and after

handling food, and washing all tools used to cut meat. These simple, but very essential, guidelines help to improve health outcomes, particularly those concerning diarrheal disease. RACHA also works with the Cambodian Ministry of Health to reform health policies and health systems, concurrently working at the ground level with the community to ensure appropriate, collaborative and sustainable solutions.

The knowledge I gained from my time in Cambodia has been invaluable in shaping my professional outlook. Not only has RACHA reaffirmed my interest in international maternal and child health, but it has also inspired me to pursue a career dedicated to the health and wellbeing of women and children around the world.

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1. *Pol Pot's Regime*, The Killing Fields, Phnom Penh, Cambodia.
  2. *Choeung Ek*, The Killing Fields, Phnom Penh, Cambodia.

# Obstetric Health in Western Kenya: The Necessity of Our Work

By Carolyn Pearce, Class of 2011

*Public Health*

An intern was leaning over a woman's pregnant belly, her ear pressed against the stethoscope, straining to hear the baby's heart-beat. The intern called for the attending physician. This patient was in her 29th week of pregnancy and severely preeclamptic with a history of four miscarriages. She had no children. The attending physician started working the handheld doppler, listening closely for heart rhythms. Nothing. She brought the ultrasound over and massaged the pointer around the woman's abdomen. There was no sound. She continued, hoping and praying that she would hear some sign of life, but to no avail. She turned the machine off and gently placed her hand on the woman's arm, gazing down at her. "Pole. Pole sana," she said to her. At once, the woman rolled onto her side, buried her face in her blanket, and began to sob, crying out in pain and disbelief. She would once again go home empty handed. Unfortunately, in rural Kenya, fatal obstetric complications are by no means extraordinary.

I spent my summer in western Kenya at Tenwek Hospital investigating preeclampsia by conducting a retrospective chart review of preeclampsia and eclampsia cases from 2007 to 2009. Preeclampsia

is a syndrome of pregnancy; little is understood about how or why it occurs. It begins with hypertension and excess protein in the urine. If left unchecked, the disease will escalate to a severe state, affecting the central nervous system by causing dizziness, blurred vision and other neurological symptoms. With the onset of eclampsia, a woman will experience grand mal seizures in addition to the symptoms of severe preeclampsia.<sup>1</sup> In developed countries, preeclampsia rarely progresses to eclampsia due to the availability of routine antenatal care.<sup>2</sup> Unfortunately, in more rural areas, such as western Kenya, the luxury of accessible routine medical care does not always exist. Thus, there are many cases of pregnant women coming to Tenwek Hospital, suffering from severe preeclampsia and, in many cases, eclampsia. Despite the efforts of doctors and staff, many women lose their unborn children, and often their own lives to this tragic disease.

During our case review, we tried not only to decipher the information enclosed in the doctors' notes, but also to determine the nature of these women: who they were, where they lived, and what stage of the disease process they experienced. By doing this, we hoped to under-

stand the course of treatment at the hospital and to discover ways to improve Tenwek Hospital's outreach programs in the community and its treatment regimens. Ultimately, our goal was to reduce maternal and infant mortality by reducing the incidence of preeclampsia and eclampsia.

It was in the midst of our review and shortly after I witnessed that scene in the ward that I began to wonder if my work would make any difference. What if, at the end of my summer, I did not change anything? What if unborn babies continued to die? As I was making observations in the ward one morning, however, my doubts were interrupted by "Chamage," a friendly local greeting. I looked up at the crooked smile of a woman in a green pinstriped patient gown. She began rattling off a string of Kiswahili, telling me that she had just returned from the nursery, that her baby was alive, and that she would be going home. "Thank you for saving my baby. Be abundantly blessed, doctor," she told me in Kiswahili. Though I attempted to tell her that I was only a student, she continued in Kiswahili, "Come see my baby. Come, come." I followed her to the bed where the little baby girl named Chepruto\* was sleeping. "So beauti-

ful, so beautiful,” I told the woman in Kiswahili. “Yes, doctor,” she said, “Asante. Asante sana.”

At the Bloomberg School of Public Health, we are given a task: to save lives, millions at a time. Indeed, in all of our statistical analyses, our two-by-two tables, and our cross-tabulations, our goal is to save lives. Our work, however, is more than lives. Everyone has a story, one weaved of the fabric of experiences, embroidered with personality, and intertwined with stories of others. All statistics and technicalities aside, public health programs provide me with the opportunity to not only save lives, but also to elongate the stories these lives represent. In the course of our work, there will always be encounters that will make us wonder, “how, what, why?” However, it is in these moments of uncertainty that we meet Chepruto\* and are reminded of the necessity of pouring over charts, surveying patients, and tabulating numbers. We, as public health practitioners, are in the business of not just saving millions of lives, but saving millions of stories. By preventing the premature end to one story, we are enriching a multitude of connected stories, even our own.

*\*This name has been changed.*



*Image courtesy of Carolyn Pearce*

# Reflections of Chennai: A Two-month Experience with India's Unregulated Private Sector

By Anita Ram, Class of 2012  
*Public Health*

It was a hot July day when the hospital ambulance picked me up from the train station. The driver could not speak English and had trouble understanding my broken Tamil, so we sat in silence for most of the trip. I was in Chennai, the capital city of Tamil Nadu, one of India's 28 states. The narrow, unpaved road to the hospital was lined with street vendors selling sweet-smelling South Indian food, simple electronics, and various services. Chickens, goats, and cows wandered freely alongside the vehicles on the road. Flies aggregated above the homeless men and women who slumbered undisturbed amidst the daytime rush. Our ambulance was the only four-wheeled vehicle in sight. The streets were clearly intended for pedestrians and two-wheelers, reflecting the community's difficulty in keeping pace with India's rapid, yet uneven development.

I was on my way to meet Dr. Parvathi, the chief medical officer at Pallavaram Children's Medical Center (PCMC). When the ambulance pulled into the driveway of the two-story hospital building, the staff immediately gathered near the entrance. Dr. Parvathi was a young

woman clad in the traditional salwar-kameez dress, jasmine flowers pinned in her jet-black hair, and no white coat. The two nurses and janitors were the only staff in uniform; the manager, accountant and secretary wore the common garb of locals. I was surprised by the simplicity and hospitality of Dr. Parvathi and her staff, a stark contrast to my previous clinical experiences.

For a month and a half prior to my arrival at PCMC, I volunteered at Apollo Hospital, a commercialized, large-scale, internationally accredited private hospital. While there, I observed a diversity of cases due to high patient flow, gained invaluable hands-on clinical experience and was involved in a project aimed at improving quality of care in the emergency department. However I could not help but feel guilty that my volunteer efforts were concentrated in an up-scale hospital catered to the wealthy.

This guilt stemmed from the scenes that lay just beyond the boundaries of Apollo Hospital. Each day, during my hour-long commute to the hospital, I passed the Egmore Government Hospital for Women & Children. The understaffed and underfunded

government hospital was an uncomfortable juxtaposition next to its neighboring private hospital where I volunteered. Even at 6:30AM, dozens of women and children were crowded outside the entrance waiting for assistance. Doctors in government hospitals such as this treat over a hundred patients a day, inevitably sacrificing quality of care to accommodate demand. Patients at government hospitals are usually poor because they are unable to afford better care at private hospitals. I am certain my experiences at Apollo Hospital distorted my view of the Indian healthcare system. Unfortunately, my lack of clinical skills, social connections, and general difficulties in conversing in Tamil prevented me from volunteering in a government hospital.

Near the end of my time at Apollo Hospital, a family friend from home learned I was in Chennai. He suggested that I visit Pallavaram Children's Medical Center, a small, non-profit hospital located in the outskirts of the city. From its description, PCMC seemed to be the middle ground between the commercialized, internationally accredited care at Apollo Hospital and the free yet sub-par care at

government hospitals. As the main healthcare facility for children in the Pallavaram community, PCMC served all social classes, ranging from the homeless to destitute construction workers to upper-class professionals. While I was undecided about the specifics of my project, I was certain it would be one that would directly benefit the local community. Shortly after learning about PCMC, I arranged to meet with the hospital's chief medical officer, Dr. Parvathi. I spent my first few days at PCMC shadowing Dr. Parvathi and learning the ropes of the hospital. By the end of the first week, I had gained enough trust to assist the doctor and nurses with outpatient visits. I auscultated children with cackles and wheezes after tuning my ears to common stethoscope sounds, gave vaccinations, took basic anthropometric measurements, and occasionally examined children under Dr. Parvathi's guidance.

Out of the wide range of cases, one stood out distinctly in my memory. It was the first Saturday morning I started volunteering; a young mother rushed her five-year old son into the hospital after he fell off of a motorcycle. He had several cuts and bruises along his body, but the most serious injury was a deep gash on his forehead from which he was bleeding profusely. Realizing the urgency of the situation, the nurse on duty immediately tied four sutures to reduce bleeding and applied ointment to the other cuts and bruises. The boy's mother, a poor migrant laborer from the community, was unable to pay for the treatment, and the hospital therefore waived the fee. Unlike the staff

at many other private hospitals, the nurses and doctors at PCMC were specifically trained to provide care without considering the financial status of patients.

PCMC operated under the goal of reducing the disparity in quality and access of care for all social classes. It provided medication, vaccines, primary care and emergency care at nominal cost or free of charge for those who would otherwise have to rely on low quality, crowded government services. In fact, the closest government hospital was at least one hour away for Pallavaram residents, assuming transportation is readily available and traffic reasonable. In the case of the young boy, this extra delay may have led to complications from excess blood loss.

Due to its service-oriented practice, PCMC faces the challenge of finding a stable and sustainable source of funding. In addition, because the hospital opened merely nine months prior, it must overcome obstacles in its infancy such as meeting the growing demands of patients and staff, while establishing a respectable reputation in the community. These problems are further compounded by the challenges of running a hospital in an underdeveloped community, which makes it difficult to find permanent and qualified staff, nurses, and pediatricians to run the twenty-four hour children's hospital.

While I lacked the social network to find staff or doctors for the hospital, I could assist with the hospital's funding problem. The hospital relied mainly on funding from the American Tamil Medical Association, the Tamil Nadu

Foundation, and a local neighborhood trust. In an effort to sustain funds and increase awareness of the hospital, Dr. Athi Narayan, a neonatologist at Emory Johns Creek hospital and the lead trustee of PCMC, suggested I create a video to showcase PCMC at the sixth National American Tamil Medical Association convention in Chicago. With the help of a local film crew, I created and edited a fifteen-minute video that provided a tour of the hospital and its surrounding community. It was a multifaceted video with both patient and staff interviews and a briefing by Dr. Parvathi on the history, current status, and future projects of the hospital. This video was intended to provide donors concrete evidence illustrating the positive impact of their contributions while hopefully motivating them to renew their pledge to the hospital.

Upon completion of the filming and editing of the video, I helped organize the hospital's first outreach event, sponsored by CIPLA, an Indian pharmaceutical company. I worked with the hospital to conduct a free health screening at a parent-teacher conference event at a local pre-school. While Dr. Parvathi and an accompanying dentist screened children for general health concerns, I helped the nurse take measurements such as height, weight and arm circumference. During the screening, a significant portion of the children appeared stunted and underweight. This was an unsurprising outcome given that malnutrition is currently the most prevalent health concern among Indian children and the largest underlying determinant of child mortality. In

response, I provided nutritional advice and supplemental material on healthy eating to children and parents. By screening children for malnutrition and educating parents on the importance of proper diet and regular checkups with a pediatrician, we hoped to instill the importance of preventative care in these families.

What had started out as a mess of loose, fluid ideas eventually solidified into the experience of a lifetime. This summer's adventures cemented my passion for the field of public health and medicine in general by providing first-hand exposure to the disparities in the Indian healthcare system. While there is still much to learn, I am thankful for such an experience and await another opportunity to improve health in India.

# PERSPECTIVES



# Islamic Religious Leaders and Their Potential to Promote Family Planning in Jordan

By Heather Sanders

*Program Officer at Johns Hopkins Bloomberg School of Public Health*

The 1980s and 1990s witnessed a rapid decline in fertility throughout Jordan, falling from 7.4 births per woman in 1976 to 3.7 births per woman in 2002.<sup>1</sup> Since the early 2000s, however, the total fertility rate (TFR) has remained virtually unchanged, stabilizing around 3.8 births per woman since 2002.<sup>2</sup> Key factors influencing the TFR have changed little between 2002-2009. The woman's median age at first birth has only increased .05 years, and knowledge of the fertile period amongst women has actually declined from 68 to 61 percent.<sup>3</sup> Additionally, the growth of contraceptive prevalence rate (CPR) has waned in recent years, while the percent of births that occur less than two years after a previous birth has remained at 33 percent since 2002.<sup>4</sup>

Family planning (FP) has long been a controversial issue to address in Jordan, both because of the sensitivities surrounding reproductive health (RH), and because of misconceptions regarding the Islamic stance on FP. Addressing these misconceptions has been critical to advancing the practice of FP in

Jordan.

In the contemporary Muslim world, religious leaders rank among the most regarded, trusted, and influential individuals. As Islamic jurisdiction and religious teachings guide the daily lives of 97 percent of the Jordanian population, religious leaders occupy an essential role in shaping the attitudes and behaviors of Jordanians, particularly on sensitive topics such as FP and RH. Research has shown that Islamic religious leaders in Jordan are generally supportive of FP, and believe that the use of contraceptives fits within the tenets of Islam, which makes them a positive – though often untapped – resource for FP programmers in Jordan.<sup>5</sup>

The Jordan Health Communication Partnership (JHCP), implemented by the Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs (JHU/CCP), is a United States Agency for International Development project that seeks to create a health competent Jordan through the use of integrated, national level behavior change communication campaigns. In

order to encourage behavior change surrounding RH/FP, JHCP works simultaneously on multiple levels and through a variety of channels, including working with community members, health providers, government leaders, mass media, and religious leaders. This integrated, multi-level approach fosters a supportive environment for adopting new FP behaviors, while promoting both individual and societal behavior change.

In 2001, as a precursor to its work with the Jordan Ministry of Awqaf Islamic Affairs and Holy Places (MAIAHP), JHU/CCP conducted a FP Knowledge, Attitudes and Practices (KAP) survey among Jordanian religious leaders. The survey results indicated that religious leaders wanted to be increasingly involved in health programs – from the planning stages, through implementation and evaluation. As a result, JHU/CCP began engaging them at every stage of its FP programs and initiatives. In 2007, the MAIAHP adopted the Family Health Program, a comprehensive program that goes beyond FP issues to address a wide variety of family

health topics.

Through the Family Health Program, JHCP works closely with religious leaders at all levels. At the top level, the Minister of MAIAHP serves on the board of the Higher Population Council, which helps to cultivate a supportive environment for the acceptance of FP norms based on religious values. JHCP has also established a partnership with the Al Ifta' Department – a key religious department responsible for articulating the Islamic stance on a multitude of issues. The Al Ifta' Department works with JHCP to clarify the stance of Islam on FP and issued a fatwa (religious interpretation by Muslim scholars), indicating that spacing and contraceptive use is allowed in Islam (Mubah) if it does not affect users' health.

As part of its Religious Leaders Initiative, JHCP engages religious leaders in a collaborative materials development process in which they jointly develop FP strategies, concepts, and communication materials. To highlight the positive stance of Islamic jurisdiction regarding life planning, FP, small family size, breastfeeding, gender equity and proper spacing between pregnancies, JHCP and religious leaders have created TV spots, a Family Health booklet, radio spots, and posters using verses from the Holy Qur'an and quotes from the Prophet Mohammad (Sunna Nabawiah Sharifah).

Another key element of the Religious Leaders Initiative is Observational Study Tours. Working closely with the MAIAHP, JHCP selects First Imams and Wa'izat (female religious leaders) to participate

in a religious study tour of Egypt. During these study tours, religious leaders visit Al Azhar University's International Islamic Center for Population Studies & Research, which is considered the heart of all Sunni Islamic teaching on RH/FP issues. RLs have the opportunity to meet the Skeikh Al Azhar, one of the most highly respected officials of religious law in the Sunni Muslim world, as well as representatives from the National Population Council, the Ministry of Health, and a local Johns Hopkins project. These visits offer religious leaders an occasion to review the research on Islam and FP, discuss FP with top Muslim leaders, and ask questions to clarify Islamic teachings on FP.

Upon their return from the study tour, JHCP gathers the religious leaders for an action plan development meeting. Together, religious leaders brainstorm activities that they could conduct in their communities to promote FP, such as incorporating messages into their Friday sermons and religious lessons. Next, each leader develops an action plan of what he or she will implement during the next four to six months, and shares these ideas with other leaders in order to introduce a sense of accountability. These action plans are then sent to the MAIAHP for approval, which facilitates their adoption and distribution. A field coordinator is entrusted with following up on plan implementation and collecting achievement reports from religious leaders. JHCP holds regular meetings with the leaders to discuss progress, barriers, and successes.

To assist religious leaders with their FP activities, JHCP, in coop-

eration with the Higher Population Council and MAIAHP, has developed a Religious Leaders Training Kit, including a Family Health Manual, a Friday Sermons and Religious Lessons Booklet, a DVD on the Population Opportunity in Jordan, Population Impact on Development flash cards, and key Islamic fatwas on FP. The kit provides religious leaders with credible, accurate, and trusted information on FP. The DVD, population flash cards, and Islamic fatwas are designed to show the need for FP in Jordan as well as the acceptability of FP within Islamic constructs. The Family Health Manual and the, Friday Sermons and Religious Lessons Booklet provide talking points for FP sermons and lessons as well as offering a "how to" guide for conducting sessions. JHCP and partners have trained 372 male and female religious leaders in Zarqa governorate on the use and implementation of this kit.

JHCP conducted pre- and post-tests during its religious leader trainings. The results indicated that the participants' knowledge of RH/FP increased from 64 percent to almost 77 percent post training. 100 percent of master trainers believed that the leaders trained would adopt a supportive stance toward RH/FP in their own communities. During the March to August 2010 period, RLs gave 98 Friday sermons and 250 religious lessons on family health, which reached almost 52,000 males and 5,000 females. In addition, through the trainings in 2009-2010, religious leaders in the Zarqa governorate developed 18 comprehensive action plans for implementing religious family

health activities, which include 612 Friday sermons, 959 religious lessons and 32 lectures.

In religious populations where RH/FP issues remain sensitive, engaging RLs can be critical to the success of FP programming. In Jordan, RLs have expressed repeated interest in being involved in FP activities from the planning through the implementation phases. Allowing RLs to deliver and disseminate sensitive RH/FP information builds credibility and acceptability of FP practices, and helps to clarify common misconceptions surrounding religion and FP.

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# Communication in Health Care: Is Anyone Listening?

By Mary Catherine Beach, MD, MPH

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**M**ore than a decade ago, while in medical school, I was given the honor of spending the day with a famous physician who specialized in inflammatory bowel disease. It was a field in which I had hoped to specialize, and the pockets of my short white coat were stuffed with reference material.

The day started well. I fetched and interpreted radiographs, answered his questions correctly, and sat discreetly while his patients recounted their stories, in response to which he provided his advice. Sometime mid-morning, we met a woman whose disease was so severe that she would probably need to have her colon removed. This surgery would leave her with a permanent hole in her stomach through which her feces would be collected in a bag worn under her shirt (otherwise known as a colostomy bag). It was no small thing. According to my memory of the situation, she had one chance— if she could follow a strict low-fat diet, she might be able to avoid the surgery.

The famous doctor gave the bad news, and the advice to avoid fatty foods. Tears formed in her eyes. “I like to eat Mexican food – I love my rice and beans,” she said.

“You will have to avoid eating that now, I’m afraid,” he said, not

unkindly but firmly.

But she pressed on. “But I don’t know how to cook anything low fat.” At this point, she looked in my direction helplessly.

The famous doctor began to get firmer on this point, . “If you continue to eat fatty foods,” he warned, “you will end up needing surgery. You don’t want that.”

This dynamic continued for a little longer. As a student, I knew that I was not really supposed to talk, but after awhile a while, I couldn’t stand it. “If you really like rice and beans,” I finally broke in, “there are ways to prepare that with less fat. Also, you can get some Mexican foods already prepared low fat in the frozen section of the supermarket.”

She turned her full attention to me, and engaged with me in a brief discussion of how she might be able to live with these new dietary restrictions, while still not giving up the things that were most important to her. I could feel her hope returning. But, at the same time, I could sense the aggravation from the physician whom I was shadowing, and I knew I had erred in his eyes.

It was not this particular incident, but the cumulative effect of hundreds like it that inspired me

to enter a field of researching ways to better the relationship between patients and doctors. Each patient encounter represents an opportunity to comfort, build trust, and enhance a person’s self-efficacy, autonomy, and understanding. From the physician’s perspective, there are very few encounters that seem particularly meaningful, yet their collective effect is quite substantial. Despite this, the topic occupies very little time in the curriculum of medical schools across the United States and is still viewed as too “touchy feely” to be taken seriously by physicians in training.

Research in healthcare communication is a relatively young field, and some of its earliest efforts were spent trying to understand the nature of what happens between doctors and patients once the exam room door closed. Debra Roter, a professor at the Bloomberg School of Public Health and one of the founders of the field, developed a comprehensive coding scheme to characterize communication, and has published hundreds of studies that elucidate its features.<sup>1,2</sup> In one early and well-publicized research study, it was found that it took doctors an average of 18 seconds before they interrupted the patient’s opening statement.<sup>3</sup> In another study,

it was found that doctors neglected to express empathy nearly 75% of the time when patients expressed strong emotions.<sup>4</sup> Studies such as these, while descriptive in nature, help us to understand the types of educational interventions that may be helpful. Dozens of studies have shown that communication is related to patient outcomes, and there are many more that have examined how to improve communication between patients and doctors.

My own work in this field has followed several paths. Because I am most interested in improving quality of care for underserved populations, I have developed research programs focused on the quality of interpersonal care for patients with both HIV/AIDS and sickle-cell disease. Although both of these diseases are associated with stigma, the interpersonal issues are different.

Healthcare professionals tend to possess negative attitudes and biases towards patients with sickle-cell disease.<sup>5</sup> Sickle cell disease is a genetic disorder affecting the hemoglobin in red blood cells, causing the cells to elongate during stress. This causes extreme unpredictable pain for which patients seek care in an Emergency Department to receive intravenous narcotic medications. Because patients with sickle-cell disease do not have any objective measure of their pain (e.g. you can't see it in an exam or with an X-ray), doctors and nurses sometimes doubt patient self-reports. This leads to interpersonal conflict, under-treatment of pain, and frustration. We published several studies describing this phenomenon<sup>6,7</sup>, and then secured a small grant to

create a documentary film aimed at doctors and nurses with the goal of changing these attitudes through self-reflection. In our first study using the film, we demonstrated measurable changes in attitudes. As a result of the positive reaction, the film is now being used around the world.

In HIV care, primary interpersonal issues are not related to negative attitudes towards the patients in acute settings, but rather are related to maintaining relationships and effective communication in routine outpatient settings. One issue that is particularly important in HIV care is patient adherence to medication and HIV providers struggle with how to communicate about this most effectively.<sup>8</sup> We have recently received a grant which will develop and test the efficacy of an intervention to teach HIV specialized providers to use principles of motivational interviewing when discussing medication adherence with their patients. Motivational interviewing is a technique that was initially developed to counsel about substance abuse and it relies on a nonjudgmental yet directive approach.<sup>9</sup> The use of this method in routine health encounters with physicians is relatively new and has great potential.

Although the most important communication details and approaches may be different for each disease, each setting, and each patient, an elderly woman who I met on an airplane summarized it best. After I helped her get settled next to me on an overcrowded flight, she asked me where I was going. I told her that I was going to another University and that my job was to

teach doctors how to talk to people. "Oh!" she said, "that's important." She patted my arm, and then continued with a smile, "Don't teach them how to talk; teach them how to listen."

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# Environmental Public Health in Baltimore

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**F**or socioeconomically distressed urban residents, human health disparities and living in an urban environment are intimately linked.<sup>1,2</sup> In urban environments, a variety of physical and social environmental factors contribute to poor health and disparities, many of which are associated with environmental injustice.<sup>3,4</sup> Residents of many Baltimore neighborhoods are socioeconomically distressed, according to crime, income, education, and health indicators. One particular indicator of health disparity in Baltimore City is the city's cancer mortality rate, which is 267 deaths/100,000 individuals/year compared to 206 deaths/100,000 individuals/year for Maryland as a whole, and 197.7 deaths/100,000 individuals/year for the US.<sup>5</sup> These neighborhoods are often surrounded by a myriad of urban pollution sources.<sup>6,7</sup> While there are few episodes of acute exposure to high risk environmental agents, chronic exposure to low levels of environmental hazards occur on a daily basis in Baltimore neighborhoods, contributing to health disparities. Chronic diseases that have an environmental

component include asthma, cancer, cardiovascular disease, and cognitive decline.<sup>8-12</sup> In Baltimore, such chronic disease outcomes can be found in the same geographical area and census track.<sup>6,7</sup>

Environmental Public Health has been defined as the science of conducting and translating research into action to address environmental exposures and health risks of concern to the public<sup>13</sup>. The public health challenge we face is improving health and reducing disparities for those who live in urban environments, while at the same time building their sense of ownership and partnership in the educational process that can help remediate these problems. Baltimore residents need easy access to culturally appropriate health education materials to understand that their surrounding environment plays a role in their overall health. Unfortunately, many residents have little access to this information. In addition, distrust between residents and biomedical researchers reduces community acceptance of research.

## **Building Research Information**

## **into Community Knowledge**

Community engagement and education are essential components of environmental public health. As members of the National Institute of Environmental Health Sciences (NIEHS) Center Community Outreach and Education Core (COEC), we are involved in activities designed to build scientific research information into community knowledge in order to address health disparities in Baltimore City. Our goal is to increase the knowledge base, trust and capacity of residents so that they will be better equipped to bridge the gap between research information and community knowledge concerning environmental public health issues (Figure 1).

The research information that we use to build community knowledge is based on a concept that was originally developed in presentations with a Maryland Public Television NIEHS Center Teacher Summer Institute. We refer to this as the ACE concept: Avoidance, Chemoprevention, and Education. ACE helps residents recognize

what environmental hazards are present in their community and homes and what actions they can undertake to avoid them, ACE also helps residents become cognizant of the fact that eating more fruits and vegetables promotes the body's endogenous protective mechanisms, chemoprevention, against environmental hazards and disease. And finally, ACE helps residents realize that they are a critical part of the education process by passing their knowledge about ACE concepts on to others.

In terms of avoidance, one of the major issues in Baltimore City is the vast amount of residential demolition. The local community is concerned about avoiding lead dust exposure arising from the demolition of homes built prior to 1978. In this regard, Hopkins investigators have educated the community and have worked together to design the materials for outreach and education around demolition. They have also connected the community to researchers to address the public health implications, and have translated the community concerns into a new policy for demolition in Baltimore<sup>15</sup>. Currently, we are working with the East Baltimore Development Incorporated in reviewing their demolition protocols and plan to engage the community about the upcoming demolition project in East Baltimore.

Many exposures to environmental agents occur indoors, particularly in homes.<sup>16</sup> As discussed above, asthma is a major public health issue in Baltimore. We develop and disseminate educational information to the community about environmental asthma triggers in

the home and the means to avoid them. Two years ago, Ms. Susana Berrios, a summer intern from the University of California, Berkeley, developed a poster in Spanish illustrating these triggers for Latino residents in Baltimore. In addition, we have utilized a game using the "Family Feud" format to assess resident knowledge about asthma and asthma triggers. Over the last years, COEC has reached over 1,000 individuals through several variations of the Family Feud game format.

Human exposure to components in plastics such as phthalates and bisphenol A are of public health interest and concern.<sup>17</sup> Much of this concern stems from the ability of these agents to disrupt the endocrine system and affect tissue development. These chemicals are more prevalent in plastics that have the recycle numbers 3, 6, and 7. Plastics that have these numbers should not be microwaved in order to reduce exposure to these agents. Mr. Hayden Hawry, a 2009 MHS student, developed a website campaign, 'youarewhatyouheat.org', as part of a communication class at BSPH. We worked with Hayden and his student team to engage East Baltimore residents about this issue using '367' as an engaging catch phrase. Likewise, Ms. Emily Wanzler, a 2010 summer intern from McDaniel College, conducted a pilot survey of suburban and urban residents to assess their knowledge of environmental hazards, including phthalates and bisphenol A.

The 'C' in ACE represents chemoprotection, the effort to utilize dietary components to increase the bodies' defenses against the toxic active form of chemicals. Two of

the leading researchers in this field are Drs. Paul Talaly and Thomas Kensler of Johns Hopkins. Much of their research has focused on sulforaphane, a natural compound that arises when broccoli and other cruciferous vegetables are cooked, chopped or chewed.<sup>19,20</sup> There is a spectrum of phytochemicals found in many fruits and vegetables that can enhance the bodies' protective systems.<sup>21</sup> While the majority of the focus on chemoprevention has been on cancer, this concept extends to many disease states. Thus, a key educational message is that eating a well-rounded plant-containing diet represents a mechanism for natural protection against the hazards of the chemical world in which we live. While many socioeconomically distressed Baltimore residents appreciate this message, a major issue in Baltimore City is the lack of fresh fruits and vegetables.<sup>22</sup> Many sections of Baltimore have been referred to as "food deserts". The Baltimore food environment is a focus of research and outreach efforts at the Center for a Livable Future.

Education, the 'E' in ACE, can take place in many settings, both formal and informal. As a Core, we conduct a special studies class in Environmental Health Community Outreach. The focus of this seminar-based class is to discuss the need for community engagement in environmental health, to describe the concepts and principles of community engagement, and to showcase activities and projects pertinent to environmental public health in Baltimore.

**Community Engagement: Day at the Market**

Community engagement occurs in many venues. This includes attending community meetings, events, forums, and celebrations, having a conversation with someone on the street, connecting with local agencies such as health oriented coalitions (The Coalition to End Childhood Lead Poisoning and the Greater Baltimore Asthma Alliance, for example), government Health Departments, educational entities, funding organizations, and participating at professional conferences, workshops, and trainings. In short, it is important to be in the community on a regular basis. Shown in Figure 1 are some principles of community engagement and partnership building that we follow.

One of our main community activities is a “Day at the Market”, a joint Environmental Justice Partnership and COEC program. The “Day at the Market” is an educational and outreach event held for 4 hours (10am-2pm) on the last Wednesday of every month at the Northeast Market, (one of the six Baltimore City run markets for food and other vendors). This is the closest market to the Johns Hopkins Medical Institutions. It is an ideal location because there are no other common gathering places for East Baltimore residents. This informal event engages residents, distributes materials, obtains feedback from the community, and promotes interactions between residents and researchers. Many of the Johns Hopkins Medical Institutions staff that come to the market for lunch or to shop for food items are themselves East Baltimore residents. We use the “Day at the Market”

to discuss environmental health issues relevant to the community, to introduce researchers and their research project to the community, and to assist investigators in the recruitment of community residents for Community Advisory Boards, focus groups and participation in translation-oriented research. We provide information about research in environmental health and justice issues to residents including how to safeguard against environmental hazards such as lead poisoning, community demolition hazards, and asthma. Glenn Ross, a well-known community activist, is often present to describe his toxic tours and to provide his perspective on environmental health in Baltimore.<sup>23</sup>

This activity also provides an opportunity for other COEC partners to inform the community of available services. For example, Civic Works (an EPA and Abell Foundation funded project) presented and discussed with residents their B'More Green Program, a job training and placement program in environmental technology. Health service providers were invited to deliver services such as blood pressure and vision screening. Finally, we obtain feedback both verbally and through a sign-in-sheet where comments are recorded from residents about concerns and topics they desire to learn more about. This information helps us plan for what materials we need to develop or obtain in the future. On average, about 50 individuals use the sign-in sheet. COEC staff follow up with a phone call when an individual is seeking specific information. Residents are always encouraged to contact COEC at anytime with

additional questions.

## The Public Health Model of Intervention

A key component in environmental public health intervention is community engagement and education. As a research scientist, I have found community engagement just as exciting, rewarding and frustrating as experiments at the bench. There is, however, one major difference. When you engage the community, share information, or help someone, the simple “thank you” is not only rewarding; it also makes you proud that you have made a difference, no matter how small.

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# Happy 50<sup>th</sup> Birthday, Peace Corps

By Lisa Folda M.H.S.

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On March 1st, 1961, President John F. Kennedy signed the Peace Corps into being with Executive Order #10924, which was approved by Congress in September of that same year. The year 2011 marks the fiftieth anniversary of the Peace Corps. As a returned Peace Corps volunteer (RPCV) celebrating the 10th anniversary of my service, I feel particularly excited about the recognition of this important institution. Reflecting on my own experience as a health extension volunteer in Madagascar from October 1999 to January 2002, I find it important to emphasize a few of the hidden gems of “the toughest job you’ll ever love.”<sup>2</sup>

JFK’s original vision was one with friendship in mind, and all the secondary benefits that such peaceful relations might encourage. The Peace Corps was established as both a diplomatic entity as well as a development agency, and it operates on the basis of three official goals:

1. Helping the people of interested countries in meeting their need for trained men and women.
2. Helping promote a better understanding of Americans on the part of the peoples served.
3. Helping promote a better understanding of other peoples on the part of Americans .

The Peace Corps is a 27-month commitment, with three months dedicated to training, and two years of service on site. The time commitment is often one of the largest barriers for students considering the Peace Corps, but change takes time, and most find that two years passes quickly and rarely suffices.

When joining the Peace Corps, the majority of volunteers are generally focused on the organization’s first goal. In an op-ed piece of a January 2008 New York Times, Robert Strauss, a Peace Corps Country Director for five years in Cameroon, expressed his frustration with Peace Corps volunteers’ inability to “be effective development workers in the 21st century.”<sup>4</sup> He was speaking, largely, about the high percentage of recent college graduates who enter the Peace Corps, and the fact that their level of education and skills are no longer as unique as they were 50 years ago. Most notably, he points out that many of the countries, where volunteers now serve, are doing a better job in educating their own citizens. A foreign volunteer with a college degree is not such a prize, in and of itself, anymore.

Mr. Strauss has served in the Peace Corps as a volunteer, recruiter, and as a Country Director, one of their highest positions. He understands the organization more

intimately than most volunteers, including me. With all due respect, however, as I read his piece, I wondered if he was overlooking the larger mission of the Peace Corps, and later I found the letters in response to his piece encouraging.<sup>5</sup> The authors of these letters included the deputy political counselor at the US Embassy in Khartoum, Sudan, and a returned Peace Corps volunteer who served in Cameroon where Mr. Strauss was director (though she was not under his leadership). An excerpt from her letter follows:

*The Peace Corps is not just about what “fresh out of college” Americans can teach citizens of other countries. It is an opportunity for Americans to prove to the world that hubris is not the defining characteristic of our country.*

*While Mr. Strauss worries about how America can fix other nations, former Peace Corps volunteers like me will be putting to good use the skills we learned during our service. We will be listening, learning and sharing anywhere in the world we’re still welcome.*

She speaks to somewhat overlooked, yet crucial gains for Peace Corps volunteers. There is plenty of discussion about how the volunteer



*Image courtesy of Lisa Folda*

benefits more than the community in which they are placed, that's not news. But the experience also affects the volunteer in terms of new perspective and broadened capacity for empathy. And that perspective, forever changed, comes home with them, an asset to any subsequent work be it domestic or abroad.

In the last few years, the Peace Corps created the "Core Expectations for Peace Corps Volunteers."

<sup>6</sup> This set of guidelines serves as an informational piece designed to allow prospective volunteers to be honest with themselves about their ability to live up to all three goals of the mission. The "Core Expectations," as a document, did not yet exist when I was nominated for my

post in Sendrisoa, Madagascar. It emphasizes respect of other cultures, some hardship, flexibility and adaptability—critical ideas that, hopefully, any prospective volunteer has in mind. But the following two selections from the Core Expectations are crucial concepts that may be harder to anticipate and can only truly be internalized as an active volunteer:

- Your success "...is based on the local trust and confidence you build by living in, and respectfully integrating yourself into, your host community and culture," and
- "...you will be perceived 24 hours a day, 7 days a week..."  
"...as a representative of the

people, cultures, values, and traditions of the United States of America."

Thanks to tools like Skype and Gchat, never before have active volunteers been able to stay more connected with family and friends back home. While this connectedness alone is not a vice, it may be, in fact, threatening the integration of volunteers into their local communities. There is no doubt that the Peace Corps can be very difficult, especially as a volunteer attempting to acclimate to a new culture and learn a new language. I remember well being perceived as a complete idiot for stumbling over my Malagasy grammar, trying to convey to people that I really did

have complex thoughts, and wanted to communicate much more than “how much are your tomatoes?” Those frustrating times are when the right support is vital. Someone back home may be the perfect audience to vent to, but it is important to recognize that progress is more likely to come when you then enlist the help of someone local, and let them know of your struggle. I stand by the core expectation above – that you must work to build trust – because trust is one of the greatest treasures of a commitment like the Peace Corps. Recognizing that you have real weaknesses in this unfamiliar environment, that you must ask for assistance, and that only your neighbor can give you the help you need may be one of the most lasting gifts of your service. It was one of mine.

While there is incredible variety within Peace Corps service, both in terms of sites and responsibilities, there is a constant need for diplomacy. Any volunteer is a short-term member of a long-term social ecology, a source of curiosity for their fellow inhabitants (especially children), and may well be the only American that they will ever meet in their lifetime. Representing an entire country is a difficult role, no matter what the circumstances, but particularly one as diverse as the United States. In terms of local diplomacy, I came to understand, too, that any individual that I dealt with in my village was surely related to someone else whose significance to a project or endeavor might only become clear further down the road. I could not afford to burn a single interpersonal bridge – it was imperative to build alliances, not



*Images courtesy of Lisa Folda*



only because it was the right thing to do, but also simply to get things done. This heightened appreciation of tact, mediation, and ambiguity is the other key unsung reward for the returned Peace Corps volunteer, a

talent invaluable to effective leadership and one that remains long past the time spent at the site.

Mr. Strauss ends his submission to the New York Times with the accusation that the Peace Corps has

been “mythologized...into something that can never be questioned or improved,” but I would argue to the contrary. The simple existence of the list of “Core Expectations” proves that the Peace Corps is ever conscious of its changing image and potential. His concern for the need of the US to foster good relationships abroad is now, more than ever, is a sound one, and an area where we definitely agree. I believe the Peace Corps is doing just that, in its fortunately unique way.

The Peace Corps makes an incredible investment in their volunteers financially. Not only does the organization provide for volunteers during their service and offer good benefits upon their return, but it also pours resources into its infrastructure, finding great trainers for volunteers, and having key staff in country whose sole role is the volunteers’ safety and good health. I know of no other organization that does as much. There are simply not many organizations that have lasted 50 years to learn those important lessons – for Peace Corps, the numbers are approaching 200,000 RPCVs since 1961. While sustained and growing funding for these efforts might have been accomplished based on the merits of service alone, it is more honest to admit that garnering favor in Congress likely comes from presenting the ways that RPCVs continue to contribute to the US and global relations when their 27 months are done. There are many prominent civil servants who are returned volunteers, many CEOs of national and international corporations, celebrities in journalism and television, and former President Jimmy Carter’s mother,

Lillian, was a volunteer in India at the age of 68. The small percentage of those who are well-known, however, is unquestionably dwarfed by those who come home, “listening, learning, and sharing,” to become teachers in their local schools, health care professionals, or simply citizens who incorporate a global perspective on the way they raise their children, spend their money, and live their lives.

Happy Fiftieth Anniversary Peace Corps. I, for one, am looking forward your next fifty years.

“What is going to change the world today is the same thing that has changed it in the past: an idea, and the service of dedicated individuals committed to that idea.”  
~Robert. Sargent Shriver, Jr., November 9, 1915 – January 18, 2011

Early in the Peace Corps’ 50th anniversary year, it said goodbye to its founding Director, Sargent Shriver, who died at the age of 95. Brother-in-law to JFK, he was responsible for implementing the young president’s vision, and became its true leader and creator. His is the shared and lasting legacy of service, positive change, and peace.

Recently, an episode of ABC’s 20/20 brought to light troubling stories about volunteer safety and services for assaulted volunteers. I am happy to say that my experience was a good one and can only hope that the Peace Corps is taking this media attention very seriously. Let me also reiterate, I know of no other organization that does as much.

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# Angle Closure Glaucoma in India: Preventing Blindness on the Subcontinent

By Pradeep Ramulu, M.D., MHS, Ph. D

*Assistant Professor of Ophthalmology, Wilmer Eye Institute*

**B**lindness in developing nations continues to be a significant problem. Data from 2009 indicates that 45 million people globally were bilaterally blind, with an additional 270 million visually impaired.<sup>1</sup> Tragically, most cases of blindness and visual impairment continue to result from treatable causes, such as cataracts or uncorrected refracted error. I have been fortunate to collaborate with the Aravind Eye Institute in India, which has introduced cost-efficient systems to deliver extremely high-quality care to large numbers of patients. Indeed, Aravind and other prominent eye institutes in India have made a significant impact on blindness and visual impairment through highly efficient cataract treatment programs, widespread distribution of spectacles, and training programs that produce high-quality cataract surgeons. Hence, eradication of unnecessary blindness from reversible causes of vision loss is becoming a possibility for people in the catchment zones of these eye hospitals. However, a second, and much more formidable challenge remains: addressing vision loss resulting from chronic eye diseases, such as glaucoma, diabetic retinopathy, and macular degeneration.

Aravind has aggressively tackled

the issue of diabetic retinopathy by employing mobile screening units, which screen diabetics for retinal complications, and by treating most patients requiring laser therapy at tertiary referral centers. We have employed a different approach towards identifying and treating another specific eye disease: angle closure glaucoma. Glaucoma refers to characteristic damage to the optic nerve, which first leads to loss of the peripheral visual field and ultimately leads to loss of central vision. Vision loss is irreversible most often occurring gradually over years or decades. Two major forms of glaucoma are recognized: open angle glaucoma and angle closure glaucoma. The “angle” is formed by the iris (which gives the eye its characteristic color) and the cornea. In angle closure glaucoma, the angle is narrow enough that egress of fluid out of the eye is obstructed, leading to elevation of intraocular pressure and optic nerve damage.

Angle closure glaucoma is an appealing “chronic” condition to tackle for many reasons. First, blindness associated with angle closure glaucoma is much more common than blindness associated with primary angle closure glaucoma.<sup>2,3</sup> Second, if detected early enough, most cases of angle clo-

sure glaucoma can be permanently prevented by a simple, low-risk laser procedure (laser iridotomy) which can be completed in the office.<sup>4</sup> In fact, angle closure glaucoma only develops into a chronic condition at the later stages of disease. At these later stages of disease, laser therapy is usually insufficient treatment, and surgery or long-term eye drop treatment is frequently required.

Several major challenges persist in preventing blindness from angle closure glaucoma. First, many Indians and Asians show a predisposition towards angle closure glaucoma. However, epidemiological data suggest that most of them will never develop meaningful loss of vision during their lifetime.<sup>5</sup> Second, most individuals have limited access to eye care, making widespread screening for the early stages of angle closure glaucoma impractical. Finally, even if widespread screening were practical, treating the 10-20% of the population with the early stages of angle closure glaucoma would strain a system in which the number of eye care professionals is a limiting resource. Additionally, while laser iridotomy is generally safe over the short term, some studies have suggested that long-term side-effects, such as cataracts, may occur.<sup>6</sup> Even if these side effects are rare, the

impact could potentially be great, particularly for individuals living in areas where access to care is limited and whose ability to obtain cataract surgery may be hampered by costs, lack of transportation, or the inability to take time off work.

One aspect of our work has focused on how eyes with the earliest stages of angle closure glaucoma differ from eyes with more advanced stages (besides obvious differences such as optic nerve damage). This work, along with other longitudinal studies being done in Asia by physicians at Johns Hopkins<sup>7</sup>, will hopefully allow for a more limited, intelligent selection of which patients need laser iridotomy, and which can be observed without treatment or safely released without the need for continued follow-up.

A second focus of our work has been to screen individuals potentially at high risk for angle closure glaucoma so that they can be treated prophylactically as indicated. Unfortunately, other than age, most of the known risk factors for angle closure glaucoma, such as far-sightedness (hyperopia), corneal curvature, or shallowness of the front (anterior) chamber of the eye cannot be readily identified in the population without a proper eye exam. One potential risk factor that could be used to select high-risk individuals for screening is family history of disease. A positive family history is known to increase the risk of open angle glaucoma by up to tenfold.<sup>8</sup> Unfortunately, no similar study has been performed with angle closure glaucoma. We have currently screened over 100 sibling pairs with glaucoma and anticipate reporting, for the first

time, to what extent a family history of angle closure glaucoma puts one at risk for the disease and whether this group of individuals represents an appropriate high-risk group for screening. One appealing feature of sibling screening has already become readily apparent: over two-thirds of siblings requested to come to the Aravind Eye Hospital have indeed done so, despite the obvious financial and logistical obstacles.

A third major focus of the Aravind Eye Care System has been setting up methods to better deliver care to patients who do not live close to their five large eye hospitals. Traditionally, this work has been done as part of eye camps, which have been primarily designed to identify cataract. However, these camps are not equipped to measure intraocular pressure (a major risk factor for glaucoma) using the latest, most-reliable techniques, or to adequately identify damage to the optic nerve (the hallmark of glaucoma). As a result, we've begun additional work to see if better screening methods could identify more glaucoma and retinal disease amongst patients screened at eye camps.

Finally, there is ongoing work to test if a new model of outreach eye care implemented by Aravind satellite hospitals, with our without surgical facilities, is better able to identify glaucoma and encourage reliable follow-up for individuals in need of chronic care.

While much work is yet to be done, we see our work as a first step towards decreasing visual impairment and blindness related to angle closure glaucoma, and towards addressing chronic eye conditions in

developing nations.

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A large, diverse crowd of people is gathered outdoors, likely in a rural or semi-rural setting. In the foreground, several women are wearing vibrant, patterned traditional dresses and headwraps in shades of blue, red, and yellow. They appear to be engaged in a communal activity, possibly a dance or a social gathering. The background is filled with more people, including men and children, some wearing hats and casual clothing. The overall atmosphere is one of a significant community event. The word "EDITORIALS" is overlaid in white, bold, sans-serif capital letters across the center of the image.

**EDITORIALS**

# Danish Health Care Lessons for the United States

By Andrea Popovech, Class of 2011

*Public Health Studies*

Pedaling on my bike through the cobblestone streets of Copenhagen, past five-story neoclassical homes, colorful shops, and fragrant bakeries, I was skeptical of Denmark's outward charm and smirked at the thought that this was a social democracy. Later, after securing my bike to the stand outside of Gammel Køge Landevej 22, I stood gawking at the new-age glass building in front of me. It hardly seemed right for a health care clinic. Upon entering the "Kommune", I was greeted by its glistening, renovated interior, complete with up-to-date computer stations, LCD televisions, and helpful staff. I sat on a plush orange chair and waited for the usual overabundance of paperwork, droves of anxious adults and screaming children to appear. To my surprise, the waiting room remained tranquil and I was simply handed an electronic waiting number and told to wait until a representative was ready for me.

Almost immediately, I was called to a desk where I was asked for my name, my basic medical history, my letter confirming my temporary Danish citizenship, and whether I preferred a male or female practitioner. The information was entered and stored on

an electronic form that was then transferred to a "CPR card." At the size of any credit card, the Computer-based Patient Record Card now held my medical and personal information and the name of my primary care physician. I was only a swipe away from access to primary care or a hospital visit. As I stepped out of the building through the automatic glass doors, I wondered whether this hospital could truly be publicly funded. Is it really feasible to have an efficient, technology driven, paperless health care system that still delivers quality care to all of its citizens? More importantly, how can the United States learn from this model health care system?

## The Danish Healthcare System

Although both the Danish and American health care systems are decentralized, they function quite differently. On one hand, the Danish system is often categorized as a "social democratic" model of health care.<sup>1</sup> Through general taxation, set at eight percent of taxable income, Denmark is able to provide universal and compulsory health care coverage to all of its citizens.<sup>2,3,4</sup> Therefore, Danes only pay out-of-pocket for 14% of the Danish budget for

health care.<sup>5</sup> With the majority of its power relegated to the local municipalities,<sup>6</sup> the system functions at three distinct levels: state, regional, and municipal.<sup>7</sup> On the state level, the Ministry of Health and the National Board of Health together manage the financing of health care by allocating tax revenues to municipalities and regions.<sup>3</sup> Health care on the regional level deals with the quality and equity of care within the hospital sector and provides compensation for practitioners, specialists, and pharmaceutical companies.<sup>3</sup> Coordinating with both the state and regional levels of the system, municipalities have authority over a range of services including health promotion, primary prevention, tertiary prevention, and rehabilitation.<sup>8</sup> Retaining the power to levy taxes, municipalities also have input on decisions regarding inter-municipal fund redistribution.<sup>9</sup>

On the other hand, health care in the United States is characterized by a decentralized, market-oriented system. Power is divided among health maintenance organizations, insurance companies, and public health institutions, which means that providers are not all compensated equally.<sup>4</sup> This mixed

system of public and private insurance providers leaves 47 million Americans uninsured and without access to primary care. Thus, despite the fact that health care in the United States is technologically sophisticated and can provide highly specialized care, there is still a high barrier to access because it requires direct payment. As a result, many of the uninsured flock to emergency rooms, overburdening inpatient and emergency services.<sup>4</sup> However, focusing solely on the cost and the need to lower spending will not give birth to a solution. Instead, improvement efforts need to address the weaknesses in the structure, quality, and distribution of health care in the United States. The movement towards homogeneity of care will require greater centralization of health care financing, which would improve equity and drastically cut advertisement and administration costs, as well as ease the burden on patient insurance premiums.<sup>4</sup>

In Denmark, where medical services are available to all, there exists a higher level of satisfaction with care than in the United States.<sup>4</sup> Within the publicly funded system, gate-keeping strategies are put in place to prevent overuse of health care and abuse of pharmaceuticals. The quality of care in Denmark is measured by a comprehensive program, which accounts for organizational, structural as well as clinical standards. The quality-data accumulated from annual self-assessments, and external evaluations is accessible to patients via the Internet, enabling them to make informed decisions while encouraging system improvement.<sup>9</sup>

Moreover, the advances in health information technology make it possible to monitor general practitioner care, specialist consultations, prescribing history, and hospitalization records for individual patients through a single online database.<sup>9</sup> With this type of monitoring in place, practitioners with excessive prescribing history can be identified and counseled to curtail overuse.

Self-employed general physicians are reimbursed through a mixed capitation and fee-for-service system and assume the role of gatekeepers by controlling the flow of patients to specialized/secondary care services. A mixed capitation and fee-for-service system avoids the disadvantages of each system operating separately. Fee-for-service increases incentive to provide preventative care, testing, procedures, and referrals, while capitation reduces these same incentives by providing practitioners with a fixed fee for each patient regardless of the services rendered.<sup>4</sup> This payment system encourages practitioners to focus on the patient and their needs, instead of the incentives behind reimbursement.

Primary care physicians are also available on weekends in Denmark, allowing greater access to care.<sup>4</sup> As a result, patients may meet with a primary care physician first, instead of choosing to see a specialist or undating emergency rooms, which often happens in the United States where citizens may not have direct access to primary care. Uninsured Americans are much more likely to live without receiving the necessary preventative care and long-term treatment of chronic conditions, thereby increasing their risk for

mortality and disability.<sup>4</sup> For those who are insured through employers, the fluctuation of premiums creates instability in health care. For example, when employers control the insurance coverage that their employees receive, higher premiums could necessitate a change of insurance provider. This could potentially disrupt the patient-practitioner relationship, and thus weaken the trust that could prevent the need for second opinions.

### **Putting the Danish Healthcare System to the Test**

A short time after my visit to the Kommune, I became ill with the flu, and so I made an appointment to see my primary care physician on a Sunday afternoon. I entered the waiting room, occupied by several other patients and approached the secretary who swiped my CPR card. Within minutes, I was called into the physician's office, fitted with a desk in its corner and an adjacent examination table. The doctor and I sat facing each other, which created a sense of equity between us, and her conversational tone put me at ease. Once the examination was complete, the doctor assured me that there was no medication better than getting ample rest and drinking plenty of liquids to get over my flu. Leaving the clinic, I realized that this was a very different experience than the one I would have had in the United States.

### **Where to Go From Here?**

The achievement of universal coverage, while maintaining economic stability and an adequate

supply of resources speaks to the efficiency of the Danish health care system. I believe that the United States now, in an effort to improve its own health care system, can look to the Danish model for lessons and inspiration. Several changes can be made to improve the relationship between patients and practitioners while both managing costs and increasing efficiency. These include restructuring financial incentives to improve service allocation, cultivating a stronger trust to reduce the need for second opinions, and enforcing counseling for physicians with high rates of referrals or prescribing history. More broadly, patients should have access to unbiased assessments of different providers, a change that would also increase the providers' incentive to maintain and ameliorate the quality of care. The improved system would break down financial barriers that limit the availability of primary and preventative care to ensure that health care is not a privilege, but a right. None of these changes are guaranteed to fix our system overnight. Nevertheless, measures must be taken to strive toward a health care system that ensures quality care, lower costs, and greater access to care for all United States citizens.

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# HIV and Blood Donation: A Civil Rights Battlefield

By Eric Luitweiler, Class of 2013

*Molecular and Cellular Biology B.S., Bioethics Minor*

Each year, millions of Americans lie flat on tables, have their arms pricked and prodded by needles, and deal with post-procedural dizziness, all to provide three pints of blood for cancer patients and car accident victims. Unfortunately, even with massive blood drives across the nation, there are always patients in need of blood. Although the American Red Cross is primarily responsible for nationwide blood drives, the Food and Drug Administration (FDA) is also greatly responsible for the success and safety of blood donations, as the administrative body that establishes the rules and regulations which determine donor eligibility. By removing a controversially outdated restriction, the FDA can take our health care system one step closer to meeting the needs that the current blood supply cannot.

The American Red Cross claims that a person should not give blood if he has engaged in behavior that would put him at risk for being infected with HIV. They provide one such example: "If you are a male who has had sexual contact with another male, even once, since 1977."<sup>1</sup> This restriction is in place to prevent HIV from spreading through the blood supply, as it did in the 1980's when a disproportionate

number of HIV infections were observed among hemophiliacs. Yet unlike many other high-risk populations deemed ineligible by the FDA, men who have had sex with other men (shorthand as MSM), along with IV drug-abusers, are barred for life from donating blood.

Gay rights advocates across the nation have been fighting to lift this restriction. The major civil rights argument asserts that all citizens, regardless of gender, sexuality, and race, deserve the right to act altruistically. Regardless of whether this argument is valid, the lifetime ban on MSM from donating blood is detrimental to the American health care system because it limits the blood supply by prohibiting so many potentially uninfected men from donating.

The ban began in 1983, when the probability of HIV transmission to the average blood recipient was estimated at 1:250,000, and at a time when 71.2 % of AIDS cases were reported to be MSM associated.<sup>2</sup> The blood supply during this period was at risk for contamination and, understandably, required the implementation of interventions such as HIV tests, and donor screening questions. Among these questions was the one directed towards MSM, and so it remains.

Comparing the number of HIV infections through donation from nearly three decades ago to the current statistic, there is a strong disparity. About 12 million units of blood are donated per year in the United States, out of which 10 units of HIV-positive blood pass through because of false-negatives or human error, causing only two to three infections in recipients nationwide.<sup>3</sup> The American Red Cross and the FDA have done an impressive job in all but eliminating HIV transmission via blood donations, especially since cases of HIV have increased five-fold, from 200,000 to 1 million between 1983 and 2003.<sup>4</sup>

The major question that remains is whether this great reduction in transmission is due to the donor screening questions or the HIV tests that have been implemented, since neither intervention was widely used in the early 1980's. The first anti-HIV test, enzyme-linked immunosorbent assay (ELISA), was incorporated in blood donations in 1985; however, HIV infections from donations were still observed.<sup>5</sup> This was due to the effect of the window period, a period of time between the donor's infection and the presence of testable HIV antibodies in his blood. The primary goal of tests over the years has been to reduce

the window period, thus providing fewer false-negatives. Then, in 1999, the blood test for HIV became much more reliable with the incorporation of Nucleic Acid Testing (NAT). With NAT, the window period of the HIV test has been reduced to only a timeframe of 12 days.<sup>6</sup> Such improvements have made it safe for the FDA to consider reducing the ban on MSM down to one year, since it would still be a long enough ban to prevent false-negatives in the window period from passing through donation.

The institution of donor screening questions was likely effective in reducing the number of contaminated blood units as well. The FDA correctly chose to institute some measure of pre-donation screening, for both the safety of the donor and the safety of the recipient. However, the donor restriction questions are flawed in nature. Considering that there are factors other than MSM that give higher risk to HIV transmission, it is a wonder why no revisions have been made. A high number of unprotected sexual encounters, for example, is a major risk factor in HIV transmission in both homosexuals and heterosexuals. In addition, as opposed to the lifetime ban on MSM, a heterosexual woman who has had sex with high-risk men is only banned for one year.<sup>7</sup> In effect, the FDA has created a situation in which a man in a monogamous relationship with another man is banned for life, while a female with multiple high risk sex partners may not be banned at all. Though it is clear that any individual, regardless of sexual orientation, engaging in high-risk sexual practices is at a greater risk

for contracting HIV, the ban is still most strict for self-identifying homosexual males.

In light of the improvements in HIV-testing and the flaws in donor screening questions, the FDA is due to revise the current bans and regulations on high-risk groups. Even though the annual number of new HIV infections attributable to blood donations has greatly decreased, primarily as a result of accurate HIV screening tests, thousands of gay men remain ineligible. In March of 2006, large blood supply organizations, including the American Association of Blood Banks (AABB) and the American Red Cross, proposed that the FDA reduce the lifetime ban on MSM to a one-year ban. The American Red Cross also stated, "It does not appear rational to treat gay sex differently from straight sex."<sup>8</sup> It is now up to the FDA to take the advice of the American Red Cross.

It is difficult to estimate how many more donations would be obtained, and how many more lives would be saved if MSM were allowed to donate. Undoubtedly, the American Red Cross, as well as hospitals across the country, would see an increase in their blood supply. Perhaps the best of advice comes from the Director of the Gay and Lesbian Medical Association, Dr. Joel Ginsberg: "Our position is simply that the same criteria should be used for gay men as are used for other groups, and our sense is that that's not the case now."<sup>9</sup> By revising the sweeping lifetime ban over all homosexuals and developing more specific questions to identify high-risk individuals, the FDA would still provide safe blood, but

more of it. After all, the goal of blood donation is to save as many lives as possible.

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# Hepatitis B: A Silent Killer

## The Need for Increased Surveillance and Awareness of Hepatitis B among AAPIs

By Byung Joon Park, Class of 2011

*Public Health Studies, Biology*

After first hearing that as many as one in 10 Asian Americans have chronic hepatitis B, I was shocked. Although I am an immigrant from Korea, my family, friends and I have never known anything about this disease that is so prevalent in our ethnic community. Not only was I ashamed as a public health studies major that I had never known I was so vulnerable to hepatitis B, but I was even more disappointed that not many people had commonly discussed the status of the disease in the United States, or knew much about its effects on the body. The hepatitis B virus (HBV) is a relatively resilient virus that is transmitted easily from person to person, among family members or among groups of friends. HBV can be transmitted by percutaneous or mucosal exposure to infected blood or other bodily fluids and can be transmitted from mother to newborn during delivery.<sup>1</sup> Chronic hepatitis B infection, an asymptomatic disease, leads to primary liver cancer (hepatocellular carcinoma) and cirrhosis. In the U.S., approximately 80% of liver cancer is etiologically associated with chronic hepatitis B and 25% of HBV carriers develop cirrhosis.<sup>2</sup> The direct and indirect financial burden of

chronic hepatitis B reaches \$1 billion each year.<sup>2</sup> Despite the wide availability of an effective licensed vaccine that was first introduced in 1981 and the adoption of universal childhood HBV vaccination, the number of new HBV infections is not decreasing significantly and primary liver cancer incidence is increasing steadily.

In contrast to hepatitis B, HIV/AIDS is a pandemic of which we are well informed. We hear the horrific personal stories and read a number of related statistics in news articles. The disease has become a subject of common knowledge in our culture, and by the end of 2006, it was estimated that almost 1,106,400 people in the United States were living with HIV infection.<sup>3</sup> A similar proportion of the U.S. population lives with hepatitis B virus (HBV), yet only a scarce amount of the federal or state budget is reserved for combating HBV in comparison to the resources set aside for HIV/AIDS programs.<sup>4</sup> Every state in the U.S. has state coordinators for hepatitis B - usually nurses or public health professionals - who are appointed by the Centers for Disease Control and Prevention to work primarily with physicians and hospitals to ensure

that perinatal HBV infections are prevented and routine hepatitis B vaccination is promoted.<sup>5</sup> Nevertheless, the majority of local public health officials do not have enough funds to provide HBV education and initiate screening campaigns.<sup>2</sup>

The reason for this lack of sufficient funding is under-reporting of the disease. A recent study conducted by Wasley in 2010 concludes that approximately 730,000 U.S. residents live with chronic HBV.<sup>6</sup> Other experts think that the current estimate of HBV prevalence would increase if taking into account HBV prevalence in immigrant populations, particularly Asian Americans.<sup>7</sup> Experts reason that under-representation of high-risk populations, such as Asian Americans and Pacific Islanders (AAPIs), in surveillance studies often performed by the National Health and Nutrition Examination Surveys (NHANES), results in under-estimation of the true prevalence of HBV in the U.S.<sup>8</sup> A recent heavy influx of foreign born immigrants from countries of high HBV endemicity further limits the accuracy of NHANES estimates.<sup>9</sup> Perhaps a more accurate number set forth by the Hepatitis B Foundation proposes that as many as 2 mil-

lion people in the United States are currently living with the disease.<sup>9</sup>

According to census data (2005 American Community Survey) and current prevalence estimates for HBV, AAPIs alone account for approximately 850,000 cases of HBV, a number reached using hepatitis B prevalence estimates drawn from a survey of AAPI pregnant women.<sup>10</sup> Thus, AAPIs account for almost half of the HBV cases, a significantly high figure considering that only 4.6% of the U.S. population are AAPIs.<sup>11</sup> In the San Francisco Bay Area, 3,163 Asian American adults were screened for HBV from 2001 to 2006 and 8.9% were found to be chronically infected with HBV; notably, 65.4% of the people who were chronically infected were unaware that they were infected.<sup>12</sup> In another recent study conducted in New York City, 1,836 Asian Americans were tested for HBV infection and 14.8% tested positive for a chronic HBV infection.<sup>13</sup>

It is imperative that hepatitis B be recognized as one of the chief public health concerns and that different strategies be implemented to decrease the prevalence of chronic infections. One possible strategy is to advertise vaccination and HBV screening among high-risk groups, particularly AAPIs. A major national objective in Healthy People 2010, a science-based document containing 10 year national objectives for promoting health and preventing disease managed by the Department of Health and Human Services, is the prevention and early detection of cancer in all racial and ethnic groups. Nevertheless, the fact remains that very few health programs today accommodate the

cultural and social needs of ethnic minorities, including Asian American immigrants.

Several factors influence the low rate of HBV screening and vaccination among Asian Americans, such as: individuals not being aware of their infection, limited access to healthcare, language and cultural barriers. I am currently involved in the Maryland Asian American Cancer Prevention Program based out of the Johns Hopkins Bloomberg School of Public Health, and last year, I was part of several educational intervention programs that provided education about hepatitis B screening and vaccination to Chinese Americans residing Maryland. Many of the participants told me that having hepatitis B was perceived as ignominy and were therefore afraid to be tested. Thus, sustainable HBV screening and vaccination programs that use culturally tailored educational material are necessary in order to reduce liver cancer incidence as well as chronic HBV prevalence among Asian Americans. According to the U.S. Census Bureau, the AAPI population will grow to 33.4 million people (8% of the total population) by 2050,<sup>14</sup> so there is an undeniable need to increase HBV knowledge and screening rates. If these changes fail to take place, Asian Americans will continue to bear a disproportionate burden of disease that leads to premature death – an unfortunate example of the deteriorating public health conditions created by health disparities in the U.S.

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