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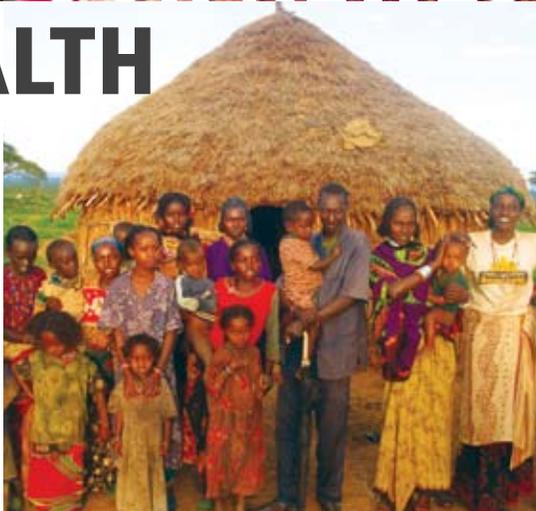


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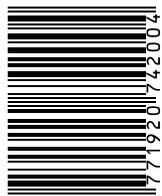
Diagnosing the Obama Plan

Tackling Ataxia After
"Chasing the Dragon"

Climate Change and UN
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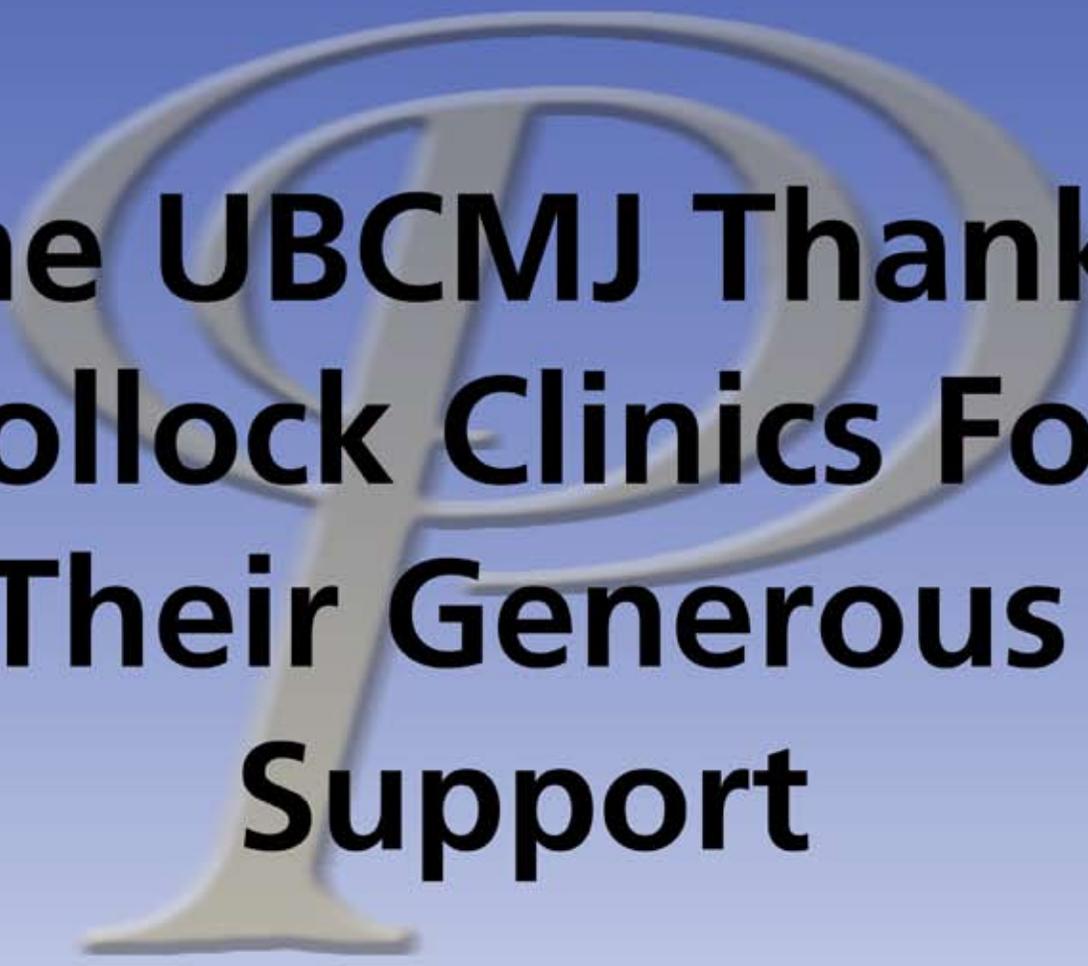
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On behalf of the Michael Smith Foundation for Health Research (MSFHR), I congratulate the UBC Faculty of Medicine students on the publication of the second issue of the *University of British Columbia Medical Journal*. The journal provides important insight into the research being done by medical students at UBC – our future leaders in medicine and health research in British Columbia.

MSFHR is proud to have supported many talented students in the UBC Faculty of Medicine over the last nine years with our Masters, PhD and postdoctoral awards. These awardees and other Faculty students make a valuable contribution towards putting BC on the Canadian and international map as one of the places to conduct outstanding health research.

UBC students are pursuing a great number of exciting research projects, all of which have significant potential to improve health and health care in the future. Their commitment to health research helps to build a strong health research sector in BC which in turn benefits our health system, our advanced education system, our economy, and all British Columbians.

Again, our congratulations on compiling a publication that showcases the research contributions of students in the UBC Faculty of Medicine – we look forward to seeing many more issues in the years to come.



Dr. John Challis

Universal Health Care for All

Diane Wu, BSc(Hons)^a, Pamela Verma, BSc(Hons)^a, Rupinder Brar, BSc, MDip in Global Health^{a,b}

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The *UBCMJ* has taken leaps in its development since its last issue. Our first issue looked at local issues facing British Columbians; this issue we focus on a global perspective. Global health is a major area of interest in health sciences, and the economics and administration of health delivery systems has been at the forefront of debate both nationally and internationally. It is widely agreed that universal coverage of health care is an important benchmark to measure the success of health systems worldwide. British Medical Association chairman Hamish Meldrum recently announced that “at a time of financial difficulty we should be encouraging all parts of the service to work together and not compete with each other. There is no evidence that competition has driven up quality of care.”¹ Ensuring enrollment in a national insurance system or health service provides the necessary risk protection against catastrophic expenditures incurred by unforeseen and largely unpredictable health emergencies. In the United States, for example, medical bills are one of the leading reasons for descent into poverty.²

It is widely accepted that providing universal coverage contributes largely to favorable health statistics because of its focus on preventative health measures. A well-known example of this is the Cuban health paradox. Cuba ranks low in GDP per capita yet parallels Canada and the United Kingdom in infant mortality rate and life expectancy at birth.³ From physician training to service delivery, Cuban medicine upholds the value in preventative medicine. Intersectorality, community participation and strong health policy all contribute to the successful combination of good health outcomes with low resources.⁴ This is not a new phenomenon. China’s communist-designed health system, offering a standardized basic package of primary care for all citizens in urban and rural areas, was deemed a “model country” for health at the historic 1978 world health conference in Alma Ata.⁵

Yet while strong primary care is the driving force behind better health outcomes, the introduction of ancillary private systems can often jeopardize these efforts. Private, self-governed medical systems can make it difficult to implement nation-wide prevention services. The two-tier system implemented in Australia has seen an increase in expenditure due to the large subsidization by the government but no reduction in wait times as initially predicted. This is partly due to the shift of health care professionals from the

public to the private sector further increasing the inequities faced by the public sector.⁶ This tends to foster a polarizing environment in which those with the ability to pay often experience care that is removed in quality and cost from those without similar financial means.

Our neighbors to the south currently find themselves in the center of a heated debate on health reform. In this issue, Grewal reviews one of the most recent versions of the “Obama Plan” (p. 30). Walker discusses the importance of an environmental perspective on health care and the UN Millennium Development Goals (p. 27). Cultural considerations are vital to successful health care delivery both when working abroad (McInnes, p. 17), and locally with new immigrants to our country (Chew, p. 40).

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...universal coverage of health care is an important benchmark to measure the success of health systems worldwide.

Health care is a right, not a privilege. Better management of resources and providing better medical infrastructure will produce much better results than deflecting all of our waitlists to private options. New services such as the BC Perinatal Health

Program and Pharmanet allow the tracking of service use and create an environment that allows for innovative ways to study medicine, and may reveal new ways to improve services without compromising cost. This direction is perhaps the most reasonable way to proceed into the future. 

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A Made-in-Canada Strategy to Stop HIV and AIDS

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TREATMENT OF HIV/AIDS

While an outright cure and a preventive vaccine for HIV/AIDS remain elusive, remarkable advances have taken place over the last two decades with regard to HIV therapeutics.¹ Most significant among them has been the development of Highly Active Anti-Retroviral Therapy (HAART).² HAART refers to a combination of antiretroviral drugs, typically three, that can fully suppress HIV replication.³ With the use of HAART, the number of HIV-1-viral copies in plasma rapidly becomes undetectable as measured by the most sensitive commercially available plasma HIV-1-viral load assays. This allows immune reconstitution to take place, arresting the otherwise fatal course of the disease. HIV disease can therefore be put into remission on a long-term basis. Dramatic HAART-related reductions in morbidity and mortality in HIV-infected patients have been shown in clinical trials and observational studies.^{4,5} By 2006, it was estimated that at least three million years of life were saved in the United States as a direct result from the roll out of HAART.⁶

TREATMENT AS PREVENTION

Recently, a rapidly growing body of evidence has suggested that expansion of HAART coverage can offer a substantial positive synergy towards the reduction of HIV transmission.⁷⁻¹³ HAART effectively suppresses viral replication rendering the plasma HIV-1-viral load undetectable on a sustained basis. As a result, HAART also decreases HIV-1-viral load in other biological fluids, including semen and vaginal secretions.^{14,15}

Strong proof of principle regarding the impact of HAART on HIV transmission is found in the vertical transmission setting.¹⁶ In this scenario, HIV transmission is virtually eliminated when HAART is appropriately used.¹⁷

A preventive role of HAART has also been demonstrated in HIV sero-discordant heterosexual couples. Attia *et al.* completed a meta-analysis involving over 1000 person-years (the sum of

actual observation times for each patient) from five different cohorts, which showed that no events of HIV transmission were documented when the index patient was receiving antiretroviral therapy and had a viral load below 400 copies/mL.¹⁸

More recently, we were interested in evaluating the potential secondary benefit of HAART on HIV transmission among injection drug users.¹⁴ Our results showed, for the first time, that the “community plasma HIV-1-RNA level” directly correlated with HIV incidence in this community. Further, we showed that increased HAART uptake in this community was a major driver for decreasing the community plasma HIV-1-RNA level.

At the population level, the effect of the initial roll out of HAART on HIV transmission has also been reported. In Taiwan, this was associated with a 53% reduction in new HIV-positive

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...we showed that increased HAART uptake in this community was a major driver for decreasing the community plasma HIV-1-RNA level.

diagnoses between 1996 and 1999.²⁰ In British Columbia, Canada, new yearly HIV diagnoses decreased by approximately 50% between 1995 and 1998 following the introduction of HAART.⁸ Of note, while the changes described in Taiwan occurred against a background stable syphilis rate, which serves as a marker of high-risk sexual behavior in the community, syphilis rates steadily increased in British Columbia over the same period.²¹

Based on the British Columbia experience described above, Lima *et al.* estimated the potential decrease in HIV incidence that would be associated with stepwise increases in HAART coverage.²² Overall, the model suggested that increased HAART coverage leads to proportional decreases in HIV transmission, which is not overwhelmed by decreasing adherence or increasing resistance rates.

Our proposed “Treatment as Prevention” strategy was initially regarded as controversial; however, this notion has

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gained the support of the international community in recent years. In fact, as recently as January 2009, investigators based at the World Health Organization's AIDS program published a paper in *The Lancet*,¹³ which independently validated this approach. Further, in February 2009, an International Summit co-convened by the International AIDS Society, the World Bank and the Global Fund in Vancouver called for further expansion of HAART in the developing world centered on the proposed "Treatment as Prevention" initiative.²³

COLLATERAL BENEFITS OF HAART

As discussed above, the benefit of HAART on AIDS-related morbidity and mortality is quite clearly established. HAART is widely accepted to be highly cost-effective based on its effect on reducing AIDS-related morbidity and mortality. In addition, appropriate use of HAART can substantially decrease HIV transmission, rendering HAART potentially cost-averting. Several other significant collateral benefits of HAART have also been described, which further enhance the individual and public health value of this intervention.²⁴

HAART has been shown to reduce tuberculosis burden substantially.²⁵ Of note, this benefit has the potential to impact not only those infected with HIV but also the community at large. HAART has also been shown to enhance maternal health substantially, which is particularly crucial in the African context where families are currently being devastated by the effect of the HIV pandemic. Specifically, "motherless children" are ten times more likely to die within two years of their mother's death.²⁶ In a recent study, HAART programs in this context were associated with a 95% decrease in mortality in HIV-infected adults, an 81% reduction in mortality in their uninfected children and a 93% decrease in the number of orphans in a Ugandan cohort.²⁷ Additionally, antiretroviral therapy use in HIV-infected mothers after delivery allows for safe breastfeeding which simultaneously can prevent HIV infection in the newborn as well as prevent diarrhea attributed to formula feeding with contaminated water, which is frequent in that setting.²⁸

Other collateral benefits of expanded HAART coverage have been reported, including its ability to preserve the integrity of the health care system by protecting the health work force.²⁹ HIV infection is estimated to already afflict 20% of the nursing force in South Africa.³⁰ Even greater impact can be seen in other work forces; notably among them is the mining force where the death toll from HIV is currently estimated at 60% in those aged thirty to forty-four years. As a result, HIV has led to decreased productivity and lower exports. It is estimated that the AIDS pandemic has reduced the average national gross domestic product growth rates across forty-one African countries by 2-4% per year.³¹

HAART therefore represents a powerful tool to decrease not only AIDS-related morbidity and mortality but also to decrease HIV transmission, prevent orphans, reduce tuberculosis burden, preserve the integrity of the population pyramid and specially protect the productive demographic groups. As a result, HAART contributes significantly towards maintaining social stability and therefore prevents social unrest.

CONCLUSION

HAART has been associated with dramatic decreases in AIDS-related morbidity and mortality. These benefits can be demonstrated regardless of the route of HIV infection. More recently, a secondary benefit of HAART has been demonstrated in its ability to decrease HIV transmission. Further, many other collateral benefits of HAART have been reported at the individual and societal level.

Based on the available evidence, we urge for the immediate implementation of an aggressive strategy aimed at rapidly³² expanding antiretroviral therapy coverage to all those in medical need based on a liberal interpretation of current medical guidelines. This should be done with full respect of human rights, including the need to respect the privacy and autonomy of HIV infected individuals.³³ Additionally, the expansion of HAART should be carried out within a comprehensive "combination prevention" framework.³⁴ It should also include enhanced case finding, as well as supportive and culturally sensitive strategies, to promote, facilitate and support engagement and maintenance in care, particularly among hard-to-reach populations.

Implementation of this strategy will dramatically decrease AIDS-related morbidity and mortality, eliminate neonatal HIV infection, prevent orphanhood, decrease HIV transmission and maximize individual and societal collateral benefits of HAART, as described above. As such, the expansion of HAART proposed here represents a cost-averting proposition. In fact, the recognition of the dramatic direct and indirect benefits of expanded HAART use should serve as a strong motivation to strengthen the roll out of HAART in resource-limited settings. 

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Challenges in Controlling Multiple Drug-Resistant Tuberculosis in Endemic Settings

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In 1993 the World Health Organization (WHO) introduced the Directly Observed Therapy Short course program (DOTS), a multi-pronged approach which includes the monitoring and treatment of tuberculosis (TB) cases to combat the worldwide TB epidemic that was causing over two million deaths each year. While DOTS has decreased TB prevalence and death rates, global TB control is being increasingly challenged by the emergence of multiple drug-resistant (MDR)-TB.¹ WHO estimates that 511,000 MDR-TB cases occurred worldwide in 2007 alone,^{2,3} yet currently the number of MDR-TB patients receiving treatment is less than 1-2% of the total number of TB cases — far below WHO annual targets.^{1,4} Standard DOTS treatments are ineffective for treating patients with MDR strains.⁵ Second-line drugs to treat MDR-TB are available, but these treatments are longer (minimum eighteen months), are more toxic and can cost 100 times more than first-line drugs alone.^{5,6,7} Recognizing the threat MDR disease poses to TB control worldwide, WHO and Stop TB partnership introduced the DOTS-plus program in 2006, including a new target of treating 1.6 million cases of MDR-TB by 2015.¹ Whether the existing DOTS program or the more recently established DOTS-plus program will be sufficient to control MDR-TB, however, remains uncertain.

While the DOTS-plus program provides a strategy for provision and completion of second-line drug treatments, there are additional pragmatic challenges to preventing the spread of MDR-TB. In order to optimize efficacy of current treatment regimens, a

patient's previous treatment history or, ideally, drug-susceptibility testing (DST) results are required.^{4,7} DST is practical in most industrialized countries but is not routinely available in many TB-endemic countries. Even in optimum settings, DST results may be available only several weeks after specimen collection. During this time, TB patients are often given empiric first-line treatment based on clinical suspicion and initial sputum tests prior to receiving MDR-TB resistance profiles. Consequently, many MDR-TB patients receive possibly ineffective treatment that may contribute to the progression of their disease and continued transmission of the drug-resistant strain. While new rapid diagnostics for MDR-TB exist as research tools, presently there is no gold standard rapid MDR-TB diagnostic with widespread clinical acceptance.^{8,9} New methods for accurately and rapidly diagnosing MDR-TB could greatly improve the ability to treat MDR-TB cases in a timely manner.

While earlier diagnosis of MDR-TB will require clinical and laboratory improvements, preventing ongoing spread of drug-resistant strains in the community also is a critical TB control concern. Primary MDR-TB (MDR disease in new TB patients with no history of previous treatment) now accounts for the majority of global MDR-TB cases.¹⁰ Several studies have found that close contacts of MDR-TB patients have very high rates of MDR-TB.^{7,11-15} Knowledge that symptomatic patients have had close contact with an MDR-TB case may improve preferential DST and empiric treatments in settings where routine testing of all patients is not possible. At present, contact tracing is recommended by WHO for all close contacts of MDR-TB cases; however, whether this practice actually occurs systematically in endemic countries is questionable due to limited resources and high case burden.⁷ With MDR-TB, case detection needs to be actively shortened in order to improve delays in diagnosis and in order to reduce the length of the infectious period during which a case is likely to propagate the drug-resistant strain. While symptomatic cases usually present themselves for care, given the heightened concern for MDR-TB transmission, actively seeking out high-risk persons who may have MDR-TB should be considered a priority. Venues such as prisons and hospitals also are hubs of MDR-TB transmission in some countries, and these settings may require targeted screening.⁷

“...currently the number of MDR-TB patients receiving treatment is less than 1-2% of the total number of TB cases — far below WHO annual targets.”

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There is an urgent need for new and more effective treatment regimens for MDR-TB. However, even as new treatments become available, the largest potential to improve MDR-TB treatment and control is early and accurate diagnosis of drug-resistance, which requires accurate rapid DST and strategic case finding. While rapid DST development and contact tracing often take secondary priority to treatment development, these preventive measures are in fact integral to the success of MDR-TB control. The mismanagement of MDR-TB cases could lead to an increase in the far more difficult to treat extensively drug-resistant TB (XDR-TB), which is already of great concern worldwide. Enhanced prevention and control efforts are urgently needed in order to stem the continued spread of MDR-TB. 

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Considerations for Culturally Appropriate HIV/AIDS Education Strategies in Belize: An Analytical Study Exploring the Relationship Between Knowledge and Stigma

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ABSTRACT

OBJECTIVE: The stigma associated with HIV/AIDS is a global problem and particularly concerning in countries such as Belize where the prevalence of the disease is high. This exploratory study examines factors associated with HIV-related stigma to determine if low HIV knowledge is a contributing factor.

METHODS: A cross-sectional survey was administered to participants in San Ignacio and in the rural locale of Bullet Tree. Each survey contained 15 HIV-related knowledge questions and a three question stigma scale. Knowledge-based scores and socio-demographic characteristics were compared in a multivariate logistic model to determine factors associated with HIV-related stigma.

RESULTS: A total of 92 surveys were completed. High stigma answers were found among participants with low incomes ($p=0.010$) and low HIV-related knowledge ($p<0.001$). High stigma was also associated with living in a rural community ($p=0.020$) and the absence of a high school education ($p=0.020$).

CONCLUSION: Strategies to reduce HIV stigma in Belize should include the expansion of HIV-related education programs.

KEYWORDS: *HIV/AIDS, stigma, knowledge, education, Belize*

INTRODUCTION

Once part of Mayan and Spanish empires, the country of Belize was an English colony, referred to as British Honduras, for over a century until achieving independence in 1981. The official language in Belize is English, and many residents speak an English-based Creole and Spanish. Located within Central America and the Caribbean, it is home to a small population of approximately 295,000, and high literacy rates exist among its residents.¹ However, this region also has the highest incidence of HIV/AIDS in the Americas and is second only to sub-Saharan Africa with respect to the magnitude of the

pandemic.¹ One of the most compelling and challenging features of HIV/AIDS in this area is its diversity, and it is often referred to as an “epidemic with many faces.”^{3,4} Similar to global trends, although HIV was initially concentrated in certain marginalized populations (i.e. sex trade and migrant workers, intravenous drug users), it is now a generalized epidemic that particularly affects women and youth at alarming rates.^{1,5}

The prevalence of HIV in Belize has risen to become the highest in Central America since the first diagnosis in 1986.⁶ The current estimate of adult HIV prevalence (15-49 years of age) is 2.5% and the predominant mode of infection is through heterosexual sexual activity and mother-to-child transmission.^{4,6} Since 2003, the state government of Belize has provided antiretroviral medications (ARVs) free of charge to clinically

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eligible individuals (i.e. those with a CD4 cell count below 200/mm³) and has established a national plan to address HIV/AIDS.⁷ Despite these accomplishments, there is a lack of HIV knowledge among the general public. This may contribute to high levels of stigma and negatively impact the attendant issues of access to antiretroviral treatment and disclosure of HIV status.⁸ For instance, if an HIV positive individual seeks treatment they risk social isolation and may be rejected by their family and community. Since communities are often small and patient confidentiality is not necessarily protected, simply being identified at an HIV testing facility in Belize may invite discrimination, regardless of the test result.⁹

The relatively slow government response to the epidemic, the lack of adequate disease surveillance systems, and conservative socio-cultural and religious norms regarding sexual behavior have posed problems for the creation of culturally appropriate and effective HIV education and prevention efforts. In light of these challenges, non-government organizations (NGOs) have introduced some of the most responsive intervention programs across Belize. Yet, very little data on these efforts have been documented or published.³ This paper is based on findings from a brief project conducted by one such NGO and represents a vital step in reporting on the hard and very necessary work undertaken by this organization in the fight against the epidemic. Designed to investigate HIV-related knowledge and stigma among residents in urban and rural areas of Belize, this data can guide the development of HIV-related education materials and programs to further help reduce the stigma that continues to be linked with the epidemic and those affected.

MATERIALS AND METHODS

Background and Survey Development

Stigma is traditionally defined as a discrediting social and moral attribute that creates a “spoiled identity” at the level of the individual and in much of the HIV education and prevention literature. This concept has been applied to diverse socio-economic and political settings.¹⁰ Although defining stigma is problematic in terms of developing standardized measurements that can be compared across cultures, our model is very basic and was created with the input of the NGO with whom we worked, the Cornerstone Foundation. Founded in 1999, the Cornerstone Foundation focuses on issues of human rights, empowerment, HIV/AIDS, and advocacy in relation to the health and safety of women and youth.¹¹

The cross-sectional survey contained 15 HIV-related knowledge questions and a three question stigma scale, which was complemented by the collection of basic socio-demographic data (i.e. age, gender, education, income, religion, marital status). The three statements devised to ascertain levels of HIV stigma were the following: 1) people with HIV should live in isolation; 2) talking about HIV makes me uncomfortable; and 3) I am/would be uncomfortable being around people who are HIV positive. All survey questions were answered as either “true”, “false”, or “I don’t know”. Participants were also asked whether they had ever taken an HIV test and if they were aware that free HIV treatment is provided by their government.

Survey Administration

The general lack of information on HIV knowledge, specifically in terms of differences between rural and urban residents, figured prominently in our selection of research sites. The first locale where participants were recruited was a popular urban market in San Ignacio, which, together with the town of Santa Elena, make up Belize’s second largest urban area. The rural component of our sample was set in an area called Bullet Tree, located 2.5 miles from San Ignacio. Survey recruitment occurred between August and November of 2006. All surveys were administered by trained interviewers and took approximately 10 minutes each. The surveys were coded to maintain participant confidentiality. Ethical approval for this study was obtained by the Cornerstone Foundation through a collaborative, peer-based process.

Analyses of Survey Data

The analyses presented here are a preliminary look at the survey data. First, we provide descriptive details about the survey sample and participants’ responses to the survey question items. Further, we tabulated HIV-related knowledge-based questions, giving them a percentage score based on the number of correct answers. In a similar fashion, stigma-based questions were also tabulated and given a percentage score. For the purpose of data analysis, “I don’t know” responses were considered equivalent to incorrect knowledge responses or to high stigma responses. Individuals with knowledge scores at or below the 25th percentile had scores of less than 60% and were considered to have relatively low HIV-related knowledge. Individuals were considered to have relatively high HIV-related stigma if a high stigma answer was given for any of the three stigma-based questions. Second, we compared socio-demographic characteristics and HIV-related knowledge scores among participants with low and high HIV-related stigma. This analysis was performed using the Pearson Chi-squared statistic for categorical variables and Wilcoxon rank sum test for continuous variables. Third, we entered all explanatory variables (i.e. socio-demographic characteristics and HIV-related knowledge scores) into a multivariate logistic model to evaluate the effect of these factors on HIV-related stigma. A backward Akaike Information Criterion (AIC) procedure was used to determine the final model. Model fit was examined using the Hosmer Lemeshow statistic for Goodness-of-Fit.¹² All analyses were conducted using SAS version 8 (SAS, Cary, North Carolina, United States). All tests of significance were two-sided with a p-value of less than 0.05 indicating that an association was statistically significant.

RESULTS

Table 1 summarizes the demographic profile of the survey participants. The median age of the 92 study participants was 22 years (interquartile range [IQR]: 18, 33 years). Those who took part in the project were male (59%), had only elementary school education (40%), were more likely to be single (64%), identified with having a middle or high income (71%), and were Catholic (45%). It is also noteworthy that only 29% of participants were aware that ARVs were subsidized by their government and only 39% had ever received an HIV test (Data not shown).

Table 2 lists the responses to individual questions. The median knowledge-based score was 73.3% (IQR: 67%, 87%). The most poorly answered question, which pertained to the ability of HIV to pass through condoms, was answered correctly by only 23% of participants. The men and women who took part in the study were generally knowledgeable about the inability of HIV to be transmitted through handshaking, with 91% answering this question correctly. For each stigma-based question, approximately one quarter of respondents gave a high stigma answer, indicating that they were either uncomfortable speaking about HIV, being around someone with HIV, or feel that people with HIV should live in isolation.

Table 1. Socio-demographic variables of survey participants (N = 92).

| | |
|-----------------------------|------------|
| Sex <i>n (%)</i> | |
| Male | 54 (59) |
| Female | 38 (41) |
| Age Median (IQR) | 22 (18-33) |
| Education <i>n (%)</i> | |
| Elementary | 37 (40) |
| High School or College | 55 (60) |
| Marital Status <i>n (%)</i> | |
| Married | 33 (36) |
| Single | 59 (64) |
| Income <i>n (%)</i> | |
| Low | 27 (29) |
| Middle or High | 65 (71) |
| Religion <i>n (%)</i> | |
| Other | 51 (55) |
| Catholic | 41 (45) |

IQR: Interquartile Range

Table 2. HIV-related knowledge and stigma questions items.

| HIV-Related Knowledge Questions | Correct <i>n (%)</i> | Incorrect <i>n (%)</i> | Unsure <i>n (%)</i> | Missing <i>n (%)</i> |
|---|----------------------------|-----------------------------|------------------------|-------------------------|
| 1. You can tell a person has HIV by looking at them | 59 (64.1) | 19 (20.7) | 14 (15.2) | 0 |
| 2. A person with HIV can be cured by having sex with a virgin | 81 (88.0) | 4 (4.4) | 7 (7.6) | 0 |
| 3. Besides not having sex condoms are the best way to prevent HIV transmission | 60 (65.0) | 23 (25.0) | 9 (10.0) | 0 |
| 4. HIV only affects gay people | 80 (87.0) | 7 (7.6) | 5 (5.4) | 0 |
| 5. You can get HIV by sharing a cup with an infected person | 75 (81.5) | 12 (13.0) | 5 (5.4) | 0 |
| 6. Mosquitoes or other insects can transmit HIV | 56 (60.9) | 26 (28.3) | 10 (10.9) | 0 |
| 7. There is a difference between HIV and AIDS | 47 (51.1) | 30 (32.6) | 14 (15.2) | 1 (1.1) |
| 8. HIV can be transmitted by shaking hands with an infected individual | 84 (91.3) | 2 (2.2) | 5 (5.4) | 1 (1.1) |
| 9. HIV can be transmitted by being sneezed on by an infected person | 69 (75.0) | 6 (6.5) | 17 (18.5) | 0 |
| 10. HIV can be transmitted by kissing an infected individual | 74 (80.4) | 5 (5.4) | 13 (14.1) | 0 |
| 11. There are certain drugs that can be used to treat, but not cure, a person infected with HIV | 71 (77.2) | 8 (8.7) | 13 (14.1) | 0 |
| 12. Only men can get HIV | 86 (93.5) | 2 (2.2) | 4 (4.3) | 0 |
| 13. Because the HIV virus is so small it can sometimes pass through a condom | 21 (22.8) | 53 (57.6) | 18 (19.6) | 0 |
| 14. Using an elastic band and saran wrap is a good way of preventing HIV transmission | 57 (61.9) | 11 (12.0) | 23 (25.0) | 1 (1.1) |
| 15. Condoms that have been used more than once are a good way of preventing HIV transmission | 76 (82.6) | 9 (9.8) | 7 (7.6) | 0 |
| HIV-Related Stigma Questions | Low Stigma <i>n (%)</i> | High Stigma <i>n (%)</i> | Unsure <i>n (%)</i> | Missing <i>n (%)</i> |
| 1. People with HIV should live in isolation | 63 (68.5) | 21 (22.8) | 8 (8.7) | 0 |
| 2. Talking about HIV makes me uncomfortable | 65 (70.7) | 23 (25.0) | 3 (3.3) | 1 (1.1) |
| 3. I am/would be uncomfortable being around people who are HIV positive | 60 (65.2) | 24 (26.1) | 6 (6.5) | 2 (2.2) |

Table 3 shows the comparison of socio-demographic variables and HIV-related knowledge among participants with low and high HIV-related stigma.

Table 3. Socio-demographic variables and their association with stigma.

| Variable | Low Stigma <i>n=41</i> | High Stigma* <i>n=51</i> | p-value |
|-----------------------------|---------------------------|-----------------------------|---------|
| Knowledge <i>n (%)</i> | | | |
| Low | 7 (17.07) | 28 (54.90) | <0.001 |
| High | 34 (82.93) | 23 (45.10) | |
| Community <i>n (%)</i> | | | |
| Rural | 5 (12.20) | 17 (33.33) | 0.020 |
| Urban | 36 (87.80) | 34 (66.67) | |
| Age Median (IQR) | 22 (18-31) | 22 (17-38) | 0.880 |
| Gender <i>n (%)</i> | | | |
| Female | 16 (40.00) | 21 (42.00) | 0.850 |
| Male | 24 (60.00) | 29 (58.00) | |
| Education <i>n (%)</i> | | | |
| Elementary | 11 (26.83) | 24 (51.06) | 0.020 |
| High School or College | 30 (73.17) | 23 (48.94) | |
| Income <i>n (%)</i> | | | |
| Low | 6 (16.22) | 16 (42.11) | 0.010 |
| Middle or High | 31 (83.78) | 22 (57.89) | |
| Religion <i>n (%)</i> | | | |
| Other | 24 (58.54) | 27 (52.94) | 0.590 |
| Catholic | 17 (41.46) | 24 (47.06) | |
| Marital Status <i>n (%)</i> | | | |
| Married | 11 (26.83) | 22 (43.14) | 0.110 |
| Single | 30 (73.17) | 29 (56.86) | |

*Respondents who gave a high stigma answer to any of the three stigma-based questions were considered to have relatively high stigma.

These data reveal that participants with low HIV-related knowledge were more likely to have high stigma ($p < 0.001$). In addition, we observed significantly higher stigma in the rural setting ($p = 0.020$) and in individuals with only elementary education ($p = 0.020$) and low incomes ($p = 0.010$). Notably, a number of participants with high HIV-related knowledge also demonstrated high stigma.

Table 4 presents the univariate and multivariate analyses of factors associated with HIV-related stigma. In univariate analyses, high knowledge was significantly associated with low stigma. Additionally, living in an urban setting, having a high school or college education, and having a middle or high income was significantly associated with low stigma. In multivariate analysis, high knowledge remained significantly associated with low stigma (odds ratio [OR] 0.17; 95% confidence interval [CI] 0.06, 0.49). As well, living in an urban community was significantly associated with low stigma (OR 0.25; 95% CI 0.08, 0.81). Using the Hosmer-Lemeshow statistic, we obtained a non-significant p -value of 0.10, indicating a good model fit.

Table 4. Univariate and multivariate analyses of factors associated with HIV-related stigma.

| Variable | Unadjusted OR (95% CI) | Adjusted OR (95% CI) |
|---|------------------------|----------------------|
| Knowledge (<i>High vs. Low</i>) | 0.17 (0.06, 0.45) | 0.17 (0.06, 0.49) |
| Community (<i>Urban vs. Rural</i>) | 0.28 (0.09, 0.84) | 0.25 (0.08, 0.81) |
| Age | 1.02 (0.98, 1.05) | -- |
| Sex (<i>Male vs. Female</i>) | 0.92 (0.40, 2.15) | -- |
| Education (<i>High School/College vs. Elementary</i>) | 0.35 (0.14, 0.86) | -- |
| Income (<i>Middle/High vs. Low</i>) | 0.27 (0.09, 0.79) | -- |
| Religion (<i>Catholic vs. Other</i>) | 1.26 (0.55, 2.88) | -- |
| Marital Status (<i>Single vs. Married</i>) | 0.48 (0.20, 1.17) | -- |

OR, odds ratio
CI, confidence interval

DISCUSSION

HIV/AIDS within Central America and the Caribbean is characterized by great diversity with respect to levels of infection and transmission patterns, and the magnitude of the epidemic is second only to sub-Saharan Africa.^{5,13} These factors, along with the structural inequalities, lack of systematic disease surveillance, and pervasive religious norms that often prohibit public discussions about sexuality, combine to make culturally relevant and responsive HIV education and prevention programs very challenging to develop. This is particularly troubling in Belize, where the prevalence of HIV among adults has risen to 2.5%, the highest of any country in Central America. However, the government of Belize spends the most amount of capital on combating the epidemic of any country in Central America and the Caribbean.¹⁴ Importantly, it is also one of the few locales in the area that offers free ARVs to those with the virus who are clinically eligible. This complicated paradox has yet to be adequately addressed in state or NGO-run HIV programming or in the prevention literature.

It is important to acknowledge that HIV education and

prevention efforts are, in many respects, in their infancy in Belize. Take, for instance, the series of HIV-related myths that have been posted on the Cornerstone Foundation’s website:

“You cannot contract HIV from a mosquito; HIV/AIDS education does not lead to sexual promiscuity; Having intercourse



HIV-related misconceptions have posed challenges to educational campaigns.

with a virgin will not cure HIV; Condoms do not have tiny holes in them that allow HIV to enter the body; You won’t keep HIV away by drinking red Fanta after intercourse; Hugs, tears, sweat, and breath do not spread HIV; Washing with lime juice after intercourse does not keep HIV away; and Sharing eating utensils, cups, a toilet, the river, toys, or a home with someone who is HIV+ does not put you at risk of contracting the virus.”¹¹

These scenarios echo ideas that were circulating in North America twenty years ago and bring into stark relief some of the dominant concepts regarding HIV/AIDS, transmission, and people living with the virus. In one of the few published papers on stigma in Belize, it was found that Belize has the second highest level of HIV-related stigma within Central America and Mexico, a clear indication of the significance of developing culturally specific education and prevention strategies in this setting.¹⁵

Since the advent of the epidemic, HIV-related misconceptions have posed challenges to educational campaigns. For instance, some Catholic school teachers, in an attempt to promote abstinence, were instructing their students that HIV can pass through condoms.¹¹ Our results did not show that Catholics were less knowledgeable about HIV than non-Catholics. However, the majority of the study sample believed that HIV could pass through a condom, and, as mentioned above, this particular issue has been featured on the Foundation’s web site as one of the primary myths associated with HIV/AIDS. Conversely, our participants had a good understanding of low risk transmission routes, such as hand shaking and drink sharing. These two sets of HIV-related knowledge are markedly different: one is directly related to issues of sexuality, reproduction, and religion, whereas the other forms of information are much less socially charged. That HIV-related knowledge/information does not necessarily lead to behavior change is not a novel finding,¹⁶⁻¹⁸ but the importance of different kinds of information must be considered when designing prevention and education programs that are culturally appropriate and population-specific.^{5,19-20}

The prevalence of HIV-related stigma among our participants is consistent with previous findings in Belize and other Central American countries.^{3,13,15} Our results indicated that participants from urban communities and those with higher HIV-related knowledge had lower HIV-related stigma. It is worth noting that a fair number of participants with high HIV-related knowledge also demonstrated high stigma. Although this finding was not significant in our study, it indicates that stigma in Belize may be partially due to factors unrelated to HIV knowledge,

namely the forces of religion, sexuality, gender roles, and access to education.^{2,5}

Our data suggest that HIV-related stigma may be reduced if more emphasis is placed on HIV education which takes into account local cultural realities. In Belize, the primary mode of HIV transmission is through sexual contact in heterosexual populations, and sexual intercourse starts at a relatively young age, with 32% of adolescents having sex for the first time at age 15.⁷ Individuals aged 15-24 are particularly at risk of acquiring HIV, and the prevalence in this group is estimated to be an alarming 3.4%.⁶ Accessing these young people through the school system is perhaps the most effective way to inform them, especially in light of the absence of well-developed public health campaigns regarding HIV/AIDS. However, only 44% of Belizeans attend secondary school, which presents major challenges to increasing HIV knowledge among this vulnerable population.⁷ Fortunately, since 2007 the Health and Family Life Education (HFLE) unit of the Ministry of Education has been in the process of implementing HIV and sexual education programs in Belizean primary schools. School-based HIV knowledge interventions have been previously effective in improving the HIV-related knowledge of adolescents.²¹⁻²² Currently, all public schools are required to follow the curriculum developed by the HFLE. The HFLE has wisely chosen to establish a system to monitor and evaluate these programs, the results of which will allow for future improvements of the curriculum.

The results of this study have their limitations. The administered survey has not been assessed for validity or variability. In addition to a relatively small sample size of 92, the results do not constitute a random sample. Individual participation was voluntary, and participants were approached by interviewers, which is a possible source of sampling bias. The interviews took place in one of the six primary districts in Belize, the Cayo district, and our results are not intended to be applied to, or necessarily representative of, the experiences of residents in the rest of the country. Additionally, our findings are observational and do not necessarily represent a causal relationship between HIV-related stigma and education. Finally, while findings did indicate that Belizeans with high stigma had significantly lower HIV-related knowledge, there were a considerable number of participants with adequate knowledge who had high stigma. Additional studies are needed to more fully characterize HIV knowledge and stigma at the national level, especially those that are developed collaboratively with local organizations and which reflect the specific needs and priorities of the social group(s) in question.

The results of this study support the idea that if youth are not properly educated about HIV before leaving school they may develop relatively high stigma towards the disease and those affected.²³ Along with enhancing school-based HIV programs, educational outreach programs are also needed and should target those who are no longer in school, particularly in rural communities.

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Sorafenib, A New Treatment for Advanced Hepatocellular Carcinoma: The Preliminary British Columbia Experience

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ABSTRACT

OBJECTIVE: Hepatocellular carcinoma is the fifth most common cancer worldwide and is a direct consequence of chronic liver disease, most commonly viral hepatitis, and cirrhosis. Current therapies for localized disease include surgical resection, locoregional radiologic interventions such as radiofrequency ablation, transarterial chemoembolization, and in select patients, liver transplantation. Historically, systemic chemotherapy has been disappointing and is rarely offered. Sorafenib is a new oral multikinase inhibitor that in the most recent pivotal clinical trial has demonstrated a survival benefit of almost 3 months over placebo. Sorafenib is now covered by the province via the British Columbia Cancer Agency, and this study aims to assess the preliminary BC experience with this drug.

METHODS: A review was conducted of all patients referred to the British Columbia Cancer Agency with a diagnosis of hepatocellular carcinoma, and we performed a retrospective chart review on 30 patients who had received sorafenib.

RESULTS: Overall median survival was 7 months, similar to the placebo arm of the pivotal trial. Discontinuation of medication because of intolerability and disease progression occurred in 23 patients, and only 30% took 80% of the optimal dose for a median of 2.8 months. Compared to the Sorafenib Hepatocellular Carcinoma Assessment Randomized Protocol (SHARP) trial, the BC group consisted of more patients from an Asian descent and more patients with advanced liver disease.

CONCLUSION: These results underscore the significant differences between the perfect conditions of a clinical trial, compared to the “real world” of clinical medicine. Future follow-up review of the BC sorafenib experience is warranted.

KEYWORDS: *sorafenib, hepatocellular carcinoma, survival, BCCA, retrospective*

INTRODUCTION

Hepatocellular carcinoma (HCC) accounts for over 90% of primary liver cancers and is the fifth most common cancer worldwide as well as the third highest cause of cancer-related death.¹ HCC largely arises from a background of cirrhosis and chronic liver disease, usually due to hepatitis B virus (HBV), hepatitis C virus (HCV), as well as alcoholic liver disease or nonalcoholic steatohepatitis. It is less commonly due to α -1 antitrypsin deficiency, autoimmune hepatitis or hereditary hemochromatosis.¹ While surgical therapies, such as resection and liver transplantation, or locoregional procedures, such as

radiofrequency ablation, are potentially curable, only 30–40% of HCC in North America are discovered at an early stage.² However, even after the careful selection of patients undergoing resection, Llovet *et al.*³ found that 1-, 3- and 5-year probability of recurrence were 19%, 54% and 70%, respectively. HCC that is not diagnosed until it has reached an advanced symptomatic stage or has progressed despite locoregional procedures is associated with a 5-year survival of less than 10%.⁴ One reason for this dismal prognosis is the limited availability of effective systemic chemotherapeutic agents.

The University of British Columbia, with its main teaching hospitals within the city of Vancouver, is in a unique position to undertake clinical research in the area of HCC. Chronic HCV is a strong contributor to HCC – while the prevalence of HCV in Canada is 0.8%, the prevalence of HCV in British Columbia is

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approximately 1.5%.⁵ Spinelli *et al.*⁵ contributed this difference to high rates of intravenous drug use in BC. Concurrently, BC has the greatest proportion of visible minorities in Canada (21.6%), the majority of whom are from Asia.⁶ In China and Taiwan, 13% and 15% of the respective populations are chronic carriers of HBV, and immigration from highly endemic HBV areas results in increased rates of HCC in BC, especially because HBV contributes to approximately 75% of HCC cases worldwide.⁶

Sorafenib is a new oral multikinase inhibitor – studies suggest its anticancer activity is related indirectly to decreased tumor angiogenesis by blocking the vascular endothelial growth factor receptor (VEGFR) and platelet-derived growth factor receptor (PDGFR).^{7,8} It is related directly to the inhibition of tumor cell proliferation by blocking Raf-1 kinase, an essential step in the RAF/mitogen-activation protein (MAP)/extracellular signal-regulated kinase (ERK) (RAF/MAP/ERK) pathway.^{7,8} Treatment for advanced HCC with sorafenib (Nexavar, Bayer HealthCare Pharmaceuticals – Onyx Pharmaceuticals) was recently studied by investigators in the Sorafenib Hepatocellular Carcinoma Assessment Randomized Protocol (SHARP) trial, a randomized double-blind, placebo-controlled trial.² In this trial, over 600 patients, primarily from western countries, with advanced unresectable HCC and Child-Pugh A hepatic reserve⁹ (see Table 1), were randomized to receive sorafenib or placebo.² Sorafenib was associated with an almost 3 month improvement in survival (median 10.7 vs 7.9 months).² After a number of previous negative trials of chemotherapy in HCC, sorafenib represents the first anticancer drug in 30 years to show a statistically significant and clinically meaningful survival benefit in advanced HCC.²



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of sorafenib use at the BCCA. The purpose of this study was to compare preliminary results on survival benefit at BCCA to that observed in the pivotal SHARP clinical trial.

METHODS

A review was conducted in 2009 of all patients referred to the BCCA with a diagnosis of hepatocellular carcinoma. Those who received treatment with sorafenib were selected for review. Retrospective chart review was performed, and data was collected with respect to patient demographics and risk factors, laboratory values, tumor characteristics pre- and post-treatment, treatment regimen and response, and survival outcome. One cycle of sorafenib consists of 4 weeks.

The recommended dosing regimen for sorafenib is 400 mg twice a day, but dosing interval can be reduced in response to side effects. Patients were regularly seen by physicians at BCCA. Overall survival was determined from the start of treatment to the date of death by Kaplan-Meier

analysis. All analyses were conducted with a computer software package (SPSS, SPSS Inc, Chicago IL). This study was approved by the University of British Columbia Clinical Research Ethics Board.

RESULTS

Patients

Thirty patients were included in the BCCA study. Demographics and baseline laboratory values are summarized alongside patient information from the SHARP study in Table 2.² The average age of patients, gender ratio, baseline laboratory values and treatments used before sorafenib in the BCCA study was comparable to the SHARP study.² Ethnicity was documented in the BCCA study; 77% of patients were non-Asian, and 23% were Asian. In contrast, the SHARP study recorded the patient’s region of origin (Table 2), and included patients from Europe and Australasia (88%), North America (9%), and Central and South America (3%). The BCCA cohort had more patients with a combination of risk factors (alcohol use with chronic hepatitis B infection, for example) than the SHARP study. Although not all patients had enough data to calculate the Child-Pugh class (measure of severity of end-stage liver disease), 16% of the total number of patients were considered class B, more than the 5% contained in the SHARP study.² Similarly, 63% of the BCCA study had extrahepatic spread of HCC compared to 53% in the SHARP study.²

Survival and treatment compliance

Overall median survival was calculated to be 212 days or 7.0 months (figure 1). In the SHARP study, patients receiving sorafenib and placebo had an overall median survival of 10.7 (95% confidence interval: 9.4 - 13.3 months) and 7.9 months (95% confidence interval: 6.8 - 9.1 months) respectively.

Table 1. Child-Pugh Classification Table.⁹

| Parameter | Points assigned | | |
|----------------|-----------------|--------------------|---------------|
| | 1 | 2 | 3 |
| Ascites | Absent | Slight | Moderate |
| Bilirubin | < 34.2 µmol/L | 34.2 - 51.3 µmol/L | > 51.3 µmol/L |
| Albumin | > 35 g/L | 28 - 35 g/L | < 28 g/L |
| INR | < 1.7 | 1.7 - 2.3 | > 2.3 |
| Encephalopathy | None | Grade 1 - 2 | Grade 3 - 4 |

A total score of 5 - 6 is considered grade A (well-compensated disease), 7 - 9 is grade B (significant functional compromise), and 10 - 15 is grade C (decompensated disease).

Based upon these findings, sorafenib became available for use in British Columbia in 2008 for patients with advanced HCC and Child-Pugh A status. It is noteworthy that BC was the first province in Canada to provide drug coverage for sorafenib via the British Columbia Cancer Agency (BCCA) drug formulary. To date, over 30 patients with advanced HCC have been treated with sorafenib by the BCCA. This study describes the local experience

Table 2. Patient demographics and baseline values from BCCA study and SHARP trial.²

| | BCCA patients (n = 30) | SHARP (2): sorafenib arm (n=299) | SHARP (2): placebo arm (n=303) |
|---|--|--|--------------------------------------|
| Age - yr ± standard deviation | 61.6±12.1 | 64.9±11.2 | 66.3±10.2 |
| Male | 26 (87%) | 260 (87%) | 264 (87%) |
| Ethnicity | | | |
| Non-Asian | 23 (77) | Not stated | Not stated |
| Asian | 7 (23) | Not stated | Not stated |
| Region - no. patients (%) | | | |
| North America | 30 (100) | 27 (9) | 29 (10) |
| Europe and Australasia | | 263 (88) | 263 (87) |
| Central and South America | | 9 (3) | 11 (4) |
| Risk factors - no. (%) | | | |
| Hepatitis B only | 3 (17) | 56 (19) | 55 (18) |
| Hepatitis C only | 1 (6) | 87 (29) | 82 (27) |
| Alcohol only | 8 (44) | 79 (26) | 80 (26) |
| Alcohol + B | 3 (17) | 28 (9) | 29 (10) |
| Alcohol + C | 2 (11) | 49 (16) | 56 (19) |
| Other | 1 (6) | | |
| Unknown | 12 | | |
| Child-Pugh class - no. (%) | | | |
| A | 16 (84) | 284 (95) | 297 (98) |
| B | 3 (16) | 14 (5) | 6 (2) |
| Unknown | 11 | | |
| Extrahepatic spread - no. (%) | 19 (63) | 159 (53) | 150 (50) |
| Biochemical analysis | | | |
| Serum albumin (g/L) (median range) | 40 (29 - 44) (n=19) | 39 (27 - 53) | 40 (25 - 51) |
| Bilirubin (µmol/L) (median range) | 10 (4 - 64) (n=27) | 12.0 (1.7 - 280) | 12.0 (3.4 - 104) |
| Alpha-fetoprotein (ng/mL) (median range) | 84 (1.4 - 2.4x10 ⁵) (n=29) | 44.3 (0 - 208x10 ⁴) | 99.0 (0 - 5x10 ⁵) |
| Previous therapy* - no. (%) | | | |
| Surgical resection | 19 (33) | 57 (19) | 62 (20) |
| Ablation | 2 (7) | 17 (6) | 12 (4) |
| Chemoembolization | 2 (7) | 86 (29) | 90 (30) |
| Radiotherapy | 0 (0) | 13 (4) | 15 (5) |

*some patients received more than one type of therapy. In the SHARP study² there was no significant difference.

At the time of analysis, 23 patients had discontinued treatment. Disease progression was the most common reason for discontinuation (15 patients) followed by adverse events (7 patients), which are similar findings to the SHARP study.² The patients in the BCCA study had a median duration of treatment of 2.8 months, with 30% of patients receiving more than 80% of the planned daily dose. This was less than the treatment compliance achieved in the SHARP study, where the median duration of

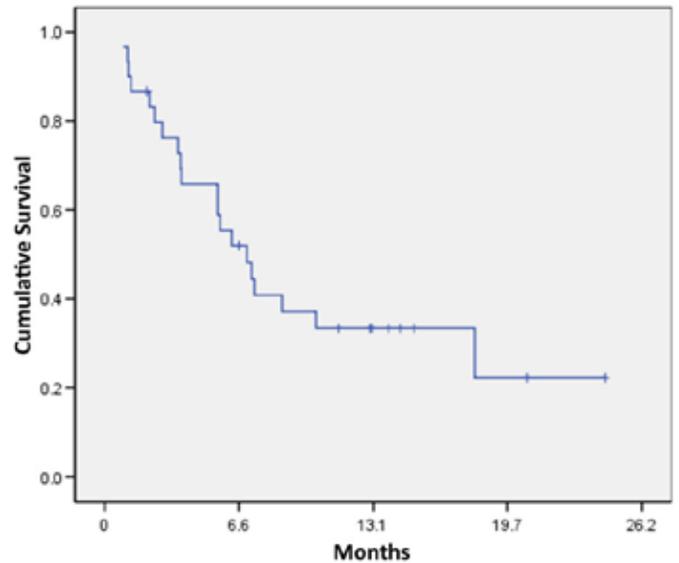


Figure 1. Kaplan-Meier Analysis of overall survival. Among 30 patients receiving sorafenib treatment for advanced hepatocellular carcinoma at the BCCA, the overall median survival was 7.0 months.

treatment was 5.3 and 4.3 months in the sorafenib and placebo arm respectively.² Additionally, 76% of patients in the treatment arm, and 94% of patients in the placebo arm received greater than 80% of the planned daily dose in the SHARP trial.²

DISCUSSION

Often times, the experience in the clinical trial setting may not be entirely generalizable to the ‘real-world’ experience due primarily to patient selection, eligibility and treatment compliance. In this study, the early experience and outcome of sorafenib treatment in BC patients with advanced HCC was compared to a phase III, multicenter, double-blind, placebo-controlled trial to investigate its effectiveness in a local setting. Based upon our review, the two populations are similar in many regards, such as age, gender and baseline laboratory studies. An inherent difficulty with end-stage liver disease research is measuring the efficacy of treatment on the background of high mortality, due to liver failure or portal hypertension.^{10,11} Many studies, including the SHARP trial, choose to exclude cirrhotic patients beyond the Child-Pugh class A category to minimize this confounding variable. Of note, the BCCA study has a greater proportion of patients with Child-Pugh class B status, which may have impacted the assessment of sorafenib benefit and its tolerability or compliance.

Child-Pugh class was unavailable for 11 patients in the BCCA study. This was a limitation of the retrospective nature of the study but highlights the importance of future accurate determination and documentation of relevant data prior to the initiation of sorafenib therapy for HCC.

The observed overall survival in the BCCA-treated cohort was 7.0 months. This falls within the 95% confidence interval of the SHARP trial’s placebo arm, specifically 6.8 - 9.1 months.²

While a direct comparison is not possible, factors to consider for this difference include a smaller sample size, a higher proportion of Child-Pugh Class B patients, a greater proportion of patients with extrahepatic spread, differences in patient ethnicity, and differences in treatment compliance as clinical trial patients are typically followed by dedicated clinical trial nurses who monitor compliance via pill counts and patient diaries.

Despite the majority of HCC arising from the Asia-Pacific region,⁶ the SHARP trial selected patients largely from European sites, and some proponents have suggested that generalization of the success of sorafenib outside of this population is uncertain.^{12,14} Taking 226 patients from China, Taiwan and South Korea, Cheng *et al.* was able to repeat the success of the SHARP trial in a similar phase III, randomized, double-blind placebo-controlled trial in what is sometimes called the “Asia-Pacific Trial”.¹² They measured a statistically significant difference in overall median survival of 6.5 months (95% confidence interval 5.56 - 7.56 months) and 4.2 months (95% confidence interval 3.75 - 5.46 months) for those receiving sorafenib and placebo respectively.¹² Interestingly, the overall median survival is comparatively less than the SHARP trial. While both trials show similar relative benefit with the addition of sorafenib as systemic chemotherapy for HCC, it is speculated that the overall prognosis for advanced HCC patients of Asian descent, particularly with underlying Hepatitis B disease, is more adverse than their western counterparts. As almost one-quarter of the BCCA cohort was of Asian descent, this variability in prognosis may be a factor contributing to the overall shorter survival observed in the BCCA experience.

The SHARP trial was able to achieve a substantially higher treatment compliance rate, with 76% of patients receiving more than 80% of the expected daily dose,² whereas in the BCCA cohort, only 30% of patients received more than 80% of the expected daily dose. Patients in the SHARP trial also received treatment for a longer period of time compared to the BCCA study (5.3 vs. 2.8 months). With treatment below target dosing for a shorter period of time, anti-HCC activity via inhibition of angiogenesis and cell proliferation would be diminished and possibly resulted in a lower overall median survival. While dose delays or dose reductions are entirely within the scope of appropriate clinical care, one way that the SHARP trial was likely able to avoid premature dose reductions was by strict adherence to protocol-defined dose reduction guidelines. Such guidelines are difficult to enforce in practice, and typically, subjects on a clinical trial may be more accepting of higher levels of toxicity compared to clinical practice. In addition, ensuring compliance with an oral chemotherapeutic agent taken at home, such as sorafenib, can be more challenging than conventional intravenous chemotherapy given in clinic.

In the SHARP trial,² the Asia-Pacific trial,¹² and this BCCA study, many patients complained of the adverse effects of sorafenib treatment. In the BCCA study, this was the reason for discontinuation in 23% of the patients. Similar to the side effects noted by the SHARP trial,² these included fatigue, hand-foot skin reaction, anorexia, diarrhea, nausea and hypertension. With severe adverse effects, this invariably leads to cessation of treatment.

Future studies may be targeted at understanding sorafenib toxicity in the context of an individual patient’s expression of biomarkers known to be related to HCC.

In summary, sorafenib represents a novel therapeutic option for patients with HCC. Challenges exist when attempting to extrapolate the clinical trial findings from the SHARP study to ascertain the impact of sorafenib in the real-world. Based upon our review of the early experience with implementation of sorafenib therapy for advanced HCC in BC, the overall survival of patients treated on the SHARP study appears to be more favorable than that observed in the BCCA experience. Attempts to improve patient selection, compliance and management of adverse events may optimize the impact of treatment for BC patients. Sorafenib patients will require careful selection in the future with regards to the degree of hepatic decompensation. Future follow-up review of the BC sorafenib experience is warranted to better understand the population-based impact of this novel therapy for patients with advanced HCC.

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Preparing Tomorrow's Healthcare Providers for Interprofessional Collaborative Patient-Centred Practice Today

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ABSTRACT

Interprofessional collaborative patient-centred practice is increasingly recognized as a means of addressing the challenges facing today's health care environment, such as patient safety issues, human resource shortages, and populations with complex health care needs. However, in order to be able to practice collaboratively, future health care providers need to receive an education that gives them the competencies necessary for being an effective team member. Interprofessional education provides opportunities for students to develop the knowledge, skills, and attitudes required to work as a member of an interprofessional team. This paper discusses some of the main arguments in support of moving towards collaborative practice models and advocates the need to train future health care providers using an interprofessional approach in support of this shift. This paper provides a survey of the literature in support of incorporating interprofessional education into health and human service curricula.

INTRODUCTION

Interprofessional collaborative patient-centred practice is increasingly advocated as a means of improving patient outcomes and the cost effectiveness of care in a variety of settings from primary health care to acute care to rehabilitation.¹ Collaborative practice “is designed to promote the active participation of each discipline in patient care. It enhances patient and family centred goals and values, provides mechanisms for continuous communication among care givers, optimizes staff participation in clinical decision making within and across disciplines and fosters respect for the disciplinary contributions of all professionals”.²

In a health care environment faced with patient safety issues, human resource shortages, and populations with increasingly complex health care needs, health professionals must be able to work in collaborative practice models such as interprofessional teams, in order to ensure consistent, continuous and reliable care. Interprofessional education (IPE), “occasions when two or more professions learn with, from and about each other to improve collaboration and the quality of care”,³ provides opportunities for students to develop the knowledge, skills, and attitudes required to work effectively as a member of an interprofessional team.^{4,5,6} This paper discusses some of the main arguments in support of moving towards collaborative practice models and advocates the need to train future health care providers using an interprofessional

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...health professionals must be able to work in collaborative practice models such as interprofessional teams in order to ensure consistent, continuous and reliable care.”

approach. It concludes by arguing that interprofessional educational opportunities need to be integrated as a required component of health and human service program curricula if collaborative practice models are to become the new reality.

MOVES TOWARDS INTERPROFESSIONAL COLLABORATIVE PATIENT-CENTRED PRACTICE

The literature provides limited evidence of the actual impact of interprofessional collaboration (IPC) on patient care and outcomes.⁷ Current evidence contains mainly descriptive studies of interprofessional interventions. However, there are strong arguments made throughout the literature in support of interprofessional collaborative patient-centred practice as a means of improving patient care. Today's society is characterized by an aging population that is faced with increasing complex health co-morbidities, such as hypertension, osteoporosis, hypercholesterolemia, falls, etc. The resulting complexity of patient care has contributed to a growing awareness that new and

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innovative models of delivery are needed. This need is exacerbated when combined with the current reality of health human resource shortages, increasing health care costs, and patient safety issues. The literature suggests that effective interprofessional teams can help.^{8,9}

1. Reduce service duplication and minimize unnecessary interventions;
2. Reduce health care costs;
3. Enhance patient and health outcomes;
4. Improve retention and recruitment of health providers;
5. Enhance clinical effectiveness; and
6. Provide integrated, seamless care that is perceived as effective by the patient in a range of settings.

Interprofessional collaborative patient-centred practice models involve professionals from different disciplines working together closely, and communicating frequently, in order to optimize patient care. The team is organized around solving a common set of problems and meets frequently to consult. Each member of the team contributes his or her knowledge and skill set to augment and support the others' contributions. In addition, each member's assessment must take into account the others' contributions to allow for holistic management of the patients' complex health problems. Team members preserve specialized functions while maintaining continuous lines of communication with each other.⁹ The value of this model of practice lies in its potential to offer multiple perspectives on clinical issues and create opportunities for enhancing collaborative care.⁵ Examples of this type of teamwork are often seen in complex patient care areas such as palliative care, geriatrics, and mental health.⁹

Over the past decade, there has been a substantial increase in the uptake of interprofessional collaborative practice models internationally. This is demonstrated by the development of new models for IPC in primary care settings throughout Europe, the United Kingdom, the USA, and Canada.¹⁰ For example, in British Columbia (BC), Integrated Health Networks (IHN) are becoming a new way of caring for people with complex, chronic health conditions.¹¹ IHN's are being developed across the province by the BC Ministry of Health Services, the health authorities and the BC Medical Association. In this model, family physicians develop formal partnership with a healthcare team. This team may involve nurses, dietitians, pharmacists, specialist physicians and community agencies. The team works together to determine priorities and develop better ways of organizing and delivering a wide range of services to meet both individual and community needs. The team also works collaboratively with patients and their families to develop a care plan that reflects the patient's goals.

INTERPROFESSIONAL EDUCATION FOR COLLABORATIVE PATIENT-CENTRED PRACTICE

Along with movements towards collaborative practice models comes the need to find out how best to educate a work force that can work together effectively.¹ In 2002, the Health Canada-commissioned Romanow Report stated that "in view of... changing trends, corresponding changes must be made in the way health care providers are educated and trained. If health care providers are expected to work together and share expertise in a team environment, it makes sense that their education and training

should prepare them for this type of working arrangement".¹² However, existing professionally-based educational structures and practices facilitate discipline-specific learning and rarely address the need for collaboration between professions. Interprofessional education has been identified as a means of preparing future health care providers for collaborative patient-centred practice.

Interprofessional education brings students from different disciplines together to learn with, from and about each other. By engaging in IPE that is explicit, interactive, and relevant to their future practice, students can:¹³

1. Learn new knowledge and develop new abilities;
2. Develop the interpersonal skills needed to work effectively with others;
3. Gain experience working in team settings in which group members share common goals; and
4. Learn how to work with others to maximize the performance and output of the group.

While measuring changes in skills, knowledge, and attitudes is a complex issue, numerous benefits to students have been reported as a result of interprofessional training programs.¹⁴ Students who participate in IPE activities show increases in knowledge about the roles of other health professionals, have a greater respect for the contribution of other health care professionals, and understand the importance of working collaboratively to achieve optimal health outcomes.^{14,15,16} Through IPE, students can develop competencies that will enable them to work collaboratively throughout their chosen careers. Therefore, the need to define the essential competencies required for collaborative practice and to develop and implement educational interventions to ensure their adoption is widely recognized.¹⁷

The Canadian Interprofessional Health Collaborative has identified the following competencies necessary for interprofessional collaboration in their newly emerging national competency framework:¹⁸

1. Understanding one's own role, the roles of those in other professions, and using this knowledge appropriately to establish and meet patients' goals;
2. Integrating and valuing, as a partner, the input, and the engagement of patients and families in designing and implementing care;
3. Understanding the principles of team dynamics and group processes to enable effective interprofessional team collaboration;
4. Understanding and applying leadership principles that support a collaborative practice model;
5. Communicating with other professionals in a collaborative, responsive and responsible manner; and
6. Actively engaging self and others in positively and constructively addressing interprofessional conflict.

Faculty at the University of British Columbia (UBC) are engaged in the development of numerous initiatives and strategies that will ensure health and human service program students develop these interprofessional competencies. For example, a new pain management course is being developed which will bring students from different disciplines together to learn content that is common across their curricula. By having students interact around pain management in an interprofessional context, this course will ensure that all members of the team understand the different pain

management strategies and resources available. The students are able to work together to manage pain as well as the underlying disease or condition.

Another IPE strategy UBC has found effective is problem-based learning (PBL). Students and faculty involved in interprofessional PBL initiatives elsewhere have reported that collaborative PBL processes encourage the development of interpersonal skills, teamwork, and respect for all professional roles.^{19,22} Therefore, UBC has developed a module in which a clinical problem presented in a case acts as a vector through which students learn to work together. Students from different disciplines interact to develop a collaborative care plan for the patient in the case. Students who have been exposed to the module early in their program report that they learned about the roles of other disciplines and gained the confidence to share their own role with their team members.²³

These and other IPE initiatives highlight the importance of creating learning opportunities that: are relevant to learners' current or future practice; use typical, priority health problems that require interprofessional approaches for their solution; and incorporate learning methods which facilitate interaction between learners from different professions, including small-group learning formats such as case-based and problem-based learning.^{21,24,25} However, most importantly, IPE opportunities need to be accessible to students. Making IPE a required component of a student's program, rather than an elective or extracurricular activity, will facilitate this. These and other initiatives being developed at UBC have yet to be integrated as required learning in the health and human service program curricula.

REFORMING HEALTHCARE EDUCATION

Policy makers from Canada, the United Kingdom, New Zealand, and the United States are increasingly recommending changes in health professional curricula in order to ensure student acquisition of competencies that facilitate collaborative practice.^{1,8,14} However, for any educational program to work, it has to be supported by professions and the administration of the educational and clinical institutions involved, valued by students, and hold its appropriate place in curricula.^{1,8} Education programs which integrate interprofessional education throughout the curriculum, starting with the pre-qualification experience, continuing into postgraduate education, and extending into continuing professional development, offer the best potential for interprofessional learning.^{1,8} With the support of Faculty, and the interest of health professional students, IPE is more likely to become appropriately implemented into the curriculum across a variety of health care disciplines.

SUMMARY

The need for interprofessional collaborative practice models continues to grow, as does the need for health professional education programs that are committed to integrating interprofessional education into curricula. The complexity of patient care, shortages in health care professionals, increasing health care costs, and patient safety issues continue to challenge the health care system. Interprofessional collaborative patient-centred practice offers a possible means of addressing these challenges, while interprofessional education offers a means through which

students can develop competencies that will enable them to work collaboratively throughout their chosen careers. However, in order to support this argument, continued scholarly research is needed in order to determine whether there is a direct link between interprofessional education and interprofessional collaboration, and this collaboration and improved health outcomes. 

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Powering the Millennium Development Goals: Developed Countries Need to Step Off the Gas

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ABSTRACT

Climate change is a major obstacle to the poverty alleviation program set out by the Millennium Development Goals (MDGs). The world's poor already suffer most from environmental degradation. In terms of health, this translates to a higher burden of preventable disease, caused primarily by a lack of access to sanitation and clean drinking water. This inequity will worsen if development does not occur before large-scale environmental change. While continued reliance on fossil fuels threatens to exacerbate climate change, increasing access to fossil fuels in the world's poorest countries is required to lift millions out of poverty and dramatically improve health outcomes. To achieve the MDGs and build the infrastructure needed to improve resilience to future environmental challenges requires access to efficient forms of energy. The only equitable way to resolve this dilemma is for developed countries to dramatically curb their emissions and thereby offset the small per capita increases in the emissions of developing countries that are necessary to advance public health and adaptive capacity.

CLIMATE CHANGE CHALLENGES THE MDGs

In 2000, the United Nations adopted the eight Millennium Development Goals (MDGs) to improve the lives of the world's poorest people.¹ The MDGs aim to reduce extreme poverty and major infections while increasing education, gender equality, maternal and child health, environmental sustainability, and global co-operation.¹ Unless climate change is dealt with effectively, the MDGs will become exceptionally difficult to achieve. Many developmental gains will be lost if climate change is allowed to cause higher rates of infectious disease, food and water scarcity, natural disasters, ecosystem collapse, human migration, and conflict.²

Climate change is expected to amplify both environmental degradation and inequality.^{2,3} It is the single greatest global health threat of the 21st century, endangering the lives of billions of people and the natural systems that support life.² Other environmental problems, such as biodiversity loss, lack of food and water, overfishing, and deforestation do affect the poor; however, climate change has far more sweeping impacts.² Given its potential to dramatically change whole ecosystems, it is also the most urgent issue.² By century's end, climate change will likely be the primary driver of ecosystem change worldwide.³ If the global mean temperature is allowed to rise beyond two degrees,

ocean acidification and accelerated sea-level rise will lead to a biodiversity catastrophe.³ Global temperature has already risen 0.7 degrees above pre-industrial levels and is already impacting human societies in the form of extreme weather events, sea level rise, and changing patterns of disease.³ Aside from its direct implications for health, climate change threatens to seriously destabilize global security. As sea levels rise, land becomes uninhabitable, infrastructure is destroyed, and governments will have to confront and plan for a reality of massive migrations that have the potential to aggravate underlying ethnic and political tensions.^{2,3} The UN Environment Programme has identified the dramatic drop in average rainfall and resulting desertification of Southern Sudan as a major contributor to the conflict there, forcing an increase in domestic migration.⁴ For human populations, the possibilities for effective adaptation to climate change rapidly decline beyond a two-degree warming due to the scale of social disruption it is likely to cause.³ However, unless dramatic action is taken to reduce global emissions, a business-as-usual scenario is expected to result in at least a four-degree warming by 2100.³

Lacking the financial resources to adapt to climate change and hampered by a relatively high sensitivity to environmental degradation, it is the world's poor who will bear the brunt of climate change impacts.^{2,3} It is estimated that the loss of healthy life years as a result of global environmental change will be 500 times greater for poor African populations than for European ones.⁵ Simply put, eliminating poverty, the ultimate aim of the MDGs, will not happen if environmental degradation is allowed to exacerbate injury, malnutrition, and disease.^{2,3}

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ENVIRONMENTAL HEALTH DIRECTLY IMPACTS THE POOR

While the worst effects of climate change have yet to be felt, the world's poor already suffer disproportionately from environment-related morbidity and mortality. In 2007, the World Health Organization performed its first assessment of the environmental burden of disease.⁶ Surveying 192 countries, the assessment sought to quantify the disease burden by measuring the disability adjusted life years (DALYs) in each country that could be avoided by modifying the following environmental factors: pollution, hazardous exposures, the built environment, land use patterns, agricultural methods, man-made changes to climate and ecosystems as well as behaviours such as hand-washing or the personal use of protective equipment.⁶

The findings from this study show that the poor suffer most from preventable environmental disease, losing up to 20 times more healthy years of life per person per year than those in higher income countries.⁶ The majority of preventable, environment-related diseases in developing countries result from the lack of sanitation and clean water, a problem that will grow under the pressures of climate change.^{3,4,6}

FUEL USE AND HEALTH

While fossil fuels occupy an uncomfortable position as drivers of global climate change, access to relatively clean-burning, dense, and portable energy is a key reason why higher incomes afford better health. Increased access to energy is associated with higher life expectancy and lower infant mortality.⁷ The benefits of access to fossil fuels have little impact on health status beyond 2000 kg of oil equivalents per person per year, roughly one quarter the usage of the average North American.⁷ While these health gains cannot be fully ascribed to fuel, the necessity of energy for health is clear and is a large reason why global life expectancy has almost doubled since the industrial revolution.^{7,8} Currently, 2.4 billion people rely on the burning of coal or biomass (wood, charcoal, animal dung, and crop wastes).^{7,8} The indoor pollution created from the inefficient combustion of these fuels is estimated to cause 1.6 million premature deaths each year, with women bearing the largest burden.^{7,8}

Access to energy is a prerequisite to all of the MDGs.⁸ Phasing out biomass in favour of cleaner burning fuels benefits both health and development, in women and children particularly. People gain education and income-generation opportunities as they spend less time collecting fuel and gain personal access to electric light.⁷ Energy from fossil fuels is necessary to build infrastructure, expand access to electricity, and boost agricultural yields in developing countries: developments that improve access and quality of health care, education, sanitation, and nutrition.^{7,8}

Development, especially development that improves the status of women, is the best way to ensure fertility declines in the long term – a trend that reduces human pressure on the environment and makes the path out of extreme poverty easier.²

SUSTAINABLE DEVELOPMENT

Until the link between energy and greenhouse gas (GHG) emissions can be broken by a large-scale implementation of renewables (solar, wind, hydro, tidal, geothermal, and certain biofuels), we face a dilemma where bringing people out of poverty and decreasing their vulnerability to climate change will increase

their global GHG emissions.^{1,2}

Even small per capita increases in GHG emissions in developing countries make a big difference globally, simply because they are home to 5.6 billion people (81% of the world population, including emerging economies).⁹

Despite the fact that developing countries have lower average

per capita emissions, they now emit 54% of the global share.¹⁰ By 2050, global per capita emissions must be held to around two tonnes of carbon dioxide annually to prevent the most dangerous levels of climate change.⁶ Currently, the North American average is over 20 tonnes per person.³ Industrialized countries have the largest historical responsibility for climate change.¹⁰ In reducing their own emissions, developed countries must account for the small per capita increases in emissions that are necessary for advancing public health and adaptive capacity of the poor.³

Beyond the small increases in emissions required for poverty alleviation, developing countries cannot follow the same pattern of development as the industrialized world at a time when drastic cuts in global emissions are required. Given the concentration of fossil fuel reserves, a heavy dependence on imported fuels would leave many developing countries vulnerable to supply interruptions and unaffordable prices.⁸ According to the most recent World Energy Assessment, the cost of investing in alternative energy is not prohibitive, and will decline over time.⁸ In a very influential 2007 report by a former chief economist of the World Bank, it was estimated that the cost of action to avert the worst impacts of climate change by transitioning to a low carbon economy is 1% of global gross domestic product (GDP) each year, a cost he has since revised to 2% of global GDP.^{2,11} The cost of managing the biggest impacts of unmitigated climate change, such as infrastructure damage and disaster assistance, could run as high as 20% of global GDP each year.^{2,11} The economic benefits of reducing the reliance of fossil fuels are obvious but will require foresight and global cooperation to make the necessary investments.^{2,11}

The shift away from fossil fuels requires increased energy efficiency, increased reliance on renewable sources and the accelerated introduction of new energy technology.⁸ Ultimately, the largest barriers to sustainability are human, not technological. Institutions, rules, financing mechanisms, and regulations must be

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...the loss of healthy life years as a result of global environmental change will be 500 times greater for poor African populations than for European ones.

altered to incentivize the switch to renewable energy sources.⁸ At the 2009 UN climate change conference in Copenhagen, developed countries committed to investing up to \$100 billion USD a year by 2020 into an adaptation fund for developing countries that are most vulnerable to climate change.¹² However, the hope of a globally binding agreement for emissions reductions was not realized.¹² Investments in adaptive capacity and development may be for naught, and will likely exacerbate climate change, if developed countries fail to take the lead on mitigation. 

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Diagnosing the Obama Plan

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Editor's note: This article was submitted in October 2009 and may not reflect the Obama Plan at the time of publication. It is provided here to stimulate discussion surrounding public health systems.

In discussing opportunities of crisis, Rahm Emanuel, Barack Obama's Chief of Staff, stated, "you never want a serious crisis to go to waste," implying that crisis provides an opportunity to do things that could not be done otherwise. The current economic recession has provided the Obama administration an opportunity to tackle healthcare reform, which has resurfaced for the fifth time since World War II.¹

Healthcare reform is currently a fiscal imperative given the rising costs of healthcare and the dismal economic climate. In 2007, the United States spent \$2.2 trillion, or 16% of the gross domestic product (GDP) on health care, figures that are projected to reach \$4.4 trillion or 20.3% of GDP by 2018.² Between 1999 and 2008, average health insurance premiums have increased

“**The Obama plan fails to envelop the most important cost control mechanism evident internationally—cost containment by setting caps on healthcare expenditure**”

approximately 120%.²

High insurance premiums coupled with the economic recession have led to massive layoffs and cut backs on the employer-sponsored insurance system, which covers 60% of Americans.^{3,4} The high costs of health insurance premiums have left more than 45 million Americans uninsured and subsequently, placed an increased demand for government-sponsored insurance programs, like Medicaid.⁵ However, in order to qualify for government-sponsored insurance programs, stringent criteria must be met: "Medicaid ... does not provide health care services, even for very poor persons, unless they are in one of the designated eligibility groups"⁶ This has created a fiscal dilemma for the government to provide more funds while tax revenues continue to decline. The fiscal emergency works in favour of Obama's administration to entice changes that will control the healthcare costs. The Obama

plan intends to control costs by improving medical practices and health outcomes along with restructuring the health insurance marketplace.³ The purpose of this paper is to examine whether the Obama plan contains significant cost-control measures.

CUTTING COSTS BY IMPROVING MEDICAL PRACTICES AND HEALTH OUTCOMES

The Obama plan proposes to control costs by accelerating the adoption of Health Information Technology (HIT), establishing a comparative-effectiveness research institute to generate information about effective treatments, promoting better disease management, emphasizing prevention and public health, and changing the payment system on the basis of performance and outcome.⁶

Although these reforms are certainly desirable in theory, evidence suggests that they are unlikely to reduce health care costs. The Obama administration has guaranteed an investment of \$50 billion in HITs, including investment in electronic medical records, because of its potential to increase efficiency and quality while lowering costs.⁶ By allowing easier exchange of information between healthcare providers, the interoperable electronic medical records can generate savings by reducing duplication of diagnostic procedures. However, the Congressional Budget Office (CBO) report refutes the claim that HITs will result in significant savings because of the current fee-for-service payment system. If providers reduced costs by providing fewer or less expensive services, they would submit lower charges to both public and private health insurers, which will subsequently decrease their revenue. Therefore, the current organization of healthcare financing and delivery provides no real incentive for effective utilization of HITs.^{7,8}

Similarly, "re-alignment of incentives [such as changing the fee-for-service payment system] is a precondition for the successful application of CEA [cost-effectiveness-analysis]"^{9,10} "Information by itself is not enough".¹⁰ In other words, savings from cost fee-effectiveness research depends on whether insurers translate research into medical practice by changing coverage decisions. The CBO report estimates that comparative-effectiveness research might reduce healthcare spending by only \$8 billion over the period of 2010 to 2019, less than 0.1%.¹¹

Furthermore, many studies have shown that the potential of preventive medicine to decrease costs is often over exaggerated.³ Public health advocates argue that if doctors detected conditions in their early stages, before they require more costly treatment, healthcare costs would also decrease. However, a retrospective review of 599 studies published between 2000 and 2005 showed

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that 80% of preventive services increased total costs of care.^{12,13} In the review, Louise Russell, a health economist, concluded that “over the past 4 decades, hundreds of studies have shown that prevention usually adds to medical spending.”¹² Only 20% of preventive strategies, which include childhood immunizations, smoking cessation advice, and prenatal care for at-risk mothers, were cost saving.^{12,14} This is primarily because preventive strategies, in order to be effective, require patient compliance for behavioral modification, a difficult task to accomplish. It is desirable to promote behavioral changes that reduce associated morbidities, yet it is unclear what public policies will “force” the population to adopt healthier habits.³

Lastly, the cost reduction potential of Pay for Performance (P4P) strategy remains unclear.³ The P4P model rewards health care providers who meet certain efficiency and quality performance targets.¹⁵ By providing financial incentives for physicians, the P4P model attempts to encourage physicians to deliver high quality care. This model is already underway in the United States and the United Kingdom. However, further studies are needed to determine its cost reduction potential.^{15,16}

RESTRUCTURING THE HEALTH INSURANCE MARKETPLACE

The Obama administration aims to control costs by restructuring the health insurance marketplace. Plans call for creating a new government-sponsored health insurance plan (similar to Medicaid) and a National Health Insurance Exchange (NHIE) with new market regulations. Both options would be open to Americans without access to public insurance or group health insurance.¹⁷

The public plan can theoretically decrease costs in three ways. Firstly, it can lower administrative costs associated with delivery of healthcare as seen in Medicaid. Secondly, by having large purchasing power, it can contain costs by restraining prices of the medical services it finances. Lastly, the low costs of the public plan can create true competition within private insurance companies to innovate in new ways that reduce costs.^{3,18} It seems highly unlikely that the public plan will dominate the healthcare market; however, it has the potential to greatly influence the private market.¹⁸

The creation of NHIE would allow for restructuring of the private insurance marketplace. The central dogma of insurance is to pool risks within a population in order to protect individuals from significant contingent losses. Pooling individuals with diverse health statuses results in greater risk and cost sharing; individuals with large expected-healthcare needs are able to share the costs with those who anticipate little need for medical care.¹⁹ Currently, many insurance providers in the United States distribute insurance on a state-by-state basis with the insurance pools consisting solely of individuals from a single state. By creating NHIE, a large national purchasing pool, the Obama plan will allow for a larger, more diverse pool of individuals such that both the costs and risk can be shared broadly across all insured individuals.¹⁹ This will provide affordable insurance to a larger population and decrease risk segmentation.

Medical underwriting facilitates risk segmentation by providing insurance companies with the information to decide

how high to set insurance premiums or when to deny coverage.¹⁹ The process of risk segmentation is associated with high administrative costs that are directly passed on to the consumer, thereby increasing the costs of medical insurance. By creating a diverse pool of individuals, NHIE can decrease administrative costs associated with risk segmentation.^{3,19}

But in order for risk sharing to be effective, the Obama plan requires an individual mandate compelling all adults to purchase insurance, thus creating a diverse pool. Because no such mandate exists, some healthy adults might opt out of insurance to avoid paying premiums, resulting in less risk sharing.¹⁹

DISCUSSION

Although making investments to improve medical practices does not show great potential in cost reduction, restructuring the insurance marketplace seems somewhat promising. Nevertheless, the Obama plan fails to envelop the most important cost control mechanism evident internationally—cost containment by setting caps on healthcare expenditure.^{3,20} Consider Canada as an example. Since healthcare costs are primarily on the public budget, the government has a strong incentive to cap healthcare expenditure, thereby limiting the medical industry’s continuous efforts to increase prices.^{20,21} Without capping healthcare expenditure, effective cost-control cannot be achieved, and just as Medicare and Medicaid costs have risen historically, the costs of delivery of health care will continue to escalate.³ Credible cost-control strategies are politically a hard sell because of the power medical industries hold, as apparent by the demise of the Clinton healthcare reform plan of 1994. Setting a cap on healthcare expenditure threatens the medical industry’s income, and those working in the industry have significant political clout in the United States. The Obama plan, as described by Marmor and colleagues, is merely an “illusion of painless savings... [making] the acceptance of cost control realities all the more difficult.”³

Would it be prudent to embrace the Obama plan with its benign cost-control measures or should we wait for a “plan” that incorporates effective cost-control strategies as outlined above? Introducing ideas such as global budgets and spending caps at this time can be controversial. It can sink the entire reform effort because it will inherently elicit alarms of “rationing” of care from the medical industry.³ The strength of the Obama plan is that it increases access to health insurance and has the potential to decrease the percentage of uninsured Americans from 17% to 6%.¹⁹ More coverage will provide security for a greater number of Americans and can increase public support for the Obama administration. Only after gaining public confidence and some control of the healthcare market may the Obama administration draft reforms that include credible cost-control mechanisms, price restraints and spending targets.

CONCLUSION

Healthcare reform is not a one-time event; it is a process requiring a series of interventions to heal the current “bloated, Byzantine, and slowly bursting” United States healthcare system.²² If the Obama administration was to incorporate rigorous cost-control

mechanisms now, the entire reform effort will likely be defeated. Now is the opportunity to start “treating” the United States healthcare system; let’s not allow the opportunity this fiscal crisis presents to go to waste.

In addition to strengthening the ailing American healthcare system, the Obama plan has important implications for other developed countries. Many developed countries are dealing with similar issues of escalating healthcare costs while trying to provide equitable access to high-quality care, and Canada is certainly not an exception. As healthcare is becoming the most expensive social program, Canadians are grappling with the issue of public versus private insurance financing. The geographical proximity of the United States and Canada, along with their highly integrated economies means that United States’ healthcare reform will undoubtedly have significant future implications for Canada. 

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Teaching Socially Responsible Medicine in the Himalayas: A Lofty Pursuit

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Nine years ago at a hospital in Kathmandu, Nepal while on Intensive Care Unit rounds with Dr. Arjun Karki (a Nepali-trained doctor), we stopped at the bed of a twelve-year-old girl whose foot had been amputated that morning as a result of a car accident. I asked Arjun, “What will become of her?” Perhaps she would have to get a prosthesis, or have to use a cane? Arjun looked at me with troubled eyes and said, “Her chances are actually quite limited.” He explained that the infection could get worse (indeed she lost half her leg later that day). Furthermore, because she was from a poor, rural district with no medical facility, her parents would be unlikely to afford the necessary medical care that Dr. Karki initiated in the city.

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Dr. Karki’s statement pointed to the reality of how in some parts of rural, mountainous Nepal, the ratio of patients to doctors is 150 000 to 1. How is that possible in a country where more than 1000 new doctors graduate each year from 12 medical schools? A problem with retaining physicians in the country is one explanation, as 80% of the graduates will write licensing exams for practice in other countries. For those who stay in Nepal, they opt to practice close to, or in, the city of Kathmandu.

Last year the Kathmandu Post advertised 54 positions in rural district clinics. 25 applications were received, 22 applicants showed up for interviews and 12 were offered positions.¹ According to Dr. Karki, less than 50% of those offered positions actually showed up for the district jobs.

What is partly responsible for these grim statistics is the fact that current Nepali medical schools are mostly for-profit, and

they recruit urban students who can afford the high tuition fees but who carry no inclination to practice in rural settings. A second contributing factor is the staggering lack of medical resources and intellectual or professional development opportunities for new graduates if they choose to practice in rural areas.

Upon graduating fifteen years ago, Dr. Karki, like most other medical graduates in Nepal, left Nepal for specialty training in Boston. In contrast with his peers however, Dr. Karki returned to Nepal with a desire to improve his country's rural health care.

Four years ago Dr. Karki and a group of dedicated Nepalese physicians, supported by an international consortium of colleagues from twelve international medical schools (including the University of British Columbia, the University of Alberta and the University of Calgary), established a new health science university, called the Patan Academy of Health Sciences (PAHS). PAHS is a privately funded, not-for-profit, autonomous, public institution dedicated to training doctors to practice socially responsible medicine.

Several core principles support this lofty goal: 1) An innovative admissions process with preferential recruitment of applicants from rural areas, including "health assistants" who have undergone pre-requisite science courses and basic training in curative and preventative medicine, and who have already served for two years in rural health clinics; 2) scholarship support for students from rural areas; 3) a rural community health project that all students will propose, develop and implement throughout the length of their program; 4) clinical training at Patan Hospital, an institution with a well established ethos of service to the poor and disadvantaged within the Kathmandu Valley, thus providing strong social-accountability role modeling from doctors and other health care workers, and finally 5) post graduate support

while working in the rural context, including regular continuing professional development supported by information technology and telemedicine.



While the Patan Academy has yet to accept its first class, nine-year-old Saraswoti Pariyar, a young orphan girl from the Jumla district in Nepal represents the kind of student that the Patan Academy hopes to benefit. She is currently receiving an education through Sonrisa Orphanage in Kathmandu, Nepal. Saraswoti is smart but

is in a disadvantaged position financially and socially (due to her low-caste status). Without scholarship support, Saraswoti would not be able to consider a career in the health sciences. (Photo by CA Courneya)

In May of 2010 PAHS, by welcoming its first fifty students, will begin the journey towards improving socially responsible medicine — answering the World Health Organization's call in 1995:

"...The obligation [of medical schools is] to direct their education, research and service activities towards addressing the priority health concerns of the community, region, and/or nation they have the mandate to serve."

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For more information on PAHS visit the website (<http://www.pahs.edu.np>) or contact CA Courneya (3rd from left-front row) and David Powis from the University of Newcastle (4th from left-front row) leading an Admissions Workshop for faculty members of Patan Academy of Health Sciences Faculty. Dr. Rajesh Gongal (2nd from left-front row) is the Dean of PAHS. (Photo taken with CA Courneya's camera, by R. Sresthna)

Pushing Past Barriers: A Glimpse of Uganda Through a Medical Student's Eyes

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During the summer of 2009 I travelled to Arua, Uganda and volunteered for an NGO named Rural Initiative for Community Empowerment (RICE). During my initial meeting with the director, a charismatic and welcoming Ugandan, he suggested I use the knowledge I had gained in first year medical school to educate Rural Communities by way of health presentations. With this in mind by day two of my visit I set about designing a program that would touch on various health issues that could help educate communities and schools on topics such as HIV/AIDS, malaria prevention, sexual reproductive health, nutrition, and sanitation.

Locally referred to as “Mundu”, a local slang for white person, I set out into villages scattered throughout the North Western corner of Uganda. Many of the people I talked with were welcoming and eager to learn more about how they could

make small changes in their daily lives in order to improve their health. However, on more than one occasion, I had to negotiate with the local witch doctor. On one particular occasion after some heated discussion between the witch doctor and my translator, the witch doctor reluctantly lifted his wooden cane and let us enter. I hoped that somehow I could convey to the witch doctor that I was not trying to impose anything on their village, but instead help to educate for the benefit of his villager's health. As I presented under the mango tree, the witch doctor grimaced when I looked his way. Half way through the presentation he started yelling at me and my translator told me with a smile the witch doctor was casting a “spell” on me for crossing into his territory.

Despite the “spell”, I left the village that day with an added appreciation of cross cultural differences and the future challenges biological medicine faces in order to mainstream itself into many remote areas of the world.

For more information on RICE and if interested in volunteering please visit: www.riceuganda.org

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Lessons from the Travelling Patient

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I remember how nervous I felt upon our arrival. The motion sickness from the helicopter ride quickly subsided as the overwhelming crowd of local villagers greeted us. In the midst of all the excitement, a mother carrying an infant infected with Yaws (a rare disfiguring infection of the bone and cartilage) caught the corner of my eye. They, as well as others, were expecting us and I was eager to help. A part of me hoped that we, as a medical team, could live up to their expectations.

Last summer, I travelled with The Summer Medical Institute Northwest Medical Missions Team to provide healthcare to the isolated villages in Papua, Indonesia. These villages are located up in the mountains and are only accessible via small airplanes and helicopters. There is no electricity, no running water and many still hunt with bows and arrows. The atmosphere truly felt like a picture taken out of the pages from National Geographic. Needless to say, they had very little access to healthcare.

With our limited medical supplies, we treated a variety of patients in our clinic: cleaning and dressing wounds, providing B12/analgesic injections, treating common and complex tropical infectious diseases. Sadly, there were patients with illnesses we could not treat. However, the most memorable patient was a man who I appropriately named the “travelling patient”. After hearing our helicopter fly over his village, he trekked barefoot for 3 days just to see us. As he arrived exhausted with his feet blistered and damaged, I wondered what motivated him to endure such a grueling journey. When asked if it was worth it, he responded with simple yes, and expressed his sincere gratitude for having someone finally care for him.

This experience serves as a reminder of how honored we are to be in a profession where patients actively seek our care and help. It serves as one of my driving forces to become a better physician for my future patients. It is a humbling responsibility – one I do not intend to take lightly – and the story of the travelling patient will help me to never forget this privilege.

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Minimally Invasive Surgery for Scoliosis: The New Laparoscopic Cholecystectomy?

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In October 2009, a team of orthopedic surgeons at BC Children's Hospital, led by Dr. Firoz Miyanji, performed the first minimally invasive spinal surgery for scoliosis in Canada on an 18-year-old girl from Prince George.

Minimally invasive surgery (MIS) for scoliosis consists of creating small "keyhole" incisions in the back, through which screws are inserted into the joints of vertebrae.¹ Thereafter, wires are used to lay down bone grafts for fusion. Finally, through cannulated screws, a rod is fed to straighten the spine. The new procedure takes an additional 1-1.5 hours on top of the 4-6 hours of time required by the conventional method, in which one large incision is made and all associated muscles with the vertebrae are "stripped" for access to the joints.

Idiopathic scoliosis is the most common spinal deformity facing orthopaedic surgeons. Although the condition is not typically painful for adolescents, it is associated with long-term cardiac and pulmonary compromise and future back pain. Typically, surgery is considered in those with a curvature greater than 45-50 degrees with the aim to arrest the progression of the disease and secondarily to straighten the spine.

Due to the extensive muscle stripping involved in the traditional procedure, extensive tissue damage, junctional alignment difficulties and muscle atrophy are possible. Patients undergoing traditional surgery are also admitted to ICU and must undergo months of rehabilitation. With MIS, there is considerably less trauma to the tissues, less blood loss and no admission to ICU. Patients can walk the next day, and be discharged within 3-4 days. Potential disadvantages of the MIS procedure include longer operating time, and lack of long term evidence of efficacy.

While the procedure is currently offered to patients with idiopathic scoliosis, Dr. Miyanji hopes that it can be extrapolated to other causes of scoliosis. The surgery is not recommended to those with large (greater than 70 degrees) or particularly rigid curvatures, which are difficult to manipulate with small incisions.

With MIS, real challenges face the surgeons: "You have to know the anatomy more comfortably, because you don't know

where you are putting the screws in, and it's not a big visual field that you are seeing," says Dr. Miyanji. However, he believes that the surgery is a very "teachable item" and will gain more popularity. Dr. Miyanji is scheduled to give numerous talks on the topic across the country, and has received interest from adult spine surgeons interested in using the method in non-pediatric populations. 

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The Society of General Practitioners of BC

- The SGP represents the Section of General Practice in the BCMA and advocates strongly for the pivotal role of the General and Family Physician in the delivery of Primary Care in BC.
- The SGP advocates for improved funding through the GP Subsidiary Negotiations Committee.
- Membership in the SGP provides access to our website where members can find billing and practice management tools.
www.sgp.bc.ca
- MEMBERSHIP IS FREE FOR ALL MEDICAL STUDENTS AND FAMILY PRACTICE RESIDENTS.

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Pulling Back the Curtain on Physicians and the Games

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This past February and March, thousands of athletes descended upon Vancouver, British Columbia for the 21st Olympic and 10th Paralympic Winter Games, bringing their medal-winning dreams with them. Although the spotlight focused on these competitors, hundreds of physicians worked behind the scenes to ensure that events ran smoothly.

As Chief Medical Officer for the Vancouver Organizing Committee (VANOC), Dr. Jack Taunton looked after the medical and anti-doping aspects of the Games. Taunton spent the past four years working with local, national, and international health agencies, sporting organizations, researchers, and sponsors, preparing for everything from a mass casualty situation to setting up a 24-hour substance testing laboratory. As if this did not keep him busy enough, he also oversaw the installation of two 10,000-square-foot “polyclinics” in Vancouver and Whistler. Spectators, athletes, and officials needing additional urgent or emergent medical care were sent from competition venues to these sites to avoid straining local healthcare facilities.



Left: Dr. Jack Taunton, sport medicine physician and Chief Medical Officer for VANOC, spent years preparing for the medical and anti-doping needs of the Games. *Photo Credit:* Martin Dee.

Right: Orthopedic surgeon and Chief Medical Officer for the Canadian Olympic Committee Dr. Robert McCormack managed what he calls the “home field disadvantage” during the Games. *Photo Credit:* Paul H. Wright.

During the Games, things only got busier. Taunton needed to meet with his team every morning at five AM, then report at 6:30 AM to the head of the International Olympic Committee Medical Commission on issues with food, water, and air quality, illness, and doping. Most sporting events did not end until 10 PM each night!

Dr. Robert McCormack didn’t sleep much during the Games, either. As Chief Medical Officer for the Canadian Olympic Committee (COC), he led a team of physicians, massage therapists, physiotherapists, and sport psychologists in caring for approximately five hundred Canadian Olympic athletes and support staff before and during the Games. Besides managing pulled muscles and potentially dream-ending illnesses, McCormack saw handling “the home field disadvantage” as one of the biggest challenges facing his team during the Olympics. “There [were] nearly five media [personnel] for every athlete at the Games...and we stated our objective to be the top medal-winning nation,” said McCormack, placing intense attention on Canadian athletes. To help, the COC medical team set up a Wellness Centre for “athletes to go away, have some quiet music and just chill,” he added.

During any Games, it’s not just the athletes that need downtime. Both Taunton and McCormack have spent hundreds of hours travelling and attending meetings to fulfill their roles, all while trying to maintain medical practices (Taunton in Sport Medicine, McCormack in Orthopedics). Dr. Russell O’Connor understands these challenges all too well. As team physician for the Canadian Disabled Alpine Ski team, O’Connor devotes one half-day a week and travels four weeks a year with his athletes. With the Games, this commitment extended into personal vacation time away from his psychiatry practice.

However, with support from their families, all three physicians indicated that being involved with the Games had its benefits. McCormack, a former competitive athlete, loved getting “to see the best athletes in the world...from the best seats!” For O’Connor, it was the inspiration he derived from working with athletes like alpine skier Chris Williamson, who “skis with an inner vision of success” despite near-complete vision loss as a result of a toxoplasmosis infection. Brian McKeever, who competed as an able-bodied cross-country skier at the Olympics but switched to competing at the Paralympics after being diagnosed with

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Stargardt's Disease, also motivated O'Connor.

So how can you get involved in such a rewarding field? According to McCormack, "It's a matter of making yourself available, maintaining your expertise, and getting along with people." O'Connor recommended that interested medical students and residents train in orthopedics, psychiatry, emergency, or family medicine, followed by certification in sports medicine. Taunton promoted the Sport Medicine Fellowship program offered through the University of British Columbia's Allan McGavin Sport Medicine Clinic. All three physicians suggested working

with local athletic teams and events before moving up to working with national teams and at international events. In particular, those interested in working with athletes with disabilities should contact such organizations as the BC Disabled Sport Association and the Canadian Paralympic Committee.

With H1N1 fears and medal-winning pressures mixed with sleep deprivation and time away from family, Canadian physicians were certainly challenged this past February and March. Nevertheless, as Taunton aptly noted, "It doesn't get any bigger than having the Games in your own backyard." 

Learning from our Future Patients

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As part of Celebrate Learning Week at UBC, the College of Health Disciplines and the UBC Teaching and Learning Enhancement Fund Grant held the First Annual Health Education Fair in the Life Sciences Centre on October 29th, 2009. The fair focused on interdisciplinary health education, hoping to educate students from all health disciplines including nursing, pharmacy, physiotherapy, occupational therapy and medicine.

With the slogan "Health Care Involves Everybody: a fair to bridge patient, community and campus expertise," 22 organizations set up display booths and hoped for students to inquire more about their cause. The Arthritis Society, Cerebral Palsy Association of BC, Canadian Diabetes Association and Canadian Mental Health Association were only a select few of the many organizations eager to teach students about their condition.

The purpose of the fair is to provide "...an opportunity for a wide range of organizations to come to the university to share their expertise," states Dr. Angela Towle, one of the fair organizers. She explains that "often the university thinks of community engagement in terms of outreach to the community; providing the expertise from the university to the community."

The BC Epilepsy Society was another organization that took part in the Health Education Fair. Kathryn Sykes, the community development coordinator for the society, explained that they hope to teach students about the society so that in the future students

can refer patients to them for support and resources. They also wish to educate the public about epilepsy so that more people know how to help someone experiencing a seizure. Many of the organizations that participated in the fair have many patient-oriented resources that they are willing to deliver to offices and clinics. They hope that this information will help educate patients about their diagnoses and facilitate the role of health care professionals by having this information available for their patients.

Patient panels were also arranged so that students could have the opportunity to hear patient's stories, focusing on the specifics of their conditions and on their health care concerns. The first patient panel consisted of a patient with a mental illness, a patient diagnosed with lymphoma and a patient diagnosed with scleroderma. Even though the audience was small, each patient was enthusiastic to educate the students about each condition. One of the patients, Ruth, was diagnosed with lymphoma and has fought a long battle with cancer ever since. Her message for students was to focus on the whole patient and to "[look] at the patient as a person and in the context of their own life." This message resonated throughout the fair. Patients wanted health care professionals to take a holistic approach when treating them.

With the interdisciplinary focus, keen patients and devoted organizations, this fair was a success. Perhaps with more advertising, even more students will attend these sessions and have the opportunity to hear patient's stories next year. We can learn so much from patients and what better time to do so than while we are students. 

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Internships at the World Health Organization, Leader in International Public Health

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THE WORLD HEALTH ORGANIZATION

Over the past century, we have witnessed the eradication of smallpox, drastic reductions in the global incidence of polio, and highly coordinated international responses to control the spread of dangerous infectious diseases, like H1N1 influenza. At the centre of these successes stands the World Health Organization (WHO), the United Nations' coordinating authority on international public health. Since its inception on 7 April 1948, WHO has been a leader in international public health, employing over 8,000 people from various educational backgrounds, including medicine, epidemiology, public health, finance, and administration. Today, it remains one of the largest collections of technical expertise regarding health issues and continues to lead many international public health efforts.

ORGANIZATION OF THE ORGANIZATION

WHO is headquartered in Geneva, Switzerland, and has six regional offices – Regional Office for Africa (AFRO), the Americas (AMRO, also known as the Pan-American Health Organization – PAHO), Southeast Asia (SEARO), Europe (EURO), the Eastern Mediterranean (EMRO), and the Western Pacific (WPRO). The World Health Assembly (WHA) is the highest decision-making body of WHO, and delegations from each of the 193 member states convene yearly in Geneva in May. At WHO headquarters, activities are broadly divided into eight clusters – such as HIV/AIDS, TB, Malaria and Neglected Tropical Diseases; Information, Evidence, and Research; and Health Systems and Services – with numerous departments in each cluster focusing on more specific areas of technical expertise.

INTERNSHIPS AT WHO

Internships with WHO are available to individuals who are pursuing graduate studies and last for 6-12 weeks, though they can be extended up to 24 weeks in special circumstances. Applications are made to a specific cluster within WHO, and opportunities are available at WHO headquarters, as well as any of the regional offices. The application process is very competitive, as approximately 260 interns were selected from over 8,400

applications for the summer of 2009, so it is highly recommended that applications be made once the positions become available (i.e., December 1 for summer internships and August 1 for winter internships).

Numerous medical students have undertaken internships with WHO. For three months, I worked in Geneva with the Evidence-Informed Policy Networks (EVIPNet) Program, in the Department of Research Policy and Cooperation, on several projects, including a study to document efforts being made to encourage the use of research evidence to inform health policymaking in 11 African jurisdictions. Partway through my internship, I also became involved with the Department of Food Safety and Zoonoses, as they worked towards building a program in knowledge-translation. Another medical student also served as an intern this past summer, working with the Alliance for Health Policy and Services Research (Alliance HPSR). With guidance from Dr. Kent Ranson, she performed a systematic review on universal coverage mechanisms in high-income countries.

I believe that the WHO internship was an extraordinary and worthwhile experience, especially for those with an interest in international health. It was a great opportunity to work with and meet individuals who are leaders in their respective fields, and also other interns from around the world with similar interests. Unfortunately, the WHO does not provide any payment or scholarship to its interns. So, those interested in applying for internships should investigate potential sources of funding. Diane and I found funding opportunities through our universities by contacting individuals familiar with student awards and financial aid. Time spent in Geneva is hardly inexpensive, and aside from the cost of getting there, you can expect to spend between 1,000 to 1,500 CAD a month on rent and an additional 1,500 CAD per month on food, travel and other expenses.

For more information regarding WHO and its internships, please consult the following website:

WHO: <http://www.who.int>.

WHO Internships:

<http://www.who.int/employment/internship/en/>

Those who have a particular interest in the field of health policy and systems research are encouraged to check out the website of the Alliance HPSR (<http://www.who.int/alliance-hpsr/en/>) or to contact Dr. Kent Ranson directly (ransonm@who.int).

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Letter to the Editor

Oscar G. Casiro, MD, FRCPC^a

Dear Editors:

I would like to thank you very much for sending the framed and signed cover of the first *UBC Medical Journal*. This framed picture will be placed in a public area of the Island Medical Program building to preserve the memory of this important milestone. I would like to take the opportunity to congratulate you and your colleagues for the successful launch of the *UBCMJ*. I am impressed by the quality of the articles and the artwork, and by the level of interest, participation, and commitment by students and faculty alike.

Yours sincerely,

Oscar G. Casiro, MD, FRCPC

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The Launch of the Men's Health Initiative of British Columbia

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Drawing on the Olympic Motto, "Citius, Altius, Fortius" or "Swifter, Higher, Stronger", athletes took centre stage, celebrating sport and health at the Twenty-first Winter Olympic Games in Vancouver. However, as British Columbians embraced this Olympic spirit, a different motto will represent the average health of men in this province: "Slower, Weaker, Unhealthier". Launched in the fall of 2009, the Men's Health Initiative of British Columbia (MHIBC) aims to address this issue and impart change to the overall health of men in BC.

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The MHIBC is a novel idea led by Dr. Larry Goldenberg, Clinical Head of the Department of Urological Sciences at the University of British Columbia. The MHIBC will be a centre of excellence that focuses on improving men's health and quality of life through leadership, awareness, education, research, and the dissemination of best practices for clinical care in areas such as cardiac, bone, mental, sexual, and testosterone health.

The first order of business was the launch of the MHIBC website, <http://www.aboutmen.ca>, an interactive website highlighting important information on men's health for both the public and health care practitioners. This was followed by the release of the "Men's Health Report" in January 2010,¹ which emphasized the most significant issues in men's health and made recommendations to improve clinical practice, research, and health policy.

"Many 40-year-old men are more interested in looking after their cars than their bodies," says Dr. Goldenberg. "We know this catches up to them in the form of acute illness, chronic disease, and even depression, so our goals are to understand the complex issues that affect men's well-being, to make men and their families aware of [the health risk men face], how they may be able to prevent illness later in life, and to improve men's access to gender-specific health services. In this way men can potentially add ten good, quality years to the middle of their lives, postpone [the symptoms of old age], and help themselves to grow older without growing old."

It is alarming to learn that the average life expectancy of men in BC is 76 years, which is over 4 years shorter than that of women. Furthermore, the average number of healthy years for men in BC is 65 years, representing 11 years of quality life lost from poor health and disability before death.²

Clearly there are biological, social, and cultural pressures that have significantly impacted gender differences in morbidity and mortality in this province. For example, according to a report compiled by Dr. Dan Bilsker for the MHIBC, men are more likely to die from diabetes, cardiovascular disease, and cancer than women.

Additionally, men get in more motor vehicle accidents, have higher suicide death rates and comprise 97% of workplace deaths. While a women's health movement established itself over the last twenty years, men have continued to underutilize health care services and fall further behind women in their overall health. It was this gap in men's health that motivated the development of the MHIBC.

And so, it is through the MHIBC that we hope to improve the health of men in BC so that they too can be "Swifter, Higher, Stronger".

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International Medical Graduates: The BC Doctor Shortage Solution

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ABSTRACT

International medical graduates (IMGs) originate from several parts of the world including the United Kingdom, Australia, and Ireland. Despite receiving comprehensive medical training similar to North American graduates, there are still several obstacles they encounter when applying for Canadian residency positions. In particular, British Columbia has a low availability of residency spots making it especially difficult for international graduates to return and practice medicine within the province. Despite concerns in accurately assessing whether IMGs are appropriately qualified, they are an essential component of the Canadian healthcare system. In the midst of a serious physician shortage that will only deteriorate further with the high number of retiring physicians, IMGs need to be considered to alleviate the situation.

A physician shortage is crippling the health care infrastructure in Canada. Yet, many qualified doctors are not considered to alleviate this shortage. These physicians are referred to as International Medical Graduates (IMGs), having received a medical degree outside of a North American medical school.¹ There are two types of IMGs: experienced medical professional immigrants and Canadians graduating from international medical schools. The majority of the former group come from Asian and Eastern countries.² IMGs, both originally from Canada and from abroad, believe they are the solution to the healthcare deficiency. This paper will focus solely on Canadians who graduated from international medical schools.

According to a recent 2009 report, approximately 1500 Canadians are studying abroad, of which 200 are from British Columbia.² Most commonly, the competitive environment of medical school denied many qualified students the privilege of medical education at home.³ Unaccepted applicants were left to pursue other options such as completing post-graduate studies, research, or reapplying the following year.³ Others opt to apply abroad to international medical schools including Ireland, UK, Australia, and the Caribbean.

After completion of their medical degrees, students consider an array of options. Some graduates, for example Canadian-Irish medical graduates, reserve a year to complete an internship in order to obtain licensure in the EU. However, the majority of North Americans apply for residency either in Canada or the US.³

The process for IMGs applying to residency positions in Canada is remarkably similar to that of Canadian medical students, with a few notable exceptions. For example, IMGs are required to

sit for the Medical Council of Canada Evaluating Examination (MCCEE), which is designed to assess basic medical knowledge and necessary skills to be successful in residency.⁴ Students must apply through the Canadian Resident Matching Service (CaRMS).⁵ Each year, numerous students compete for 12 family practice and 6 specialist residencies at St. Paul's Hospital.⁶ For this method, there is an evaluation process, which consists of a 12 station Objective Summative Clinical Examination (OSCE)

“ Without a significant addition of foreign-trained doctors, the Canadian physician-to-population ratio will decline

and a clinical assessment.⁶ The culmination of these obstacles ultimately contributes to the lack of primary physicians in Canada.

This issue has elevated to a critical level, raising a need for the government to respond. An estimated four million Canadians currently do not have a family physician, particularly in rural areas. Furthermore, the BC Medical Association stated in 2005 the province needs more than 400 new general practitioners every year to compensate for

those retiring.⁷ Also, a 2005 report by the Fraser institute stated, “Without a significant addition of foreign-trained doctors, the Canadian physician-to-population ratio will decline between now and 2015, just as it would have through the 1990s if foreign physicians had not been used to ‘top up’ the shortfall caused by insufficient medical school admissions.”⁸

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Arguments against incorporating IMGs into the Canadian healthcare system consist of the concern that the quality of education and training of various IMGs may be lower than Canadian medical school standards.⁹ Assessment of IMG training is difficult to gauge because of the lack of education quality standardisation. Furthermore, studies have proven the inefficacy of replacing the rural shortage of doctors with IMGs. According to a retrospective study carried out in Newfoundland and Labrador between 1995 and 2006, the number of provincially licensed IMGs staying in the rural area declined to 55% after two years. Approximately 90% of IMGs who initially worked in the rural areas moved to urban centres due to increases in financial compensation and cultural similarities.¹⁰

In order to tackle the issue on measuring the quality of IMG training, the Alberta International Medical Graduate (AIMG) program was created in 2001.⁹ This program includes standardised review credentials, performance on national examinations (MCCEE and MCCQE1) and an OSCE exam. Moreover, it was discovered that for the same financial costs and resources needed to train one Canadian medical student to enter residency training, the AIMG program identifies ten “residency ready” IMGs.⁹ Concerning the efflux of IMGs from rural areas, government policy changes are required for greater incentives to sustain a long term impact on rural healthcare. However, this does not diminish the significant role IMGs have in improving the acute shortage of physicians.

The most essential adjustment to improve the physician shortage would be expanding the number of Canadian medical school positions; however, this is not the only approach. An alternative solution could be an increase in residency positions for IMGs. Many of these graduates are Canadian citizens who have passed national qualifications exams, speak English and respective native dialects, and are prepared to work in rural areas in need of their services. A study conducted among general practitioners found IMGs were more likely to practice in small towns or rural areas in comparison to Canadian medical graduates, further supporting an increase in residency positions for IMGs to appease the physician shortage in these areas.¹¹ Despite being the second highest preferred location after Ontario, British Columbia (BC) still has the lowest acceptance rate of IMGs for CaRMS match residencies per capita in the country. However, the IMG family practice residencies increased from 6 to 12 in November 2005 in BC.¹¹ Nonetheless, it is vital for BC to continue increasing the residency spots in order to address the aforementioned lack of physicians.

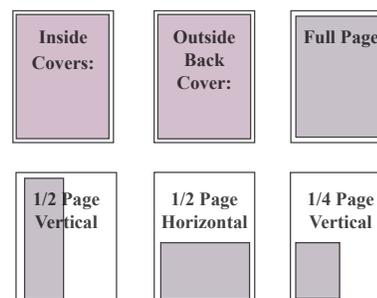
In spite of the numerous qualified applicants for Canadian medical schools, many often choose to pursue medicine abroad. Similar to Canadians at home, IMGs have to go through great lengths to achieve residency positions. Although the number of positions has increased over time, it is still evidently insufficient, particularly for BC. Studies have proven the willingness of IMGs to practice medicine in rural areas, but it is crucial for government to support this outlook by means of providing extra benefits. We can hope that raising awareness of this issue will result in better outcomes for IMG future prospects. 

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The Doctor to Women Around the World

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When Dr. Dorothy Shaw was first nominated to take the top post at the International Federation of Gynecology and Obstetrics (FIGO) and become its first female president, she was hesitant to take the job. “I wanted to learn more about where the organization is right now and where the real potential for change is,” said Dr. Shaw, also a former president of the Society of Obstetrics Gynecology of Canada (SOGC). “When I’m really serious about something, I commit and work really hard to see it to fruition.” Only after serving as a committee chair for several years did she feel comfortable to take on the prestigious position.

Behind Dr. Shaw’s modest, down-to-earth and affable image is a remarkable career and a driving passion as an advocate for women’s health. Well-known both at UBC and internationally, Dr. Shaw currently serves as a Senior Associate Dean, Professional Affairs and clinical professor in the UBC Faculty of Medicine. She currently leads as the Canada Spokesperson for the G8/G20 Partnership of Maternal Newborn and Child Health, and in 2008 was named one of Canada’s 100 Most Powerful Women.

Dr. Shaw knew she wanted to become a doctor at the young age of 8. Growing up in the north of England with her two brothers, she learned the value of hard work by helping at her family’s green grocer’s business during high school. “If you were to have a successful business, it required sacrifice and a significant commitment,” she says, and remembers how her parents had to pull long hours getting imported shipments from the docks in the morning.

In medical school at the University of Edinburgh, Dr. Shaw was not initially set on becoming an obstetrician/gynecologist. Her passion for the specialty started when she went to Montreal for her first clinical experience between second and third year of medical school. After another stint in San Francisco and later back in the United Kingdom, Dr. Shaw finally decided to settle on obstetrics/gynecology, and decided to make the move to Canada.

Dr. Shaw attributes her decision to move across the Atlantic as two-fold: her interest in the then-budding field of perinatology, which was being developed at UBC at the time by Dr. Molly Cowell, and the structural freedom available as a doctor in Canada. “As a woman in that specialty, it would have been very difficult to work through the [UK] system to reach the level of consultant [specialist]. More importantly, the way medicine was being practiced was very paternalistic in the UK, and I really wanted women to understand and learn what was happening to them as opposed to having things done to them, which was how it was. I knew that I would have the freedom



In this photo: Dr. Dorothy Shaw

to do that in Canada.”

Social justice issues also deterred Dr. Shaw from practicing in the United States. “I was unhappy about people being asked for their financial wherewithals before being treated at one of the hospitals I was working at – that disturbed me.”

Now Dr. Shaw channels her energies into women’s health advocacy. In her 4-year term as president of FIGO, Dr. Shaw chaired a number of initiatives to improve the status of women, including maternal and newborn health, prevention of unsafe abortion, cervical cancer prevention and control, and guidelines for sexual assault. She speaks of her time modestly, but is proud to consider her time as FIGO President as one of her biggest accomplishments.

A main motivation for Dr. Shaw during her FIGO presidency was her desire to help people understand that raising the status and health of women is a necessary precedent for economic development. According to the World Health Organization, 1600 women and more than 10,000 newborns die from preventable complications during childbirth each day, and most of this happens in the developing world. Dr. Shaw adds that the solutions for this are neither costly nor complex. Dr. Shaw is very open with her advice for medical students. “The challenges I have faced, even though they are difficult for a short period of time, have all turned out to be opportunities. It’s a question of not becoming bogged down or too concerned with how a particular situation might evolve, because medicine is such a wonderful career and there are so many doors. I have learned that on so many occasions that it’s been remarkable. I think that if you’re dedicated at work, your team supports you. And that helps everyone ultimately succeed.”

Dr. Shaw lives in Vancouver with her three daughters and her husband Marc, a financial executive. 

Tackling Ataxia After “Chasing the Dragon”: The Use of Buspirone in the Rehabilitation of a Patient with Heroin-Induced Toxic Leukoencephalopathy

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ABSTRACT

The topic of heroin use is often associated with images of needles and injections, overlooking the fact that heroin is also snorted or smoked in our community. Because of the risk of infection, many users resort to smoking heroin to achieve a high. A potentially fatal consequence of this practice is Heroin-Induced Leukoencephalopathy (HIL). This process may be the result of a toxin activated in the heating process and causes damage to the white matter of the brain with associated neurological symptoms. No treatments have yet been proven to alter the disease course. In this case study, we describe a 30 year old male who presented with profound ataxia and dysarthria because of HIL. We discuss the history, physical and radiological findings leading to a diagnosis of HIL and relate these to the pathological findings and pathophysiology in this disease. Finally, we present Buspirone as a potential treatment for the ataxic component of this condition.

KEYWORDS: *heroin, leukoencephalopathy, buspirone*

CASE REPORT

A 30 year old male presented to an Outpatient Neuro-Rehab Department one year after developing increasing falls, weakness, dysarthria and ataxia (Table 1). He was unable to stand unaided and his mobility was restricted to foot-propelled wheelchair. He had profound dysdiadochokinesia and dysmetria such that he could no longer use the dominant (right) arm for purposeful tasks. His cognition was adequate. Based on his presentation, the patient was questioned and endorsed a history of heroin inhalation.

MRI non-contrast studies of the brain (Figure 1) were obtained and showed symmetric white matter changes in the parietal lobes, internal capsule, corpus callosum, brainstem and large bilateral lesions in the cerebellum.

HEROIN-INDUCED LEUKOENCEPHALOPATHY

“Chasing the Dragon” refers to inhalation of the heated vapour of the free-base form of heroin. The heroin powder is placed on tinfoil above a flame until it liquefies, vaporizes and is then inhaled. The smoking of heroin is reported to have arisen in Shanghai, China

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Table 1. Glossary of terms used to describe the patient’s physical exam¹

| Term | Definition |
|--------------------|--|
| Ataxia | An inability to coordinate voluntary muscular movements. |
| Dysarthria | Difficulty in articulating words due to disease of the central nervous system. |
| Dysmetria | Impaired ability to estimate distance in muscular action. |
| Dysdiadochokinesia | Impaired ability to make movements exhibiting a rapid change of motion that is caused by cerebellar dysfunction. |

in the 1920’s using porcelain bowls and bamboo straws.² The use of tinfoil in this practice is now known as “Chasing the Dragon” because heroin vapour rising into the air appears like the tail of a dragon.²

A complication of “Chasing the Dragon” is Heroin-Induced Leukoencephalopathy (HIL). HIL was first described in the Netherlands in 1982 when forty-seven patients with encephalopathy were found to have a common history of inhaling heroin bought in the same neighbourhood.³ Since this series, HIL remains a rare condition described in under one-hundred cases. This number may reflect under-recognition. The incidence of HIL has been reported to be increasing, possibly due to increased use of ‘chasing the dragon’ to avoid the risk of HIV and HCV infection from intravenous use.⁴

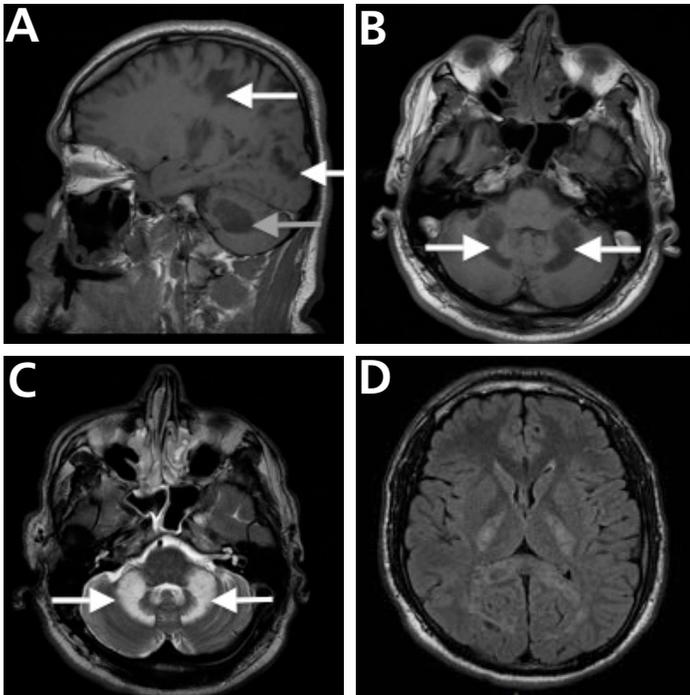


Figure 1A. T1 sagittal image shows prominent white matter changes in the parietal and occipital lobes (white arrows), extending through the internal capsule and into the midbrain, pons and medulla and cerebellum (gray arrow).

Figure 1B. T1 transverse image shows large bilateral lesions in the cerebellum (white arrows).

Figure 1C. T2 image shows symmetrical white matter hyperintensity in the cerebellum (white arrows).

Figure 1D. T2 flair image shows the bubbly cystic appearance of spongiform leukoencephalopathy.

HISTORY AND CLINICAL FINDINGS

HIL is suspected in any patient presenting with neurological impairment and a history of inhaling heroin. The most common signs and symptoms are ataxia, motor restlessness, apathy, behavioral change, aggressive behavior and confusion.²

Radiology

HIL affects the white matter.⁵ This pattern is reflected best on MRI, where T2 and FLAIR sequencing shows symmetric white matter hyper-intensities in the posterior cerebral and cerebellar white matter, cerebellar peduncles, splenium of the corpus callosum and posterior limb of the internal capsule.⁶ Affected white matter is most often found in the posterior regions of the brain, but rarely can affect the frontal regions of the brain as well.

Diagnosis

HIL is a clinical and radiological diagnosis. The history of heroin inhalation associated with neurological impairment is classic. However, other diagnoses like traumatic, ischemic or other toxic brain injury must be considered. MRI images showing characteristic white matter changes are virtually pathognomonic.⁶

Pathology

Gross neuropathological findings include slight softening of white matter and edema. Light microscopy shows spongiform degeneration of white matter with vacuolation of myelin sheaths

and scattered axonal bodies in the absence of necrosis, inflammation or vascular abnormality.⁵

Pathophysiology

The history of clusters of patients afflicted with HIL and often the use of heroin obtained from a common source suggest a toxic etiology for the lesions.⁷ Also, the pattern of spongiform degeneration of white matter is found in other conditions resulting from exposure to toxins such as tin.⁸ Despite this evidence, the pathophysiology of HIL remains poorly understood. A latent period between the toxin exposure and the presentation of symptoms often occurs – a toxicological phenomenon referred to as ‘coasting’, which has been described for other neurotoxins.⁹ The toxic substance may be deposited in the lipid-rich myelin where it remains and is slowly released, causing ongoing tissue destruction and progression of symptoms. This may account for negative toxicology results in a number of cases. Also, the toxin may induce a metabolic change that persists following the withdrawal of the offending substance. By the time the patient becomes symptomatic, the toxin is no longer detectable in the blood stream.

Natural History and Prognosis

The natural history of HIL is variable. A latent period of days to months exists between toxic exposure and clinical presentation.¹⁰ Once symptoms develop, they typically progress for 2-3 weeks in the absence of continued exposure, though they have been reported to continue progressing for up to 6 months.^{6,11} In the original description of this disease, three clinical stages were defined (Table 2); however, this scale helps prognosticate in only the most severe cases.^{2,6}

Table 2. Clinical Stages of HIL

| Stage of illness | Feature |
|------------------|---|
| Initial | Soft speech Cerebellar ataxia Motor restlessness Apathy |
| Intermediate | Pseudobulbar lesions Spastic paraparesis Tremor/myoclonic jerks Choreoathetoid movements |
| Terminal | Stretching Spasms Hypotonic Paresis Akinetic Mutism Cantral Pyrexia Death |

Patients may stay in the initial stage, progress into the intermediate stage, or progress through all three stages, with one quarter entering the final stage leading to death. Survivors have been described to have slight to dramatic degrees of spontaneous improvement. Therapy with antioxidant therapy including Co-Enzyme Q10 has been associated with dramatic improvement in two cases.⁷

TREATMENT

Recovery from HIL varies and does not appear to correlate with the severity of presentation.² Antioxidant treatment with Co-Enzyme Q10 has not been rigorously studied to declare if it is disease-

altering. Buspirone hydrochloride, is primarily used as an anxiolytic agent in the treatment of general anxiety disorder, and is thought to act as a serotonergic 5-hydroxytryptamine_{1A} receptor agonist (5-HT_{1A}) as well as a D₂-Dopamine receptor agonist/antagonist.¹² Case-reports, open-label, and double-blind trials have shown that Buspirone also has a modest effect to improve symptoms related to hereditary cerebellar ataxias, but this drug has never before been used to treat ataxia secondary to HIL.

CASE RESOLUTION

The patient was started on a regimen of Co-Enzyme Q10, vitamin C and D and was admitted to the In-Patient Rehab Unit ten weeks later. One week after admission he was started on a trial of Buspirone along with dextroamphetamine for his profound slowness.

No changes were noted in the two-month period on the antioxidant therapy prior to his in-patient rehabilitation. Within ten days of administration of the Buspirone, there was a significant improvement in dysidiadochokinesis, ataxia, and dysmetria. While no objective measures were used, his handwriting became legible, and his fine motor tasks improved.

Over the course of admission, his mobility and speech also improved. He was able to walk supported with a two-wheeled walker. However, fatigue still limited his mobility.

Over the course of the following year, the patient continued to make significant gains taking Buspirone and participating in outpatient physical, occupational and recreational therapy. He began to walk unaided, his speech became more fluent, and his handwriting improved drastically.

CONCLUSION

“Chasing the Dragon” is a common practice in our community and its use may be increasing.⁴ HIL is a rare, but potentially devastating consequence of this method of heroin consumption that can be fatal. HIL often leaves patients with persistent neurological deficits such as ataxia. Anti-oxidant therapy, which needs to be studied

further, is one of the few options in treatment of HIL. Buspirone is a serotonergic drug that has been studied in the treatment of hereditary ataxia and was observed to have a dramatic effect on the ataxia in this patient. This case underscores that clinical and MRI diagnosis of HIL is essential, as even in a fulminant presentation of HIL, measures should be taken to provide essential life support, acute care and long term rehabilitation as dramatic improvements may be seen. 

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Clinical Vignette: Splenic Abscesses

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ABSTRACT

This is a case report on a 51 year old female who was found to have a splenic abscess which failed percutaneous drainage medical therapy, and ultimately required a splenectomy. She presented multiple times over seven years with complaint of recurrent abdominal pain. Investigations and work-up of her most recent presentation of abdominal pain revealed a single splenic abscess that, over the course of three months, seeded within her spleen to become multiple splenic abscesses. The differential diagnosis included Crohn's disease, tuberculosis, and other unknown causes. The gold standard for treatment of splenic abscesses is a splenectomy; however, recent studies have shown success using different approaches based on abscess characteristics.^{1,2}

CASE HISTORY

A 51 year old female with a known history of Crohn's Disease presented to the Emergency Department with abdominal discomfort localized to the left upper quadrant (LUQ). The discomfort was described as an aching pain of 8/10 severity, periodically radiating to the back. The pain had been present 2-3 days before clinical presentation and had become progressively worse. Associated symptoms included nausea, vomiting, and fever. There was a reported change in bowel habits with loose but non-bloody stools.

Relevant history included investigations for possible exacerbation of Crohn's disease three months previously, which were inconclusive. An abdominal ultrasound at that time revealed a solitary, multiloculated splenic collection measuring 2.0 cm x 0.9 cm x 1.6 cm. The patient was diagnosed with a splenic abscess and it was drained percutaneously under ultrasound guidance. The management plan was antibiotic therapy of amoxicillin and clavulanic acid. Response to treatment was monitored through monthly abdominal ultrasounds, which revealed a continual decrease in abscess size.

The past medical history included a diagnosis of Crohn's

disease seven years previously, although this was not firmly established. Gastroenterological investigations included an unremarkable esophogastroduodenoscopy and multiple colonoscopies with biopsies, which were suggestive of Crohn's disease. Biopsies of the terminal ileum had shown acute and chronic inflammation with focal cryptitis. Biopsies of the right colon had revealed chronic inflammation suggestive of Crohn's disease. Biopsies of the left colon and rectum were normal. Although the changes were non-specific, the differential diagnosis included Crohn's disease, as well as chronic infections such as tuberculosis. A clinical diagnosis of Crohn's disease was made and management consisted of prednisone, mercaptopurine, and 5-ASA, to which the patient responded well. At the time of the most recent presentation, the patient was only on mesalamine.

During physical examination the patient was tachycardic with a pulse of 108 but afebrile. The abdominal exam revealed a soft abdomen with tenderness in the LUQ and localized voluntary guarding. The lower border of the spleen was palpable. The remainder of the exam was normal.

Laboratory examination revealed a white count of 19.5×10^6 /L, (absolute neutrophil count of 16.5×10^6 /L), hemoglobin of 116 g/L and platelets of 433×10^6 /L. The serum electrolytes and serum creatinine were normal as was the liver biochemistry apart from a slightly elevated GGT of 82 IU/L (normal < 55 IU/L). Blood cultures were negative. Radiologic investigations included an abdominal ultrasound that revealed an increase in size of the previous splenic abscess, and the interval development

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Figure 1.1. Multiple multiloculated splenic abscesses.

of three other splenic lesions, the largest of which measured 2.8 cm. Abdominal CT (Figure 1.1) with contrast confirmed the multiple splenic abscesses seen on ultrasound and revealed a 1 cm hypodense lesion with stranding in the surrounding mesentery that was interpreted to be either a mesenteric panniculitis or an early mesenteric abscess.

The patient was admitted to the Gastroenterology Service for the management of the splenic abscesses. It was postulated that the original source of the abscess was from a contiguous diseased segment of jejunum secondary to Crohn's disease. The Infectious Disease Service was consulted and medical management consisted of parenteral ciprofloxacin and metronidazole, broad spectrum antibiotics, until therapy could be tailored based on culture results. The patient continued to have episodic fevers, and serial diagnostic imaging did not reveal any improvement. The patient was inoculated with the pneumococcus and meningococcus vaccine, and the General Surgery Service was consulted. She underwent an uneventful splenectomy and was eventually discharged. The resected spleen revealed geographic necrosis and multiple areas of giant cells with mixed inflammation. There were areas of fibrosis with foamy histiocytes, as well as palisading histiocytes, supporting evidence of granulomas (Figure 2.1, Figure 2.2). Polymerase chain reaction (PCR) testing for *M. tuberculosis* DNA on a sample of the spleen was negative. Staining for acid fast bacilli and for fungal species was also negative.

CASE DISCUSSION

Splenic abscesses are uncommon with an incidence at autopsy of 0.14-0.70%.^{1,3} There is a bimodal age distribution. Peak incidences are between ages 30-40 and 60-70 years; males and females are equally affected.^{1,3} Approximately 2/3 of splenic abscesses in adults are solitary and 1/3 are multiple. In children the opposite holds true – the majority are multiple and the minority are solitary.⁴ Mortality

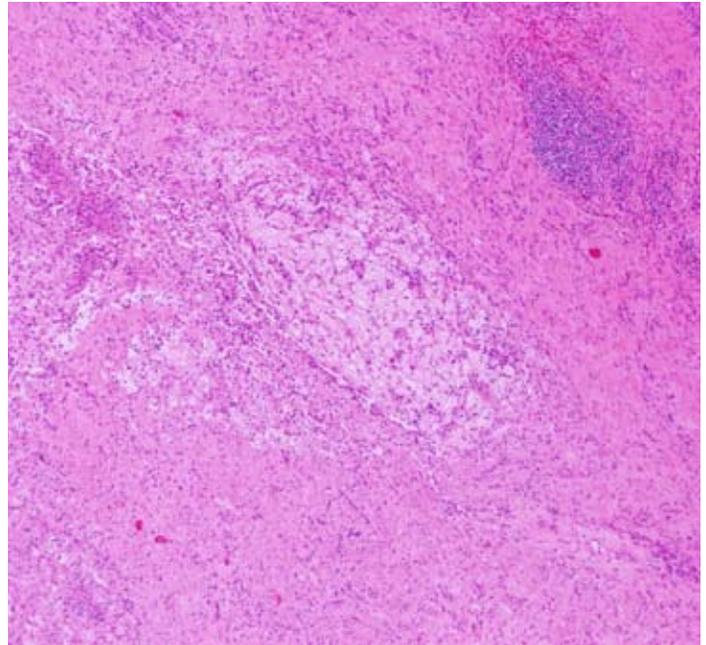


Figure 2.1. Geographic necrosis. (Spleen)

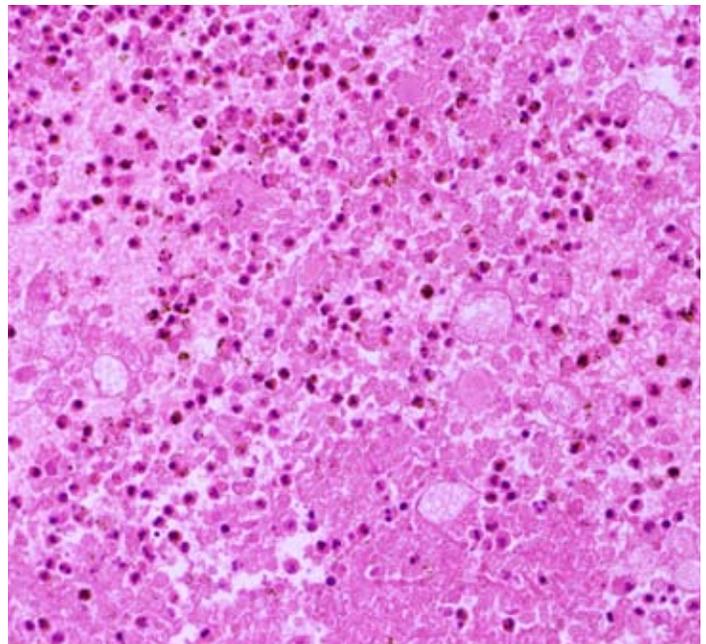


Figure 2.2. Necrotic debris and polymorphonuclear leukocytes. (Spleen)

rates are high and vary with immune status and type of abscess; there is up to 80% mortality in immunocompromised patients with multilocular abscesses and 15% mortality in immunocompetent patients with unilocular abscesses.^{5,6} The classic triad of findings for a splenic abscess is fever, left upper quadrant pain and splenomegaly.⁶ However, the clinical presentation is often vague and non-specific: abdominal pain, pleuritic chest pain, fevers, nausea and vomiting are all initial symptoms that cause patients to seek medical attention.¹ Localization of the pain to the left upper quadrant and splenomegaly are reported in less than half of the cases.¹ Combining the non-specific presentation with the rarity of a splenic abscess makes this a potentially fatal diagnosis that is

easily missed without appropriate investigations.

It is important to understand which patient populations are at risk for development of a splenic abscess and the pathophysiology as to why splenic abscesses develop. The splenic arteries are end arteries which progressively branch without the development of collateral channels. This renders the tissue they supply vulnerable to ischemia if they are damaged. When the flow to these arteries is compromised, the spleen becomes ischemic and necrotic. A nidus for infection is created.

There are four major risk factors which raise clinical suspicion. The first is that the most common cause of a splenic abscess is a result of hematogenous seeding from other sites of infection. The two most common sites are the heart in endocarditis, and direct introduction of bacteria into the blood with Intravenous Drug Use (IVDU). It is postulated that the incidence of splenic abscesses is increasing due to the increasing incidence of IVDU.^{1,2,7} The second is patients who suffer trauma to their spleen. Subsequent ischemia creates an environment for bacteria to grow.^{1,2} One must

“ The gold standard for treatment of splenic abscesses is a splenectomy; however, recent studies have shown success using different approaches based on abscess characteristics.

consider overt trauma through external forces, or microscopic trauma due to hemoglobinopathies. Third, splenic abscesses can develop from a contiguous focus of infection, such as a pancreatic or subphrenic abscess, or from adjacent infected segments of bowel as was originally hypothesized in our patient. Lastly, common to development of all infections, are patients who are immunocompromised because of the Human Immunodeficiency Virus (HIV) infection or diabetes mellitus.^{1,2}

There is no single common organism responsible for abscess formation; the infecting organisms in splenic abscesses vary depending upon the underlying cause. *Streptococcus sp.* and *Staphylococcus sp.* have been the most cultured organisms within the past century, which is in keeping with endocarditis being the most common cause of splenic abscess.^{1,3} Mycobacterium and fungal isolates are increasingly more common, as theorized to be due to increasing numbers of immunocompromised patients.^{1,3,5}

Splenic abscesses are best imaged by abdominal CT with contrast. An abscess is an area of low density in the normally homogenous spleen. Abdominal CT with contrast has a 96% sensitivity compared with 76% sensitivity of abdominal ultrasound.^{3,6} Abdominal ultrasound is limited by the operator and may be affected by overlying loops of bowel. Abdominal ultrasound findings include areas of decreased echogeneity. Images may show a gas pattern within the hypoechoic area.

Poor prognostic indicators for splenic abscesses are Gram negative bacilli, an Acute Physiology and Chronic Health Evaluation II (APACHE) score greater than 15, and multiple splenic abscesses.⁸

One must know the treatment options for patients diagnosed with a splenic abscess. The gold standard for treatment of a splenic abscess is splenectomy.^{1,8} However, recent reports of subtotal splenectomies (performed open or laparoscopically) for distal splenic abscess(es) have shown success and have allowed for preservation of splenic immune function.^{6,9} Other treatment options include antibiotic therapy with radiologically guided drainage of the abscess (either as fine needle aspirate (FNA) or placement of a percutaneous drain (PCD)) with success being reported anywhere from 50-90%.¹ The decision to proceed with a splenic resection or a radiologically guided drainage is dependent upon abscess characteristics. Abscesses that are unilocular have successfully been treated with ultrasound guided drainage.¹ This is done through FNA if the abscess is less than 50 mm or PCD if the abscess is greater than 50 mm.¹⁰ Ultrasound guided drainage is also an option for patients deemed high risk for surgery.¹⁰ Of note, there has been one reported case of definitive treatment using endoscopic ultrasound with transgastric drainage.² Indications to proceed to splenic resection includes failed attempt at drainage or multiple abscesses. Our patient failed her initial treatment of percutaneous drainage with antibiotic therapy and further developed multiple, multiloculated splenic abscesses. Current literature supports the decision to undergo a splenectomy. Future direction of research can focus specifically on patients with Crohn's disease and investigate common organisms, characteristics, causes and locations of abscesses to guide treatment options. 

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