the prognosis

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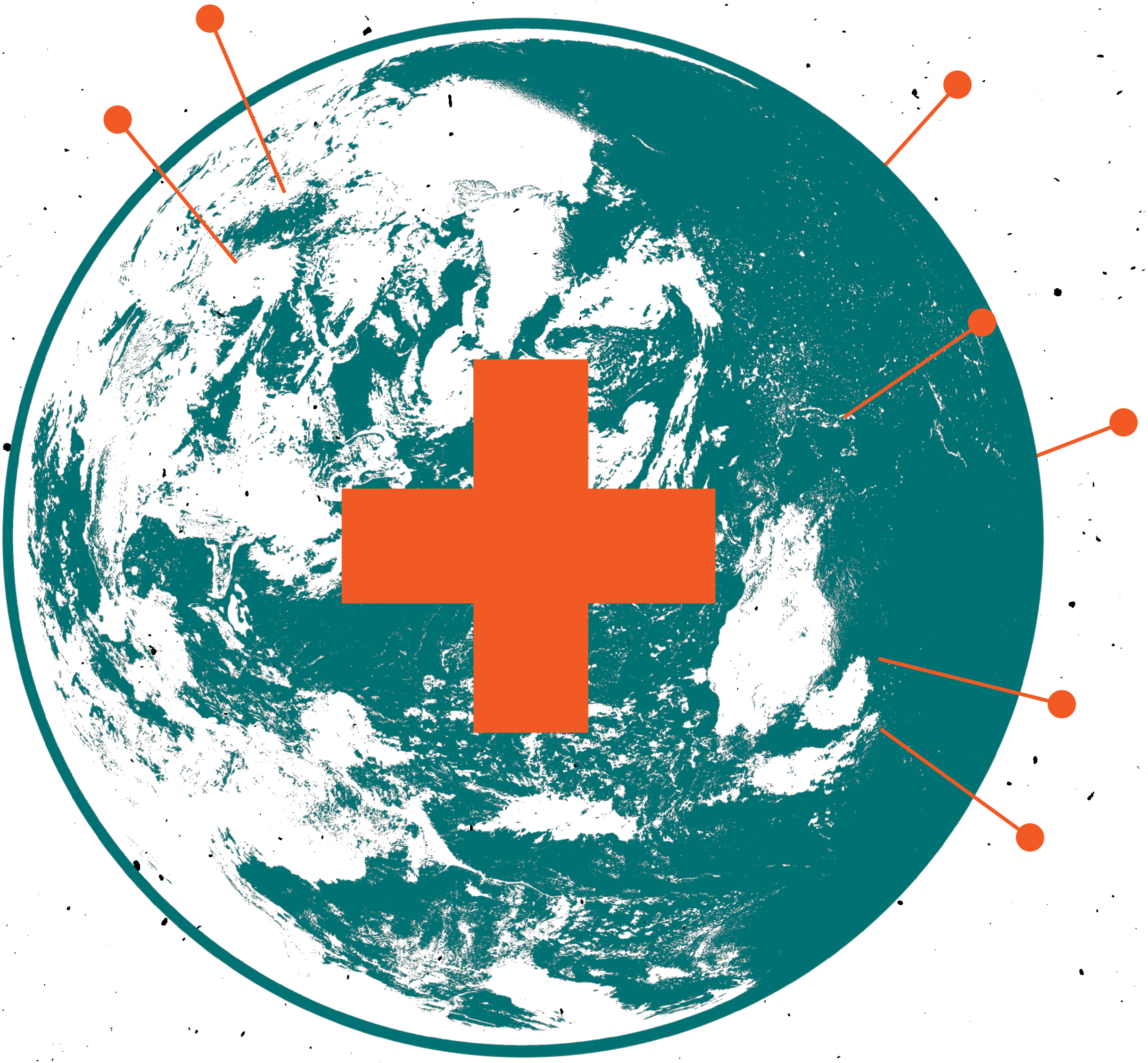

The Prognosis: McGill's Student Global Health Journal

Spring 2014

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Cover
Lucas Huang

Photographs
Jerry Lee, Wan Jin (Tiffany) Lee, and Torben Hansen.

Wan Jin (Tiffany) Lee provided the photos featured on pgs. 20, 26, 56, which were taken during her voyage in Dominican Republic. She would like to dedicate the photos to the children in DR.

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We would like to thank the AUS Journal Fund for making this project possible once again.

The Prognosis is currently developing partnerships with McGill's Global Health Programs (GHP) and the Institute for Health and Social Policy (IHSP). In keeping with the journal's focus on research at the intersection of social, biomedical, global, and local perspectives on health, these organizations are uniquely placed to support the ongoing work of this student-run publication.

GHP currently partners with numerous departments at McGill to promote human well-being, productivity and economic development, and is actively involved in research and training around the globe. Committed to collaborative projects that improve health through educational, clinical, developmental and research programs, McGill Global Health Programs is excited about new avenues to enrich the education of students interested in global health.

The IHSP conducts interdisciplinary research on how social conditions impact health and welfare. In particular it aims to translate research findings in the areas of social inequalities and health outcomes into concrete provincial, national and international policies. With expertise in student training, the IHSP is keen to develop additional opportunities to spread research findings that improve population level wellbeing.

McGill GLOBAL
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From the Editor-in-Chief

Dear Reader,

The Prognosis is excited to present to you the third volume of our global health journal. Founded in 2011 by a group of innovative students, the journal covers the emergence of global health as a prominent research topic. The mandate at the time was broad, but novel in terms of university publications: it sought to highlight student research on issues at the intersection of biomedical, social, local, and global perspectives of health.

Within these pages, you will discover that the content of this year's volume adheres to the original vision, while still evolving, addressing the new realities of this dynamic field. For instance, we are featuring a research proposal for the first time. Overall, we have selected seven essays on topics spanning current global health issues that at the same time illustrate the diversity of the student work here at McGill, but also of current international health issues. Their high quality reflects the increasingly vibrant student interest on campus surrounding global health.

We hope that you learn as much as we did from the following articles. This knowledge should inspire you to consider the topic of global health from a different perspective, and engage in fruitful discussions with your peers. The Spring 2014 edition marks a decisive moment for the journal, as The Prognosis is in talks with both the McGill Global Health Program and the Institute for Health and Social Policy to broaden its reach and further its mandate of promoting research on global health issues. Finally, I would like to thank the whole Editorial Board, for without their hard work and commitment over the course of the past year, the final product that your are reading at the moment could not have been possible.

Julien Gagnon
Editor-in-Chief

Editorial Board

Alienor Lemieux-Cumberlege

Is there a particular global health problem that interests you or that you study/research?

I'm particularly interested in how state policies and the discourse used by governments when discussing STDs affect popular perceptions of theWse diseases and the efficacy of public health campaigns. My undergrad thesis, to be finished April 2014, focusses on Chinese discourses on sex work and how that affects the spread of HIV/AIDS and the efficacy of prevention and public health campaigns. I am also very interested in autism and chronic illness self-advocacy campaigns and how they influence public health policy. Finally, I am going to be working at the IDRC this summer in their Global Equity in Health Systems program; equity of any form is something I am deeply passionate, and seeing such discrepancies in approaches to healthcare globally means that I'm really excited to learn more and understand how this can be changed.

Jerry Lee

To which health profession do you aspire? Is there a global health specialty that you will pursue?

I plan to pursue a master's degree in health policy when I graduate from McGill with my BSc in Physiology and Economics. I want to explore the intersection between economic policies and population well-being. Studying health alone is interesting, but looking at how different policies can be implemented to fix global health challenges is so much more exciting!

Erin Eady

Which Millennium Development Goal do you believe we are most likely to achieve by 2015?

On a global scale, the greatest progress has probably been made towards the targets outlined under goal 1, the eradication of extreme poverty and hunger. For instance, the proportion of people living in extreme poverty has been halved on a global level, and we are close to reaching hunger reduction targets. Considerable gains have also been made in terms of child survival and in the prevention and treatment of malaria and tuberculosis. However, progress towards the MDGs has been uneven: some countries have achieved many, while others have achieved none, and it is typically the poorest and most disempowered who have been left behind. Even where MDG targets have been met, there is still room for improvement. As one example, though the target of 88% of the world having access to safe drinking water has been exceeded globally, this still leaves more than 750 million people without access to safe and clean drinking water.

Marc Allard

Which medical technology do you think has had the strongest impact on global health in your lifetime?

The development of the zidovudine (AZT) and lamivudine (3-TC) two and a half decades ago has proven to be a major medical breakthrough that has positively impacted global health. In the mid-1980s, HIV/AIDS was on the rise and was claiming lives all around the globe. Beyond causing a total breakdown of the immune system, those infected with HIV were subject to social stigma, eloquently portrayed in the film Philadelphia. Although there is still no available cure for HIV/AIDS, the development of HAART (highly active antiretroviral therapy), has allowed people infected with the virus to live long and normal lives. The initial drug cocktail of AZT and 3-TC changed the diagnosis of HIV from a death sentence to a manageable infection. 3-TC was first developed at McGill University and remains a source of pride for the university's community.

Claire Peterson

Do you think emerging medical technologies will have more or less of an impact on global health than progress in social science?

I believe technology is a great equalizer in many aspects of our society. Social change, although important, generally takes significant time and manpower to achieve. Digital technology allows individuals anywhere in the world to connect with healthcare professionals thousands of kilometres away- to send information and receive answers in mere moments. Technology is a small step, but a creative step to circumnavigate adverse social conditions to achieve positive health outcomes where they otherwise may not be feasible. Who knows, maybe technology can help to facilitate social change as well!

Jennifer McCall

Do you have a role model in the field of global health?

I greatly admire Dr. James Orbinski. He is the former president of MSF (Doctors Without Borders) and accepted the Nobel Prize on behalf of the NGO during his tenure. He wrote a book about his global humanitarian work entitled An Imperfect Offering, and it confirmed my aspirations to work in medical humanitarian aid. After his time with MSF he co-founded an NGO called Dignitas International and began teaching at the University of Toronto.

Sean Coleman

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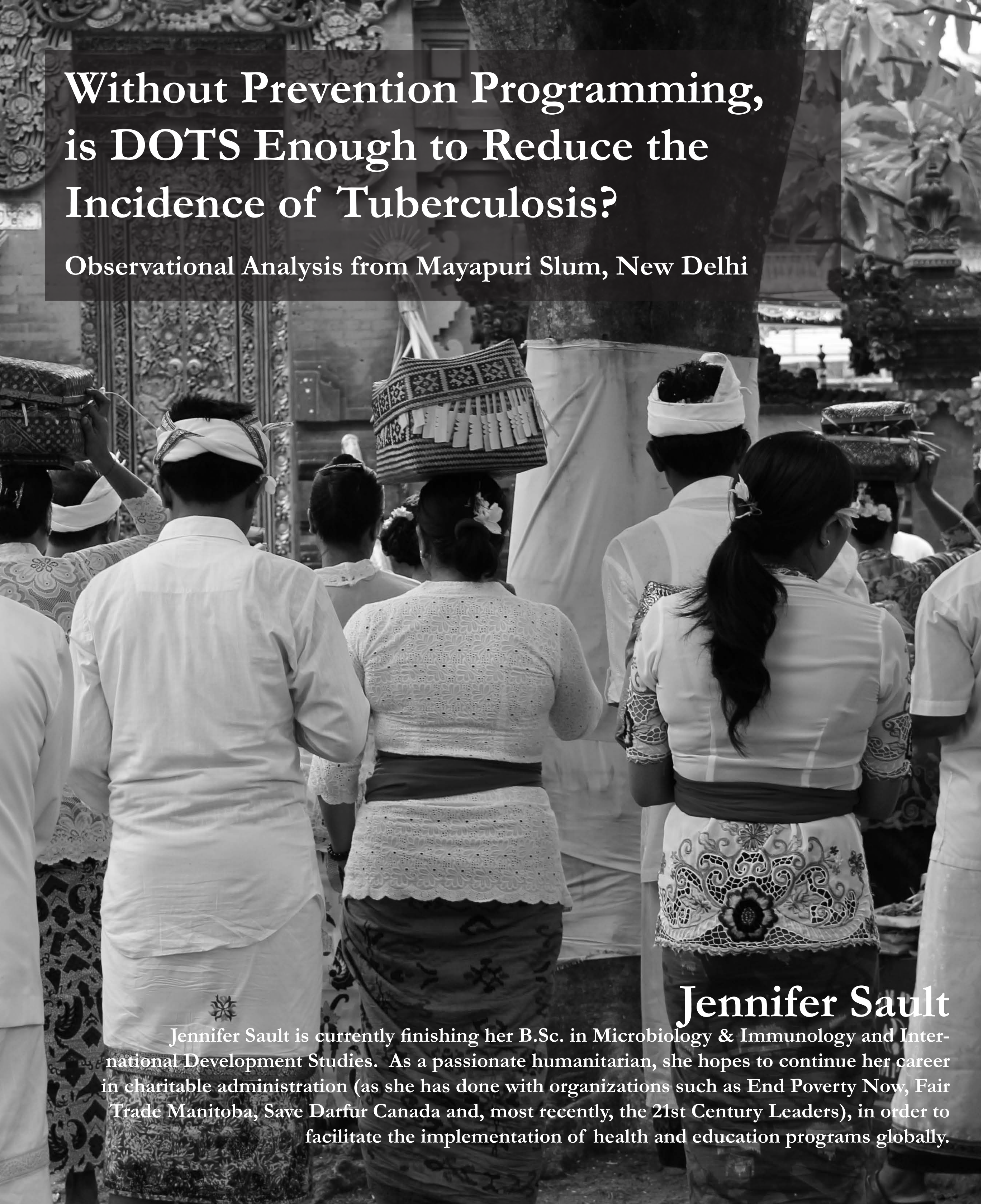

Without Prevention Programming, is DOTS Enough to Reduce the Incidence of Tuberculosis?

Observational Analysis from Mayapuri Slum, New Delhi

Jennifer Sault

Jennifer Sault is currently finishing her B.Sc. in Microbiology & Immunology and International Development Studies. As a passionate humanitarian, she hopes to continue her career in charitable administration (as she has done with organizations such as End Poverty Now, Fair Trade Manitoba, Save Darfur Canada and, most recently, the 21st Century Leaders), in order to facilitate the implementation of health and education programs globally.

Tuberculosis (TB) is one of the top ten largest contributors to global mortality: in 2012, an estimated 8.6 million people developed TB and 1.3 million died as a result (WHO 2013). India has been ranked as the country with the highest prevalence of TB (occupying 25.6% of the global total), with 2.2 million of the above-cited incidence cases occurring within the country (WHO 2013). As such, TB represents a serious public health problem within India's borders. Furthermore, due to the epidemiology of the disease, those who are at highest risk are generally those at the lowest end of the economic spectrum. TB threatens to continually entangle the cycle of disease and poverty, with profound socio-economic effects.

Through the Direct Observed Treatment Short-course (DOTS) of the World Health Organization (WHO), excellent outcomes are being achieved worldwide through improved diagnostics and treatment of TB. However, the transmission of TB in high-risk areas throughout India continues to impede the success of DOTS and threatens the ability to control the burden of the disease. Incidence has increased in India since 2009 by 10%, from 2 million to 2.2 million (WHO 2013). DOTS's primary focus is on the final stages of TB control, from diagnostics to completion of treatment. Prevention of TB is not, however, a primary focus in the DOTS programme; where present in policy, it is evident that prevention is lacking in practice. To reduce transmission – and thereby incidence – prevention needs to play a more extensive role in high-risk communities.

While the DOTS programme is most needed in vulnerable demographics in order to counter the relatively higher incidence, the greatest difficulties are also found in these areas. Over one-third of Delhi's population of approximately 15 million live in urban slums, and a considerable proportion are at high risk of developing TB in their lifetime: 40% of people in New Delhi are infected with the *Mycobacterium tuberculosis* bacilli, and 10% of these patients will present with active infection (Jaramillo 1999). In slums, although these statistics are unknown, it is logical to assume that infection is prevalent at a rate higher than the city's average due to the strain of poverty-associated risk factors such as overcrowding, indoor pollution, decreased nutrition, increased susceptibility to disease, and others.

The purpose of this paper is to explore the continued increase in incidence in many urban slums in Northern India under the protective umbrella of DOTS, through direct observations made in one of Delhi's slums, Mayapuri. After outlining the need for TB care in urban slums, the current available programming, and its impact in TB-prone areas, this paper concludes that necessary outcomes are not being achieved in Mayapuri slum due to the lack of front-end preventative measures needed to reduce the transmission of TB. This paper then identifies viable interventions that are currently overlooked and have the potential to be incorporated into the DOTS programme for further effective anti-TB practice. By focusing on a grassroots example of DOTS implementation in a representative slum, the purely diagnostic/treatment-focused approach of DOTS is challenged.

Methods

Observations were made in Mayapuri slum while working in collaboration with a clinic operated by a Non-Governmental Organization (NGO) in the community. This clinic functions as the DOTS centre for Mayapuri's population and thus enables the observation of community-based DOTS treatment and informal interactions with TB patients and workers. Special attention was paid to the process of DOTS implementation, modes of TB transmission, social risk factors, and TB-related challenges present in the community. Similar observations were made with three other DOTS-NGOs in Delhi. Concurrently, a review was conducted through the PubMed database on the literature relevant to TB treatment in Delhi since DOTS was formulated in 1993. Findings were then integrated to present a fact-based recollection of DOTS implementation in Mayapuri and slums throughout Delhi.

Mayapuri as a Case Study

Mayapuri slum is located in western New Delhi between the Mayapuri Phase I and Phase II industrial zones and the city's main railway line. Over approximately 10,000 inhabitants live along a long, thin stretch of over 2 km, in many places just feet away from the railway track. Most residents are originally from rural Uttar Pradesh and have family outside of Delhi. The slum has slowly developed over the last twenty years and, while there is still some population mobility, the slum has an established community. Results from a randomized survey of 50 Mayapuri Phase II households conducted by the National Institute of Urban Affairs in Delhi shows that there are approximately 5 people to each household, 62% of which are less than 22.5 squared meters. All 50 households have access to water, but 13 households claim this to be inadequate supply and a further 29 claim that they have supply only sometimes, both due to water pressure and/or distance. All 50 households have access to a community toilet, bathe in a public stand-post, and have illegal connection to electricity (NIUA 2004).

There are no private or government clinics, but there is one community centre clinic that provides DOTS care and has a doctor present two mornings per week. This centre also provides vaccinations, pre- and post- natal care, and encourages community mobilization through the facilitation of numerous working groups and educational programming. Mayapuri is presented with unique challenges due to its location, including above-average levels of pollution due to being directly next to an industrial area, safety hazards such as sharp metal debris and the adjacent train tracks, population density, and extreme poverty. Otherwise, it is a typical example of the marginalized urban demographic in northern India that is most affected by TB.

TB Epidemiology and Risk Factors Relevant to Urban slums

TB's etiological agent is *Mycobacterium tuberculosis*, an acid-fast, airborne bacillus that is spread by close contact, primarily from sputum-positive patients. With such easily spread pathogens, high-density populations are particularly at risk (Narayanan et al 2002). TB presents with a cough lasting longer than three weeks, and is prone to re-activation if not properly treated (Jawahar 2003). It is a serious infection that was traditionally associated with death prior to the adaptation of recent chemotherapeutic techniques to counter the infection. It is now a treatable disease (drugs in current use have a 95% success rate), though stigma around the disease still remains (Ahmed et al 2009).

Inactive infection is common within these areas; in most cases it progresses to its active state where the immune system is compromised or lung tissue is damaged. Additional risk factors include HIV/AIDS, diabetes, malignancies, malnutrition, stress, tobacco smoke, alcoholism, and potentially, indoor pollution (Lönnroth et al 2009; Smith 2002; Srivastava 2005). TB has socio-economic causes and effects: it is created by and propels the conditions of poverty through imposing additional economic constraints. The highest risk demographic are the most impoverished; lower educational attainment, wages, quality of housing, and social status within one's community are all variables which affect one's likelihood of contracting TB (Ompad et al 2008). In addition, TB is prevalent among disaster-stricken or mobile populations, both of which are frequently characteristics of growing slum communities.

These risk factors not only propagate TB among impoverished populations, but also present additional challenges to existing TB control programmes: centre accessibility, costs, inconvenience, and stigma are among the limiting factors to receiving treatment (Ogden 1999). Programmes also have a multitude of policy and efficiency problems. A study following DOTS patients in Kerala gave evidence that approximately a quarter of DOTS patients are not under direct observation while on treatment, undermining the goals of DOTS and resulting in increased relapse of infections despite recorded cures (Balasubramanian et al 2000). Another less transparent programme inadequacy is that many centres will not prescribe DOTS to a patient with risk factors that decrease his likelihood of completing the treatment course as this will lead to increased treatment resistance (Multi Drug Resistant strains) (Singh et al 2002). The risk factors for incomplete treatment, or 'defaulting', overlap with the risk factors for the disease; mobile, poverty-stricken populations are most affected. Thirty-seven percent of the TB-positive population in New Delhi during a cohort study were denied short course therapy under direct observation due to this hesitation (Balasubramanian et al 2000). Challenges are greater for the vulnerable to receive successful treatment.

TB Programmes

Stop TB Strategy, DOTS, and the Millennium Development Goals

The DOTS programme underpins the Stop TB Strategy and has been the leading intervention in TB care since its conception in 1994 (WHO, 2006). It has five main components: diagnosis of pulmonary TB primarily by sputum microscopy; treatment administration under direct observation; regular drug supply; monitor of the patient's progress to cure by follow-up sputum tests; and procurement of administrative and political commitment (Jawahar 2003). This programme focuses on early detection and successful treatment as a means to achieve the following goals: a cure rate of 85% and a detection rate of 70% for smear-positive patients (WHO 2006); halt and begin to reverse the current incidence rate by 2015, as corresponds to the Millennium Development Goal 6C for infectious disease (UN 2013); and, in the long term, lowering of TB incidence to one in one million by 2050 (Lönnoth et al. 2009). If accomplished, the disease would be effectively eradicated.

DOTS was subsequently implemented in India by the Revised National Tuberculosis Control Programme (RNTCP) in 1997. A need for a strategic approach was defined following studies on the inefficacy of previous TB treatments in the country: in 1992, less than half of patients with TB had received an accurate diagnosis and even fewer were successfully treated (Khatri et al 2002). A nationwide TB approach has been implemented since then, with outstanding results in the areas of diagnostics, treatment, and ultimate cure rates; since RNTCP's execution, treatment success rates have tripled from 25% to 86% and mortality rates have been cut sevenfold from 29% to 4% (Central TB Division 2009).

As for the World Health Organization targets (85% cure rate among new sputum positive cases and 70% case-detection rate, the latter which serves as the best measure for incidence), India is on target: the treatment success rate is 88% for new smear-positive cases and a 71% case-detection rate has been reached (Central TB Division 2013). In short, outstanding results are being achieved by DOTS.

There is reason to doubt the impact of these successes on incidence, however. On a global scale, incidence is declining at a rate of just 1% per year (WHO 2009). If the goal of eliminating TB by 2050 is to be met, incidence must fall by an average of 16% annually over the next 40 years (Lönnroth et al 2009). Additionally, in India, incidence has increased by 10% since 2009 from 2 million to 2.2 million (WHO 2013). Furthermore, the 70% detection rate is not accurate among people living in slums: several states in Northern India have not yet obtained notable declines (Marias et al 2009). Additionally, there is evidence to believe that these rates are overvalued due to both false negatives and underreporting; the "missed cases" – *people who were either not diagnosed or diagnosed and not reported* – are estimated at 2.9 million globally, of which 31% of these cases are in India (WHO 2013). As the strategy underpinning DOTS relies on sputum testing instead of X-rays to diagnose, numerous Extra-Pulmonary TB (EPT) cases are overlooked, resulting in false positives and an apparently lowered incidence (Chadha 2005). Finally, DOTS failed to report an estimated 3.7 million cases in 2007, an additional 40% of global TB incidence (Marias et al 2009). In communities such as Mayapuri, incidence is growing and there is little evidence to suggest that they will soon halt or decline in response to increased cure rates.

As incidence remains high despite DOTS, it is doubtful that treatment programmes are leading to advances in case detection. In a study measuring the correlation between the programme's successful implementation and reduced case notification ratios, it was suggested that DOTS has had little to no effect on the incidence of TB (Dye et al 2008). The explanations for these results were either that statistics were invalid; that insufficient time had passed to see results in reduced incidence; that there was a rise in new TB cases after treatment, offsetting any advances in transmission; or that early diagnosis and curative treatment are not enough to prevent the transmission of TB. The two final conclusions are the most probable, and raise concerns about the current implementation of DOTS. Ultimately, there is reason to doubt that DOTS is efficacious in reducing incidence. Without a reduction in case incidence, there is evidence of ongoing transmission, infection and disease.

TB Treatment in Mayapuri

Similar concerns are raised in case-specific examples; despite a comprehensive treatment system, little can be observed in terms of preventative measures to address transmission and case incidence.

Great success has indeed been observed

with DOTS: the strategy is widespread throughout Delhi and is utilized in public, private, and NGO-operated clinics. The services provided to each slum are dependent on its location relative to a DOTS centre. For many slums, especially the newer ones, there are no available DOTS centres within reach; however, this is quickly changing due to NGO interventions that ensure the provision of DOTS distributors in many communities. Mayapuri is no exception to this, and is fortunate to have a community clinic in its enclosure that uses DOTS.

Once patients are assigned to the center, they are delegated their anti-TB drug box with their allotted medication for 6 months. As prescribed by DOTS, a community health worker oversees their progress, follows up on missed doses, and works to reduce stigma by speaking with the diagnosed and their families. Due to such initiatives, DOTS is stimulating notable decreases in default rates, increases in cure rates, and superior results from diagnosis onwards.

There is little evidence of action against TB transmission, however. Residents of slums still have difficult challenges to face in obtaining DOTS treatment. As is common of many DOTS dispensaries, the community clinic in Mayapuri does not have the technology to conduct sputum smears nor chest X-rays; thus, suspected TB patients are referred to the next closest centre, which is over forty minutes away from the tracks (by bus, in traffic). The reasons for patient hesitation to seek diagnosis become obvious when compounding travel expenses with the opportunity cost for labourers, in addition to other social factors such as stigma. Other challenges also impact individual incentive to visit diagnostic stations: for many women especially, it is difficult to leave family responsibilities and some fear stigma and family disapproval. This particular hardship is demonstrated by the significantly lower case-notification of females compared to males in India (Balasubramanian 2004). All of these social challenges prevent the early diagnosis of TB and result in continued transmission.

A delay in diagnoses of sputum-positive patients living in a slum is predicted to infect ten to fifteen other individuals (Operation Asha, 2009). One out of ten persons infected with TB will develop the active form, i.e., present with symptoms (Jaramillo, 1999). Once one family member becomes infected with TB, it is common to see an uncontrollable spread among the entire household and surrounding families in densely populated areas, such as Mayapuri.

The DOTS programme endeavours to drastically reduce incidence through the early detection of TB. Although the time required to medically diagnose TB has improved, this decrease is not sufficient to offset TB transmission. What is currently lacking in TB control programmes, such as those present in Mayapuri, are preventative measures that will result in reduced transmission prior to diagnosis. Although some organizations are mobilizing education initiatives and discussing the need for interventions such as family screening, there are currently no distinguishable internal propositions for policy amendments to further address TB incidence. Unless altered, the transmission of TB will continue in these disadvantaged communities faster than it can be countered. In other words, there is a need for prevention in TB control.

Preventative Measures

From Policy to Practice

None of the components of the original DOTS intervention address prevention. The Stop TB Partnership, on the other hand, is a strategy established in 2006 which enhances DOTS by addressing its areas of weakness. Although its central philosophy still preaches the benefits of cure-rates and medical detection, its six principal components also incorporate social variables that are applicable to prevention initiatives. They include the following: (i) pursuit of high-quality DOTS expansion and enhancement; (ii) address of the emerging issues of HIV-associated TB and multi-drug resistant (MDR)-TB; (iii) contribution to health system strengthening, (improved financing, information, and communication with other health initiatives to improve innovation); (iv) engagement of all care providers, extending beyond public health providers to the realm of private practitioners, etc; (v) empowerment of people and communities afflicted by TB; and (vi) promotion of research (WHO 2006).

The goal of reducing incidence is integrated into these components as a long-term consequence of improved DOTS functioning. Improved accessibility to DOTS is assured with the first and fourth measures. As per the first, since 1997, DOTS coverage has increased from less than 20 million (2% of India's population) to more than 1 billion people (90%) (Sharma 2006). It is likely that these efforts will reduce the hesitations of many to adhere to the TB treatment and will increase cure rates even further. The fourth component is reflected in the Public-Private Mix approach Delhi has used in recent years; engaging private providers has made TB diagnosis and treatment through DOTS more accessible. It is arguable, however, that more numerous and effective medical distribution centres will contribute to early detection and reduced incidence as an imminent result of increased programming.

The second and third components of addressing HIV-TB and MDR-TB will also directly contribute to improving cure rates and, through doing so, indirectly affect incidence through reducing the potential to transmit active infection. The increased susceptibility to and infection of TB in people who are HIV-positive (HIV-TB) has also had a large impact on incidence. HIV-TB has a profound global health complication, resulting in increased case detection of TB in some countries, particularly in sub-Saharan Africa, and while much less, also in India. In 2002, out of the 4 million people infected with HIV in India, half were infected with latent TB and 140,000 additional cases were seen in re-activation alone, representing a 10% increase in TB incidence from a relatively low HIV rate (Khatri et al 2002). If HIV-TB can be halted, a large proportion of global infections will be eradicated and future incidence will be reduced. Similarly, the third component of the Stop TB Partnership of reducing the emergence of multi-drug-resistant TB will result in a decline of future TB prevalence. Increased and continued funding (iii) will give DOTS sustainability, TB-control, and, in general, the support it needs for the eradication of TB. Perhaps here, through increased communication and innovation, there is an open platform for coordinating ideas to control TB transmission.

The fifth element of empowering those with TB is one unconventional to the early diagnosis and treatment mandate persistent elsewhere, and one which could increase preventative measures. A campaign similar to this is found in Delhi as part of the RNTCP's Advocacy, Communication and Social Mobilization (ACSM) unit. ACSM works to disseminate information, education, and communication on the stigma around TB and to empower individuals to mobilize on early detection and treatment adherence (Central TB Division 2008). Though the activities of this campaign are widespread throughout India, in Mayapuri and numerous other locations this intervention has yet to be effected. Although ACSM has been implemented alongside RNTCP's DOTS since 1997 in India, this has not resulted in a decline in incidence.. More research needs to be conducted to assess this goal in practice and its efficacy. There is no reason to doubt, however, that successful community participation and education fosters early diagnosis and reduces the social stigma that prevents individuals from seeking treatment.

To enable and promote research for innovative diagnostics, cures, and vaccines (vi) is to define the future of TB control. It is an integral component of improving methods to cure TB, to the extent that it will bring down rates of transmission, and find advances that will eliminate the need for treatment through effective prevention. This is a goal that may shift emphasis within DOTS to focus on preventative measures when further developments are discovered.

Room for Policy Prescription

Neither the utilization of existing advancements nor the technologies to reduce transmission are included in DOTS or the Stop TB Partnership. For instance, the Bacille Calmette-Guerin (BCG) vaccination has been in use since 1921 and, although there have been varying conclusions around its efficacy, it has been proven to considerably reduce the risk of active TB and death when given at birth. The overall protective rate is 50% against TB infections, 78% against pulmonary TB, 64% against tuberculosis meningitis, and 71% against death (Colditz et al 1994). It is recommended by the World Health Organization as part of their Expanded Program on Immunization for Infants (England et al 2007), yet is not evident in either DOTS policy or practice.

With a high prevalence rate of TB, active case detection through close-contact screening and surveys can be conducted in high-risk communities to ensure early diagnosis at a level capable of abating transmission. As has been illustrated, detection of active cases decreases the infectious period by approximately 50%, halving the transmission of TB. When cure rates are above 70%, active case detection has the potential to essentially eliminate transmission of non-self-reporting persons (Borgdorff et al 2002). These estimates are determined from conducting randomized surveys in vulnerable communities and show significant results. Strategic screening among those with a higher risk for TB (HIV-infected populations or close contacts) also proves to be an effective tactic. Although DOTS prescribes direct observation of patients by a community health worker, it is not written into policy to screen contacts for contracting TB (WHO 2006; WHO 2009; Central TB Division 2009). As these health workers are already monitoring patients, perhaps there is strategic gain to be found in combining efforts to screen family members and neighbours with patient visits or frequent surveys. Targeting vulnerable communities with screening and active case detection can be successful.

Also not encountered in policy or practice is the use of preventative therapy in reducing the infection and reactivation of latent TB. Such an approach would need to be pursued strategically to avoid multi-drug resistant TB (MDR-TB), but it also has the potential to contain TB transmission. Chemoprophylaxis (preventative therapy) provides protection during the period of exposure and secondary prophylaxis can be provided to prevent re-activation of latent infections. Contact management and preventative therapy were not observed in Mayapuri and are rarely identified in literature. Yet, results can be achieved through the strategic use of preventative therapy in countering TB transmission, especially when targeting those at high risk for infection and individuals in close contact with sputum-positive patients (Marias et al 2009).

Reducing poverty and eliminating the most pertinent risk factors for TB will undoubtedly decrease TB transmission. Campaigns for the provision of adequate nutrition, sanitary living conditions or even, reduction of indoor pollution all support viable preventative measures. These measures will also be beneficial to governments as they address the socio-economic impact of the disease. This approach has the capacity to both counter TB and uplift vulnerable communities such as Mayapuri. No literature on these alternative interventions can be found in DOTS strategies, but they could potentially be combined with efforts surrounding social mobilization and innovative joint partnerships between existing programmes.

Discussion & Limitations

To integrate the above measures, policy-makers must face pressure to ensure comprehensive coverage in TB care from start to finish. Although a difficult task, TB prevention is estimated to be more cost-effective than DOTS if accompanied by clear program aims and adherence to guidelines (Marias et al 2009). No conclusive studies have yet been conducted on the cost-effectiveness of preventative therapy in contacts or those with latent infection; BCG, on the other hand, has been proven to be equally as cost-effective as DOTS (Borgdorff et al 2002). Prevention can have a strong place in policy and practice with proper funding and methodology.

Scaling up DOTS to include these additional costs may be the reason underlying the dismissal of preventative measures. The funding gap for 2014 and 2015 for DOTS is US $1.6 billion per year (WHO 2013); there is a profound strain on governments to upkeep DOTS. Governments may be hesitant to dedicate further commitment and funding without concrete evidence on the cost-effectiveness of prevention. Throughout literature pertaining to prevention, as well, there is hope for more cost-effective and beneficial vaccines/medications (Marias et al 2009; Borgdorff et al 2002; Narayanan et al 2002). Now that the genome of Mycobacterium tuberculosis is known, it is likely that new innovative techniques will appear in the next decade.

It is also important to note that, although the arguments in this paper are based in fact, Mayapuri is only one community and the analysis used in this paper was conducted over a short time. Assumptions therein many therefore overlook the efforts of numerous small-scale initiatives. DOTS is dually adopted and adapted by multiple organizations, centres, and others, many of which may be integrating preventative measures into their programming and further addressing TB transmission.

Additionally, the findings in Mayapuri are strictly observational. Where possible, all observations were supported by a literature review, but these results would nonetheless benefit greatly from empirical evidence. More research needs to be conducted to confirm continued TB transmission, especially due to a delay in self-reporting. Also, while many of the above observations are true of Mayapuri today, there is a wide range of variance between different urban slums and DOTS programmes.

Conclusion

TB programmes are integral to TB control, treatment, and prevention of death for many hundreds of thousands each year; outstanding results are being achieved by the DOTS programme in particular. Although the extent is not definitive, the transmission of TB in high-risk areas is significant in outpacing the current successes of these initiatives and is impeding future TB control and programme sustainability. It is not enough to presume early detection and high cure rates preclude the further transmission of TB. While the Stop TB Strategy is introducing minimal preventative measures, they are indirect measures and do not emphasize countering TB transmission. Furthermore, if they are capable of abating incidence, these prescriptions require further attention to effect change in practice. Several other measures can be undertaken to compliment DOTS and ensure success, including vaccinations, contact screening, preventative therapy, community empowerment, and poverty-alleviation and risk factor reduction campaigns. In face of so many potential preventative interventions, TB control programmes are thus confronted with a challenge: to address the root causes of TB and protect the livelihoods of the otherwise vulnerable. With preventative measures, DOTS has the capacity to not only ensure the control of TB, but to mobilize for its elimination.

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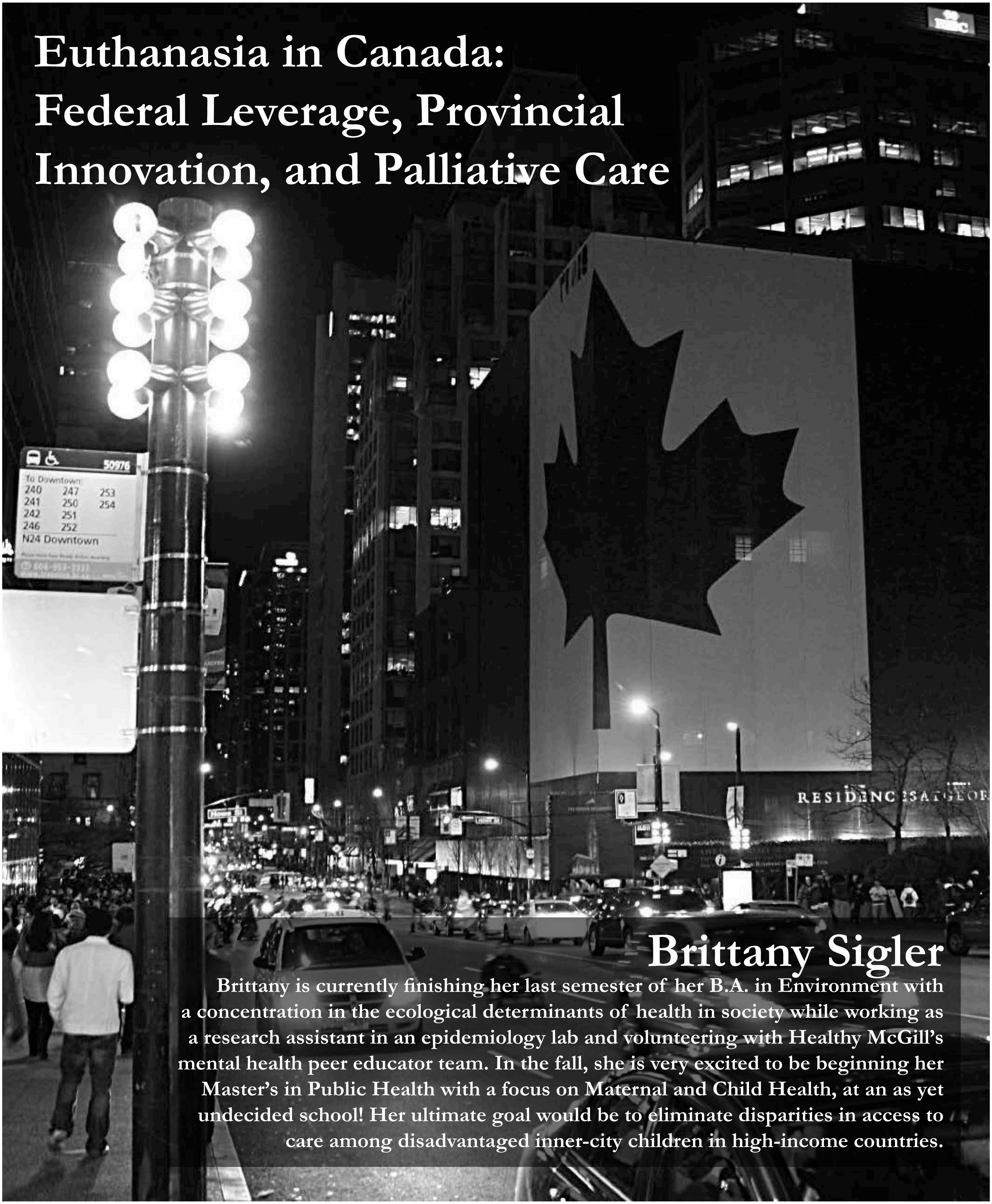
Euthanasia in Canada: Federal Leverage, Provincial Innovation, and Palliative Care



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Introduction

In 2010, Canadians older than 65 represented slightly more than 14% of the population, yet they consumed 45% of provincial and territorial government health care dollars (Canadian Institute for Health Information [CIHI], 2012). While CIHI's National Health Expenditure Trends show consumption has been growing slowly, more importantly, it is growing consistently. Due to the aging of baby boomers, the largest demographic in Canada, in the near future the health care system will have to cope with a senior population that is larger than all other age groups combined, a challenge that has never been met before (CIHI, 2012). One consequence is that there will be a greater number of people vying for limited palliative care beds in insured hospitals. Having foreseen this problem, the Honourable Michael J. L. Kirby's authoritative 2002 report tenaciously advocated for an expansion of public health insurance coverage to benefit palliative home care, catastrophic prescription drugs, and post-hospital home care (Canada. Parliament, 2002).

While in-hospital palliative care services are required to be covered by public health insurance, the Honourable Senator Sharon Carstairs noted in her detailed report pushing for palliative care reforms and improvements that at least 70% of Canadians do not have access to palliative care, and that when there is access, it is not equitable (2010). Significantly, Carstairs wrote that: "There are still Canadians dying in needless pain because health care providers do not know what a good death is" (2010). Provinces responded to her call for change very differently- the Western provinces developed palliative drug care programs, while Quebec is currently proposing a bill that regards euthanasia as an expansion of palliative care (Canadian Virtual Hospice, n.d.).

While both responses aim to make the end of life as comfortable as possible by expanding available treatment options, euthanasia, the act of purposefully ending a person's life to eliminate suffering , has been considered highly politically and ethically contentious. Opponents to euthanasia typically ascribe to one, some, or all of these lines of reasoning: killing is wrong and disregards the fundamental social value of respect for life; euthanasia requires subjective judgment on quality of life; society's most vulnerable are at risk of abuse; euthanasia can become an option when other resources are absent; euthanasia of competent people can lead to a slippery slope of assisted suicide for the incompetent, (i.e., without appropriate informed consent); and practice of euthanasia could obviate advances in palliative care (Butler et al. 2013). As of now, euthanasia, often discussed in tandem with doctor-assisted suicide, is illegal in all of Canada. However, in Belgium, the Netherlands, and Luxembourg it is part of medical care and therefore considered an issue of health, not of crime (NHS, 2012). Indeed, the greatest challenge inherent to the legalization of euthanasia is success in categorization of the practice as health-related.

Due to the federal involvement in previous efforts to pass laws similar to Quebec's, the issue of euthanasia – hotly debated in mass media as well as political circles – is a fascinating embodiment of the persistent power struggle between Ottawa and the provinces, especially in the realm of health care decision-making and accountability. Moreover, this issue presents the opportunity to examine whether the historical precedent will persist – especially after the institution of the Canada Health Act – of provinces individually undertaking innovative health reforms without national backing, yet prove so popular and successful that they are eventually adopted by the rest of the country with federal support to boot.

Policy Alternatives

There is a feeble delineation between euthanasia and assisted suicide, whereby an act of euthanasia requires the physician, or another designated individual, to administer the lethal therapy, while assisted suicide – sometimes considered within the realm of passive euthanasia – implies that the patient administers the therapy that a physician has prescribed for them. Quebec is the midst of legalizing the former, while Oregon has permitted the latter for sixteen years.

Quebec is the most recent province to challenge the reigning Canadian position on euthanasia – which was securely established by the case of *Rodriguez v. British Columbia (Attorney General)* [1993] – by tabling the radical Bill 52, "An Act respecting end-of-life care" (2013). This heavily controversial piece of legislation is trying to bypass previous opposition (based on the criminality of assisted suicide) by making health care and the administration of justice its central focus, both domains are distinctly under provincial control (CIHI, 2013). Although Bill 52 has bipartisan political support, it also receives much opposition: Catholic and other religious groups are vehemently against it; the Canadian Medical Association is officially opposed despite mixed member opinions regarding euthanasia; and Rhona Ambrose, the representative of the federal government on the topic on account of her positions as federal Health Minister and head of Health Canada, has issued unsupportive statements based on the principles of the Criminal Code, especially after the rejection of a similar federal bill (Canadian Medical Association, 2013; Canadian Medical Association, 2007; Perkel, 2013).

This bill is intriguing for its proposal to embed euthanasia within a framework of improved palliative care. Given the aforementioned complaints in Canada about inadequate end-of-life care, the purpose of this bill is: "to ensure that end-of-life patients are provided care that is respectful of their dignity and their autonomy and to recognize the primacy of wishes expressed freely and clearly with respect to end-of-life care" (Bill 52, 2013). Through the establishment of a continuum of care from 'cradle to grave,' as it is so often demanded, this piece of legislation aims to prevent and relieve suffering up until a patient's death. Bill 52 (2013) does this by setting forth precise conditions for terminal palliative sedation and "medical aid in dying," including requirements which must be met before the physician's administration of a lethal treatment; the rules for an advance medical directive to have binding force; and establishing a council to oversee such decisions. Significantly, such treatment can only be provided if a capable, informed patient suffers from an advanced, incurable, serious illness that is inflicting "constant and unbearable physical or psychological pain which cannot be relieved in a manner the person deems tolerable" and the patient voluntarily submits an oral and written request for medical assistance to die ("Bill 52," 2013). The bill therefore establishes an entire framework for euthanasia within the confines of palliative care, after all other methods for alleviating such pain have proven futile, short of unnecessary aggressive treatment.

A parallel American policy proposal that brings euthanasia into the medical sphere is Oregon's Death with Dignity Act, originally proposed in 1994. This law allows terminally ill, competent, informed adult Oregon residents to self-administer physician-prescribed lethal doses of medication. This can only take place after such a patient voluntarily voices his desire to die, subsequently makes a "written request for medication for the purpose of ending his or her life in a humane and dignified manner" in accordance with this Act, a prognosis of life expectancy of six months or less is confirmed by a consulting physician, and a minimum of 15 days later the patient orally expresses this wish a second time ("Oregon's Death with Dignity Act," 2005). The goal of Oregon's Death with Dignity Act (DWDA) is to promote patient autonomy to the greatest possible extent by providing the opportunity to choose how and when to die given that the aforementioned conditions are met. Securing this right for Oregon residents is portrayed as the means to the provision of all existing options to relieve suffering at the end of life. It is also a means to overcome the "beneficent paternalism" and authoritarianism that is inherent in western medical treatment, particularly with regards to current notions of consent (Hughes, 2006; Veatch, 1995).

The focus on choice has resonated with the Oregonian public. Voters passed the law in two separate referendums – with increased support in the second – yet just 0.2% of all Oregon deaths were accountable to the law in 2012, the year with the greatest amount of prescriptions for lethal doses of medication (Proposition 16, 1994; Proposition 51, 1997; Oregon Public Health Division, 2013). While religious-oriented groups like Physicians for Compassionate Care have opposed the Oregon law based on the "slippery slope" argument, several initial opponents have admitted that the predicted abuses have not emerged (Schwartz and Estrin, 2004). Consequently, the 9th Circuit Court ruled against the claim by former Attorney General John Ashcroft, the law's most vocal dissident, that the law did not hold a legitimate medical purpose and that doctors were illegally prescribing federally-controlled drugs (Gonzales v. Oregon, 2006). In fact, no referrals were made to the Oregon Medical Board in 2012 for failure to comply with DWDA requirements (Oregon Public Health Division, 2013).

Policy Analysis

Quebec's Bill 52 and Oregon's Death with Dignity Act have the common aim of viewing euthanasia as a viable component of end-of-life medical care. The key difference is that Quebec is emphasizing the expansion of what a doctor can do for their patients and Oregon is focusing on increasing the power of patients themselves. This distinction, however, is very nuanced and very much a matter of semantics. While both policies 'medicalize' such treatments and both provide ample safeguards to avoid abuse of the laws, which historically have been the biggest obstacles to acceptance, there is a more obvious distinction to be made. Oregon's successful implementation of its program occurred in a jurisdiction dominated by private health insurance and considered the sixth best palliative service provider in the United States in terms of hospitals offering end-of-life care, while Quebec has an inclusive political landscape that struggles to ensure equitable access to its publicly funded and universally covered palliative care (Center to Advance Palliative Care, 2011; Santé et Services sociaux, 2004; Canadian Cancer Society, 2013). Because a physician is not required to be present when a patient ingests the lethal drug cocktail according to DWDA, there are no barriers to dying at home, which was the locale of choice for 95% of all DWDA users and is considered the best possible scenario for one's death as stated by 69% of Quebecers (Oregon Public Health Division, 2013; Canadian Cancer Society, 2013). Given that palliative care encompasses "whole-person health care that aims to relieve suffering and improve the quality of living and dying" in all settings as of the diagnosis of a fatal condition, fulfilling the desires of the dying would be integral to successful palliative care (Carstairs 2010). Quebec's decision to implement a euthanasia policy prior to revamping its existing palliative health care sector seems drastically rash: 82.7% of Quebec deaths occur in hospitals, and at best, 1 in 2 people have access to palliative care (Statistics Canada, 2013; Canadian Cancer Society, 2013). That is to say, most Quebecers die in a hospital, but they are not receiving adequate end-of-life care despite eligibility. Bill 52's promise of universal funding through provincial Medicare is irrelevant in the absence of palliative care, as there is effectively no other environment where a patient can discuss the concept of euthanasia given it is far from the scope of acute care. In complete contrast, 90.4% of all DWDA patients who died were enrolled in hospice programs at the time of their death, exposing them to the notions of managing one's own death and developing one's ability to cope with it (Oregon Public Health Division 2013, Carstairs 2010).

Assuming access to quality palliative care services, the health care system would stand to greatly benefit from either of the policies presented above. In Carstairs' most recent report on end-of-life care in Canada, she explained that effective palliative care can lead to less stays in the intensive care unit and lower pharmacy costs; decreased hospital costs through decreased lengths of stay and unnecessary tests; and efficiently coordinated care transitions (2010). Indeed, in a literature review on the cost-effectiveness of palliative care by the Canadian Hospice Palliative Care Association, it was found that hospital-based palliative care can save the health care system an average of between $7,000 and $8,000 per patient relative to the cost of dying under acute care, which is the usual scenario (2012). Moreover, savings were found to be greatest for patients dying from a terminal disease (Canadian Hospice Palliative Care Association, 2012). Considering this enormous financial drain on limited healthcare funds, palliative care has the potential to significantly reduce consistently growing health expenditures; this could garner widespread political support as more of the population moves into the older age groups (CIHI, 2012; Butler et al., 2013). Although there is an extraordinarily delicate balance to be made between sustaining life and cost-containment in the health care sector, it is inarguable that euthanasia and/or physician-assisted suicide will contribute to the expenditure-reduction inherent in improved palliative care. Quite bluntly, if a patient decides they would like to pursue euthanasia or physician-assisted suicide, and is eligible according to the law to do so, they will no longer require the numerous other interventions that were previously required to make their life more comfortable. Furthermore, in addition to the cost-containment advantages of these policies, Canada stands to reap further gains from the introduction of either policy considering its health care system is currently notorious for its paternalism (Veatch, 2006). Since the Canadian health care system struggles to respond to the demands of its users, like all publicly insured systems funded through general taxation, presenting euthanasia and physician-assisted suicide as choices for the dying has the capacity to inject much coveted responsiveness into Canada's health care system (Fierlbeck, 2011).

Analysis

Despite several federal recommendations for improved palliative care, and the Senate's critique of the lag in development of the principles, expertise, and medical infrastructure needed to care for people facing death, euthanasia and physician-assisted suicide laws are liberal policies for a progressive society that has the infrastructure to support it (Parliament. Canada, 2000; Canada. Parliament, 2002; Carstairs, 2010; Canadian Medical Association, 2007). Euthanasia cannot be a viable solution to this problem in a jurisdiction without established quality palliative care services (Canadian Medical Association, 2007; Carstairs, 2010). Currently neither policy is logistically feasible in Canada due to the state of its palliative care, especially due to the absence of a pan-Canadian framework for end-of-life services. Yet this can be achieved, according to the Honourable Senator Sharon Carstairs, through the development of: "a culture of care, building capacity, support for caregivers, integration of services, and leadership" (2010).

Both policies are politically feasible given the strong incentives of improved cost-containment and responsiveness, two qualities that rarely are found within the same healthcare system. Conditional upon strong regulation against feared abuses by both physicians and relatives towards vulnerable individuals, the political will is present in Quebec and elsewhere in Canada. British Columbia already passed legislation supporting euthanasia that was subsequently overturned by the courts, demonstrating that euthanasia is a resonant issue across the country (*Carter v. Canada (*Attorney General), 2013). A notable setback to the adoption of policies that permit intended death as a medical practice is that there has not yet been a policy that can act as a benchmark for further cross-country development, as has been the case with Oregon's Death With Dignity Act in the United States. Given the political history, especially the rejection of federal bill C-384 proposing the legalization of euthanasia in 2009, Quebec's bill appears to be more feasible than Oregon's Act because it safely ensconces euthanasia as a medical issue in the hands of physicians, as opposed to a criminal one in the hands of the courts, and is pointedly trying to change the Medical Act and not the Criminal Code. Based on past Canadian efforts, a clause similar to that of the Oregon Act that allows patients to ingest their prescription without medical supervision would be enough to have such a proposed policy overturned. Still, before Quebec or any other province could implement a policy that allows intended death, the jurisdiction in question would need to ensure widespread public support due to its highly controversial nature, as Oregon was forced to accomplish with its referendums.

In a secular society, law and medicine are the institutions that determine the main societal values. If one of these policies were to be implemented in Canada, it would prompt questions of whether these institutions value life, as they permit doctors to kill their patients. The public would need to agree that the decision to include euthanasia within palliative medical care is about providing in the words of the Minister spearheading Quebec's Bill 52, an "'exceptional answer to exceptional circumstances of exceptional suffering that cannot be alleviated'" (Hamilton 2013).

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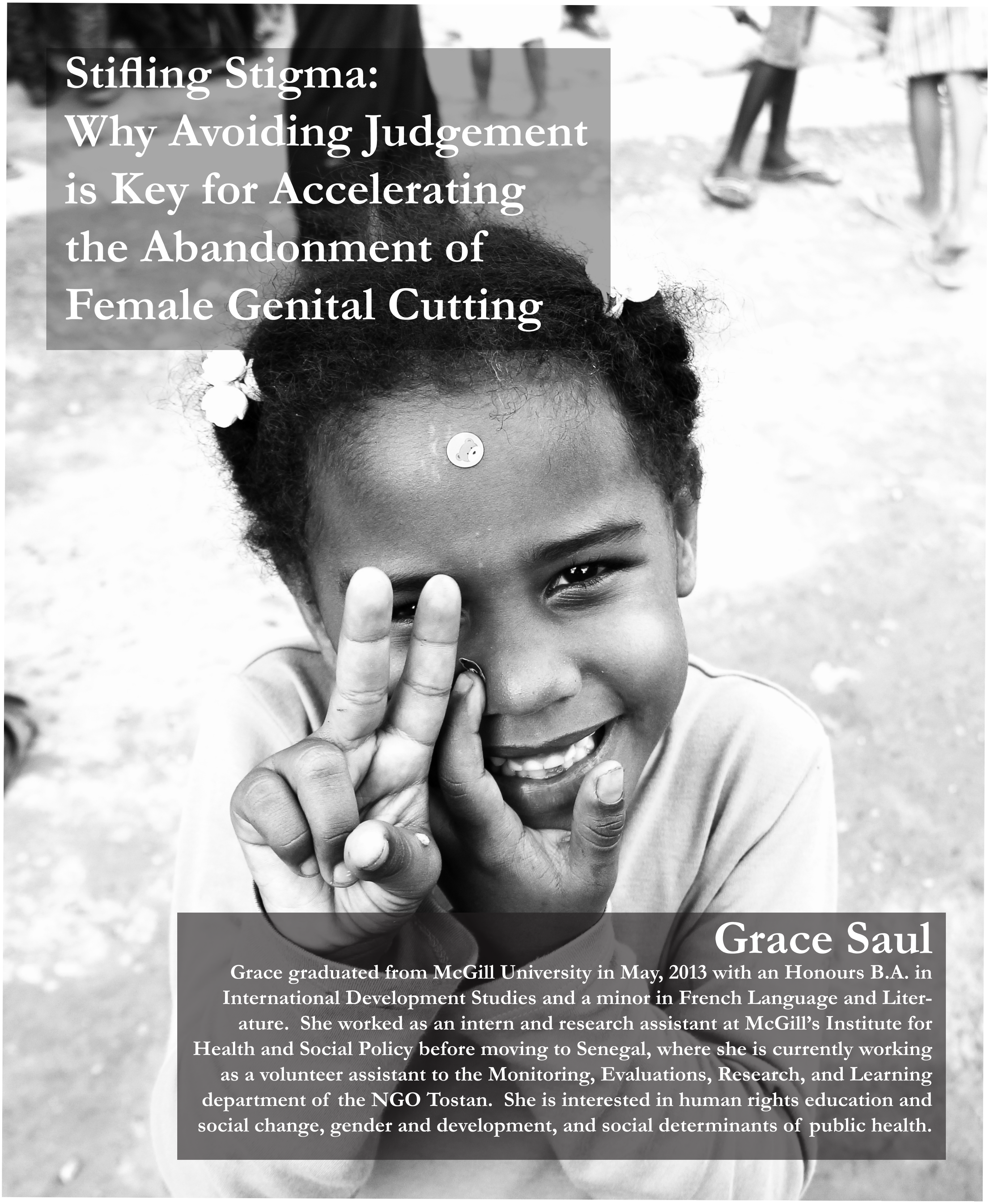

Stifling Stigma: Why Avoiding Judgement is Key for Accelerating the Abandonment of Female Genital Cutting

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When discussed in the global North and West, the issue of Female Genital Cutting (FGC) often sparks visceral reactions of fear, disgust, anger, and dejection. Among the most common responses is an expressed inability to comprehend *why* the practice is performed and *how* it continues to be a reality for millions of women throughout the developing world. Since the mid-20th century, health workers, feminists, national governments, and international organizations have singled out FGC for intervention, strongly condemning the practice for the troubling health consequences it presents and for its role in the continued underdevelopment of women (Herlund & Shell-Duncan, 2007). The practice is now considered by all influential global agencies and political actors to be strictly counter-normative (Herlund, & Shell-Duncan, 2007; Cook, 2008). The United Nations officially denounces the practice of "Female Genital Mutilation" as a violation of Human Rights and as a form of Violence Against Women (Herlund & Shell-Duncan, 2007). This assimilation of FGC into the dominant international Human Rights framework has helped increase global awareness of the issue (Cook, 2008; Gruenbaum, 2005). However, it has not necessarily contributed to a more meaningful understanding of the role FGC plays in practicing communities or of the social dynamics that preserve the tradition (Herlund & Shell-Duncan, 2008; Herlund & Shell-Duncan, 2006). Consequently, increased awareness has largely failed to translate into meaningful strategies for accelerating the abandonment of the practice (Shell-Duncan, 2008). Too often, communities practicing FGC have interpreted the fierce condemnation of the practice and its portrayal as being purely oppressive to women as yet another form of Western aggression. Accordingly, the proliferation of anti-FGC rhetoric has in large part served only to obscure the true complexity of the issue and to complicate efforts to protect the health and human rights of the girls and women concerned.

The international community's vigorous condemnation of "Female Genital Mutilation" based on moral grounds, along with a commonly perpetuated characterization of communities that practice FGC as oppressive and violent towards women, disregards the intricacy of the cultural values and norms preserving the tradition (Kanywani, 2002). In effect, such perversion thwarts efforts to end the practice, as communities respond to the perceived attack on their cultural rights with resistance and defensiveness (Henlund &Shell-Duncan, 2007; Shell-Duncan, 2008). Using the term "mutilation" to describe FGC instantly implies that the bodies of women who have experienced the practice are disfigured, deformed, or otherwise flawed by Western standards. This judgment serves to solidify an 'us' v. 'them' dichotomy between communities that practice FGC and those that do not (Lien & Schultz, 2013). As the rhetoric of 'right' versus 'wrong' and of 'civilization' versus 'barbarity' is all too familiar in the developing world context, the anti-FGC movement has often been seen as a continuation of "the colonialist effort to interpret indigenous African culture and thereby dominate it" (Okome, 1999, p. 4). This perceived imperialist assault has galvanized some practicing communities to advocate FGC more adamantly in defense of their traditions and 'cultural identity' (Herlund &Shell-Duncan, 2007; Shell-Duncan, 2008).

The portrayal of FGC solely as a barbaric and forceful means of ensuring male domination over women's bodies and societal roles overlooks the deeply entrenched social norms that maintain the practice. While it is true that control of female sexuality and ensuring marriageability are commonly cited reasons for FGC, these alone do not suffice in explaining the continuation of the tradition (Herlund & Shell-Duncan, 2007) Members of practicing communities often cite religion, hygiene, moral and physical purification, protection against sexually transmitted diseases, and the promotion of fertility, maternal health and child survival as reasons for FGC (WHO Interagency Statement, 2008). The practice is additionally considered to be an important means of enhancing social cohesion and female solidarity, and as such, is preserved by an extremely powerful convention of female pressure (Herlund & Shell-Duncan, 2007; Kanywani, 2002). Indeed, it is often the women in practicing communities who advocate the practice most adamantly, emphasizing its role in upholding cultural values including religious piety, tradition, health and fertility, and requiring it for moving up the adult female hierarchy (Prazak & Coffman, 2007). The fact that many members of practicing communities consider FGC to be exclusively a 'women's affair' complicates essentialist depictions of the practice as a symptom of the pervasive misogyny within 'primitive' societies (Caldwell, Orubuloye, & Cadwell, 2000).

Herlund and Shell-Duncan (2007) argue, convincingly, that only a few individuals in practicing communities are deeply engaged with the reasons behind FGC, while the majority chooses to follow the practice primarily out of fear of the very real discriminatory treatment and social sanctions they will face if they depart from the social norm. In practicing communities, girls and women who are uncut are considered to be abnormal and even revolting, while their parents are regarded as neglectful and cruel. The women face severe social consequences and may be entirely ostracized from their community (Prazak & Coffman, 2007; Cook, 2008). Research engaging focus groups in The Gambia found that even among groups of children, uncut peers were insulted as '*solema*' and excluded from social groups and activities (Herlund & Shell-Duncan, 2007). In light of the social necessity of the practice, the decision to have one's daughter cut is thus made out of love for the child and the desire for her to be included as a full member of the community (Shell-Duncan, 2008). This decision is typically the product of contemplation of the various reasons behind FGC, but more importantly, of the influence of personal experiences and the social pressure exerted by proximate social actors (Herlund & Shell-Duncan, 2007). Painting a simplistic image of barbarism and misogyny around FGC does little to stimulate meaningful discussion about the reasoning behind the decision to cut young women.

This failure to deeply engage with the reasons why the practice is retained is in large part why despite significant successes in increasing awareness of associated health risks and persuading national governments to pass legislation against the practice, global pressure to eliminate FGC has not resulted in large-scale behavior change (Herlund & Shell-Duncan, 2007; Prazak & Coffman, 2007; Caldwell et al., 2000). Strictly health-based approaches, which dominated the anti-FGC movement for much of the 20th century, presumed that if people were truly aware of the health risks presented by the practice, they would act 'rationally' and choose to abandon it (Prazak &Coffman, 2007; Caldwell et al., 2000). Early interventions focused, therefore, on educating populations about the adverse short- and long-term effects of FGC on women's health (Prazak &Coffman, 2007). What this approach failed to appreciate, however, was that people in communities practicing FGC are often well aware of many of the potential health consequences posed by FGC, yet judge the risk to be worth taking, given the cultural and social importance of the practice (Prazak & Coffman, 2007; Kanywani, 2002).

Labeling this as "irrational" obscures the complexity of the social contexts in which such difficult decisions are made, placing the blame on individuals while ignoring the pervasive influence of the community. When women from ethnic groups that do not practice FGC marry into practicing groups, for example, not only are they excluded from community decision-making and serious discussions among adult women. They also oftentimes possess limited authority to oppose the cutting of their own daughters. They are additionally forbidden from attending the FGC ceremony or visiting their daughters in seclusion. Where FGC is a prerequisite for group inclusion and full social rights, the prevailing pressure placed on the individual is evident. Women in such situations have sometimes elected to undergo FGC against their own tradition, even after having already had several children (Herlund & Shell-Duncan, 2007). Thus, in this context, awareness of health risks notwithstanding, the decision to practice FGC can indeed be considered rational.

Furthermore, anti-FGC campaigns have often drawn their information about the health consequences of FGC from case studies of infibulation: the most extreme yet least-practiced form of FGC wherein the clitoris, labia minor and often the entire medial part of the labia majora are removed and the two sides of the vulva are sutured together, leaving only a small opening for the passage of urine and menstrual blood (Shell-Duncan, 2008; Kanywani, 2002). The complications present in these cases are often inconsistent with the experiences of women in communities practicing less severe forms of FGC. The information presented as representative of the general health risks associated with FGC is then perceived to be highly exaggerated, and thus the credibility of anti-FGC campaigns is undermine (Kanywani, 2002). These unintended consequences experienced by well-meaning anti-FCG campaigns further demonstrate the importance of contextualizing the debate surrounding FGC and of placing the real-life medical and social experiences of women and girls at the center of the conversation.

Efforts to accelerate the abandonment of FGC must recognize that on issues so intimately linked to tradition and cultural values, meaningful change can only come through enhancing the capabilities of communities to engage in discussion about how to build community consensus around norms that protect the rights of women and children (Herlund & Shell-Duncan, 2007; Shell-Duncan, 2008). While it is essential that communities become fully aware of the true health risks associated with FGC, outside actors must always be considerate of socio-traditional contexts and take care not to tread on the cultural rights and autonomy of the women in these communities, many of whom do not identify FGC as the most pressing issue limiting their social advancement. In isolating FGC from its full context, one runs the risk of overlooking other critical, cross-cutting development issues, many of which are gendered (Prazak &Coffman, 2007).

Aggressive rhetoric that stigmatizes women who have undergone FGC, denounces the 'backwardness' and 'barbarity' of their communities, and fails to consider the intricate motivations driving decision-making, reduces the depth of the problem and serves only to provoke defensive reactions and to limit opportunities for positive change through empowerment. The international community's reductive condemnation of 'Female Genital Mutilation' falsely dichotomizes 'pro-' and 'anti-FGC' camps, neglecting the fact that often times, multiple and seemingly contradictory reasons for the practice coexist within the same communities, families, and even individuals. In reality, culture is not static, and neither is the practice of FGC (Herlund & Shell-Duncan, 2007). As Gruenbaum (2005) aptly states, "cultural values can be anchors that reinforce tradition, but they can also be the source of ideas for rethinking and challenging cultural practices." Within practicing communities, FGC is a tradition whose meaning is continuously reinterpreted in light of changing social circumstances (Herlund & Shell-Duncan, 2007). It is for this reason that efforts aiming to accelerate the abandonment of FGC must avoid sensationalism, and focus instead on providing communities with the tools they require to critically examine the social needs that Female Genital Cutting fulfills for them. Only then will communities be able to engage in a constructive conversation about possible alternative ways of upholding cultural values whilst bringing about the positive changes they wish to see in the future.

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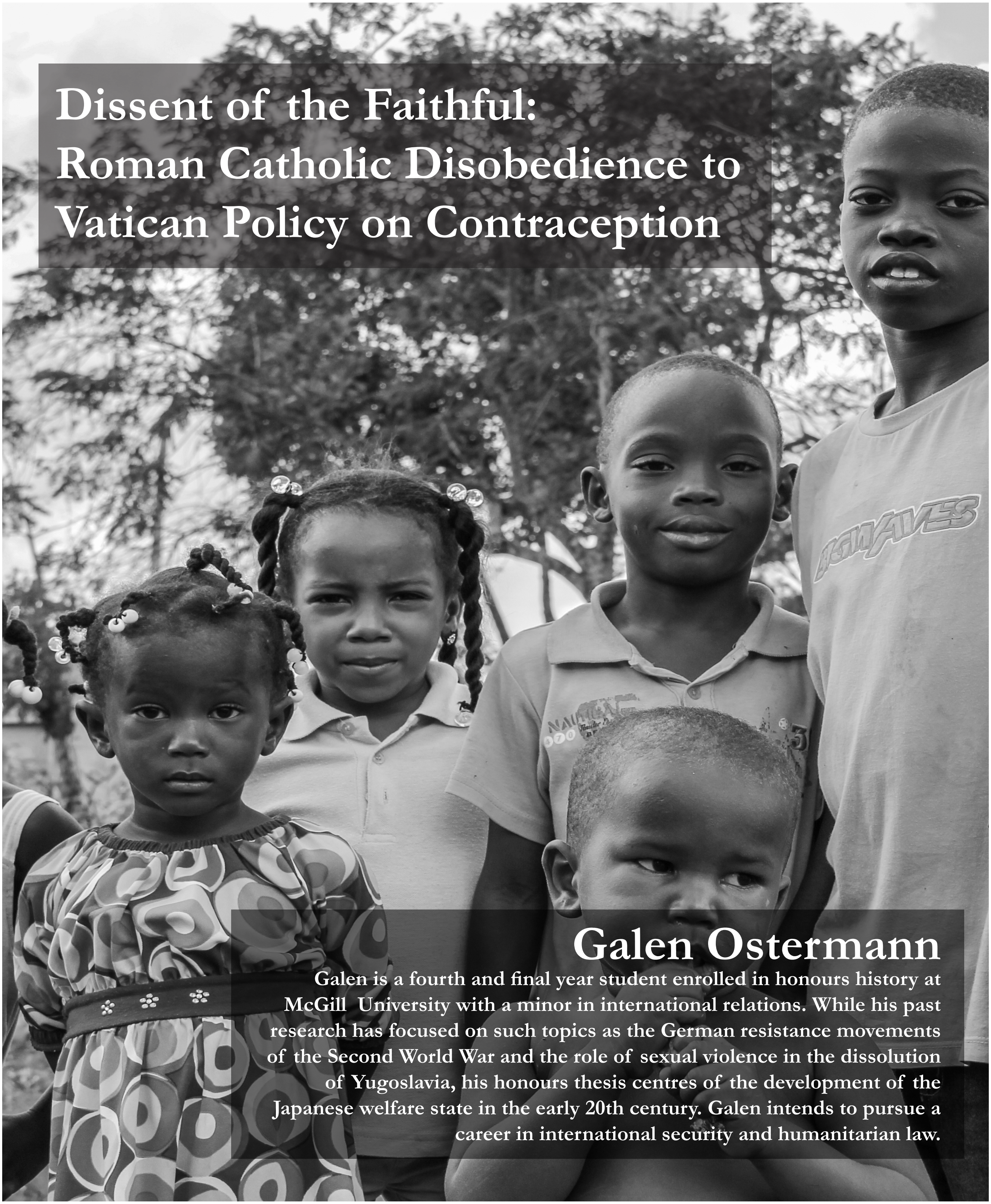

Dissent of the Faithful: Roman Catholic Disobedience to Vatican Policy on Contraception

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In 2010, despite a longstanding ban on contraceptives of all kinds within the Roman Catholic Church, Pope Benedict XVI made a statement that seemed to suggest that the Vatican had changed its stance on the use of condoms as a means of combating HIV/AIDS. In the weeks that followed, an immense amount of speculation swirled around the Pope's statements, leading many to wonder if the Church was experiencing a reformation of sorts. One online publication went to far as to say that "Pope Benedict XVI has now reversed the Catholic Church's long-standing position with regard to the use of condoms to combat the spread of the HIV virus"(Deutsche Welle, 2006). The importance of this subject is self-evident; a significant number of the world's 1.2 billion Catholics live in places that are subject to the worst instances of the AIDS pandemic, such as Haiti and the Democratic Republic of Congo (BBC News, "How Many Roman Catholics", 2013). Furthermore, many of these 1.2 billion Catholics live their lives according to the teachings of the pope and their local bishops and priests. In light of such controversial uncertainty, it is therefore necessary to explore the possibility of dissent from the traditional Roman Catholic condom policy. Have elements of the Church deviated from the longstanding policies of the Vatican on the issue of condom use? If so, what is the logic and reasoning behind this dissent? How does the Catholic laity actually live: according to doctrine or as they see fit?

It is of course erroneous to speak in a holistic way about the policies of the Roman Catholic Church, which is a complicated, bureaucratized, and hierarchical institution. The division of power, rights, and responsibilities between the various layers of the hierarchy means that a discussion regarding the Church must take these different strata into account individually. For the sake of exploration, this paper will examine elements of change and dissent among three layers of the Church: the papacy and the Vatican, a number of dissenting bishops and finally Catholic civil society and the laity more generally.

This paper will show that each of these layers has engaged in different degrees of dissent on the issue of condoms as a means of combating HIV/AIDS. First and foremost, despite claims that in 2010 that Benedict XVI "reversed the Catholic Church's long-standing position with regard to the use of condoms" (Deutsche Welle, 2006), the papacy and the Vatican have maintained the same policy on condoms since at least 1965. Far from dissenting, some traditionalist elements of the Church have even gone so far as to propagate pseudo-scientific myths to control the use of condoms among Catholic populations. Secondly, the continuing traditionalism of the papacy and the Vatican are in clear contrast to the number of notable bishops who have dissented as of the late 1980s by postulating that in many cases condoms represent an acceptable means of combating HIV/AIDS. Though most dissenting bishops exercised considerable restraint on the issue of condoms, Catholic civil society and the laity have disagreed openly and freely, often taking the opportunity to confront the Vatican on its statements and policies directly. In fact, lay Catholic populations all over the world have consistently dissented from traditional condom policy in both thought and practice.

Vatican II & Consistent Conservatism

In some respects, the close of the Second Vatican Council in 1965 signaled the close of a then-ongoing debate on the use of newly emerging forms of contraception. In December of the same year, Pope Paul VI released his encyclical titled *The Pastoral Constitution on the Church in the Modern World: Gaudium et Spes* (Pope Paul VI, 1965). As suggested by the title, the encyclical letter dealt with a number of issues faced by the Church as it was thrust into modernity. Perhaps most significantly, its author was quite clear in his statement that "sons of the Church may not undertake methods of birth control which are found blameworthy by the teaching authority of the Church in its unfolding of the divine law" (Pope Paul VI, 1965). The work makes no other direct reference to the issue of birth control, but rather set the tone for Paul's 1968 encyclical, *Human Vitae*. Unlike *Gaudium et Spes*, *Human Vitae* concerned itself directly with "the Regulation of Birth Control", stating clearly that "an act of mutual love which impairs the capacity to transmit life…contradicts the will of the Author of life" (Pope Paul VI, 1968). Paul went on to forbid any action or behaviour "specifically intended to prevent procreation—whether as an end or as a means" (Pope Paul VI, 1968). With these two encyclicals, the papacy set its standard on the issue of birth control: no artificial means were to be accepted.

Between the proclamation of *Human Vitae* in 1968 and Benedict's remarks in 2010, the position of the reigning popes has been characterized by consistent conservatism; there has been no divergence from the opinions of Paul VI on the use of condoms among either popes or the Vatican more generally. In his 1995 encyclical *Evangelium Vitae,* the generally conservative John Paul II noted that it is "morally unacceptable to encourage, let alone impose, the use of methods such as contraception, sterilization and abortion in order to regulate births" (Pope John Paul II, 1995). In December of that same year, the Pontifical Council for the Family, led by President Cardinal Alfonso López Trujillo, issued a statement claiming that "parents must also reject the promotion of so-called 'safe sex' a dangerous and immoral policy based on the deluded theory that the condom can provide adequate protection against AIDS" (The Pontifical Council for the Family, 1995).

The Vatican has made no secret of its controversial policies, even in light of a global health crisis. During the adoption of a joint United Nations declaration on HIV/AIDS in 2001, a Vatican representative noted that "The Holy See wishes to emphasize that, with regard to the use of condoms as a means of preventing HIV infection, it has in no way changed its moral position" (The Holy See, 2001). Similarly, in June of 2011, the United Nations held a convention on the international AIDS epidemic, where a Vatican representative declared that "the Holy See does not endorse the use of condoms…as part of HIV and AIDS prevention programmes" (Chullikatt, 2011).

In 2009, John Paul II's successor Pope Benedict XVI gave an extended interview to a journalist on a number of topics. As Benedict was travelling to Angola and Cameroon, the interviewer questioned him on the Vatican's position on condoms, asking "the position of the Catholic Church on the way to fight [AIDS] is often considered unrealistic and ineffective. Will you address this theme during the journey?" (The Vatican, 2009). Benedict replied that "if Africans do not help [by responsible behaviour], the problem cannot be overcome by the distribution of prophylactics: on the contrary, they increase it" (The Vatican, 2009). Thus by 2009, the papacy maintained an absolutely uncompromising position on the use of condoms, even for the prevention of infection.

The following year, something happened that seemed to destabilize forty years of consistent conservatism.

A Brief Controversy with an Expected Outcome

In 2010, journalist Peter Seewald conducted a series of interviews with Pope Benedict XVI that he later published in a book titled Light of the World. When questioned on the issue of condoms by Seewald, Benedict claimed that "there may be a basis in the case of some individuals, as perhaps when a male prostitute uses a condom, where this can be a first step in the direction of a moralization, a first assumption of responsibility, on the way toward recovering an awareness that not everything is allowed and that one cannot do whatever one wants. But it is not really the way to deal with the evil of HIV infection. That can really lie only in a humanization of sexuality" (Seewald, 2010). A puzzled Seewald inquired "Are you saying, then, that the Catholic Church is actually not opposed in principle to the use of condoms?"(Seewald, 2010). The cautious Benedict replied "She of course does not regard it as a real or moral solution, but, in this or that case, there can be nonetheless, in the intention of reducing the risk of infection, a first step in a movement toward a different way, a more human way, of living sexuality" (Seewald, 2010). The international media exploded with controversy; one article went so far as to claim that Benedict had "reversed" the Church's policy on condoms, (Deutsche Welle, 2006) as if to say that its entire body of thought had been unceremoniously discarded with one statement. Nothing was further from the truth.

In response to what it considered a stream of inaccurate interpretations, the Vatican published a Note on the Banalization of Sexuality Regarding Certain Interpretations of "Light of the World." Therein, The Congregation for the Doctrine of the Faith claimed that "the Holy Father was talking neither about conjugal morality nor about the moral norm concerning contraception. This norm belongs to the tradition of the Church and was summarized succinctly by Pope Paul VI in paragraph 14 of his Encyclical Letter Humanae vitae (sic)" (Congregation for the Doctrine of the Faith, 2010). The note went on to encourage the continuation of "abstinence before and fidelity within marriage" as a means of combating the spread of AIDS (Congregation for the Doctrine of the Faith, 2010). With this, Vatican traditionalists quickly aligned Benedict's statements with the conservative thought of Paul VI. Even without such interventions, it is exceedingly obvious that Benedict's statements did not amount to a "reversal" of the Vatican's condom policy. His statement refers only to a highly specific circumstance and does not suggest that condoms are either a "moral" or "real" solution, only that they amount to a "first step in the direction of moralization."

It seems further that the ambiguity of Benedict's statement was intentional, perhaps because the Church condemns all sexual activity which is not vaginal intercourse between husband and wife. It seems that Benedict spoke in a benign way because he did not want his perceived endorsement of homosexual activity to appear as an endorsement of homosexuality more generally. On the other hand, since male homosexual sex does not contain the potential to create life, there was no reason to insist on the use of condoms during homosexual interaction per se. The pope thus skirted a fine line by suggesting that while homosexual sex is not moral, its moral character can at least be improved by the use of condoms so as to prevent the spread of disease.

Exaggerated Conservatism

Since the outbreak of HIV, the Vatican has not only refused to compromise on the use of condoms to prevent the spread of HIV/AIDS, but in some cases has actually propagated pseudo-scientific myths in an attempt to curb the influence of governments, institutions, and NGOs which promote the use of condoms to prevent infection. Thus, far from dissenting, many traditionalist elements of the Roman Catholic Church under direct influence of the Vatican and Pope have actually resorted to trickery to stem the tide of condom use especially in the "developing world."

In 1997, a coalition of NGOs, intellectuals, and politicians in Mexico launched an advertising campaign to encourage the use of condoms (Hernandez & Luna, 1997). In response, the Catholic Church launched its own campaign featuring ads on billboards, public transport, TV and radio which claimed that condoms have a 40% failure rate. (Hernandez & Luna, 1997) In 2003, the President of the Pontifical Council for the Family, Cardinal Alfonso Lopez Trujillo said on a BBC television programme that "The AIDS virus is roughly 450 times smaller than the spermatozoon. The spermatozoon can easily pass through the 'net' that is formed by the condom" (Bradshaw, 2003).

It seems that these claims have had a tangible impact on the beliefs of the global Catholic populations and may have even exaggerated superstition is some cases. Recently, an AIDS programme director in Kenya reported that "some priests have even been saying that condoms are laced with HIV/Aids" (Bradshaw, 2003). In 2003, BBC journalists found that Catholic populations in both Latin America and Asia believed the myth of permeable condoms (Bradshaw, 2003). A series of studies conducted on Congolese youth between 2004 and 2005 yielded similar results. When questioned on the effectiveness of condoms, some replied that "AIDS can pass through the condom and enter" and "it can have little holes" (Bosmans, Cikuru, Claeys, & Temmerman, 2006). Because the Church administered all AIDS treatment and care facilities in the area, they insisted solely on abstinence and fidelity while rejecting the use of condoms. In some cases, the C of the A(bstinence) B(e faithful) C(Condoms) campaign was simply removed from t shirts, posters, and calendars (Bosmans, et al., 2006). Perhaps most importantly, the facilities were clear in stating that their policies always conformed to those of the Church (Bosmans et al., 2006). In short, several conservative elements of the Church, including bishops and Councils allegiant to Rome, have not only opposed dissent but have actually attempted to reverse the ground gained by actors who have promoted condom use as a means of fighting HIV/AIDS.

The Dissenting Bishops

Beginning in the late 1980s and amidst a strong wave of AIDS activism in the West, a steady stream of notable bishops began to make statements and proclamations that deviated considerably from the policies of the Popes and the Vatican. These bishops generally displayed a more lenient attitude on the use of condoms to prevent the spread of AIDS, but were otherwise quite conservative on other issues. So far as this research has been able to gather, no bishop or clergy member of notable significance has simply issued a *carte blanche* with regard to condoms. Rather, certain bishops have issued limited proclamations stating that condoms may be used between married couples and those individuals who, despite their infected status, are almost certain to have sexual relations anyways. Whatever their target audience, every bishop who issued such a proclamation did so under the justification of protecting life at the sacrifice of sacred sexuality, seeing condoms as a theological "lesser evil."

Protecting Marriage & Protecting Life

In 1989, the Bishop of Evreux claimed that the Vatican's failure to recommend the use of condoms in the fight against AIDS amounted to a violation of the commandment that "thou shalt not kill" (Catholics for Choice [CFC], 2013). This statement seems to have set off a general domino effect among bishops throughout the Church, some of whom began to speak publicly in support of condom use as a means of preventing transmission. In 1993, Archbishop André Collini of Toulouse claimed that an infected person engaging in sexual activity "does not have the right not to use a condom" or else becomes "an agent of death" (CFC, 2013). The Social Commission of the French Hierarchy, the Church's highest social authority in France issued a report on AIDS in 1996 which stated that "many competent doctors affirm that a condom of trustworthy quality is presently the only means of prevention. For this reason the use of a condom may be necessary" (CFC, 2013). Stating their justification, the President of the Catholic Committee of French Doctors maintained, "The Church cannot be against contraceptives, a means of preventing the transmission of death" (Dorozynski, 1996)· Kevin Dowling, the controversial and outspoken Bishop of Rustenberg (South Africa) began his trend of dissent in 2001 when he claimed that infected people who did not follow Church teachings on chastity "should use a condom in order to prevent the transmission of potential death to another" (CFC, 2013).

While most dissenting bishops have remained unspecific on who may acceptably use condoms, some have focused their desire to preserve life on the institution of marriage. In 2003, the Archbishop of Glasgow, Mario Conti, deemed condoms acceptable for married couples with one infected partner (CFC, 2013). In 2006, a Cameroonian Bishop, Christian Tumi, remarked that "if a partner in a marriage is infected with HIV, the use of condoms makes sense." In 2006, former Milanese Archbishop Carlo Martini similarly claimed that condoms were acceptable in "the particular situation of spouses, one of whom is infected with AIDS. The infected one is obligated to protect the other partner" (Sandro, 2006). Though these restrictions to married couples are conservative in nature, they nonetheless represent dissenting views by sanctioning condom use when the conception of life would otherwise be possible, thus differentiating them from the 2010 statements of Benedict.

Do the Bishops' Statements Constitute Dissent?

It may be initially tempting to suggest that there is not much difference between the statements of Benedict in 2010 and those of the various bishops since 1989. Both the former pope and the dissenting bishops all issued relatively vague statements rather than *cartes blanches* on condom use. However, a close comparison of the bishops' statements to those of Benedict reveals a considerable degree of dissent. Whereas Benedict claimed immediately that condoms were "not really the way to deal with the evil of HIV infection", Archbishop Collini suggested that infected people who fail to use condoms were "agents of death." Thus, while Benedict has loosely suggested that condom use *may* amount to some degree of responsible behavior, Collini mandated that failure to use such was tantamount to murder. Such a stark difference in language points to two fundamentally different positions: one of tradition and one of dissent.

Further, the *Note on the Banalization of Sexuality Regarding Certain Interpretations of Light of the World* which was issued after Benedict's famous statements of 2010 clearly stated that "an action which is objectively evil, even if a lesser evil, can never be licitly willed. The Holy Father did not say – as some people have claimed – that prostitution with the use of a condom can be chosen as a lesser evil" (Congregation for the Doctrine of the Faith, 2010). By contrast, the dissenting bishops were almost unanimous in the opinion that condoms constitute a "lesser evil." Cardinal Carlo Martini was direct in his suggestion that "…the use of condoms can constitute a lesser evil" (Sandro, 2006). Throughout the early 2000s, the bishops of Vienna, Paris, Goias and other districts echoed the sentiment on "lesser evil" in their own words (CFC, 2013). As one author has suggested, the dissenting bishops "have turned to the Catholic tradition and have applied to this particular question the principle of the lesser evil…the principle is concerned solely with preventing another evil being added to the moral wrongfulness of the action." (Fuller & Keenan, 2001). In invoking the idea of "lesser evil", these bishops have dissented by effectively accepting the exercise of one sin to ameliorate another.

These bishops' positions further constitute dissent insofar that they accepted condoms in a much broader array of situations and circumstances. While Benedict suggested only the instance of a male prostitute, the dissenting bishops have suggested the acceptability of condoms with regard to married couples, unmarried couples, prostitutes, and generally anyone who is infected and will have sexual relations nonetheless (CFC, 2013). The outspoken South African Bishop Kevin Dowling went so far as to say that Africans "must use condoms" in the fight against AIDS, without actually stipulating any further requirement for approval (CFC, 2013).

The Masses in Revolt

In contrast with opinions and statements of dissenting bishops, certain elements of Catholic civil society have waged an all-out revolt against the traditionalist stance of the Vatican. Organizations such as the US-based "Catholics for Choice" have directly confronted the Vatican's statements with its own agenda of condom use among the faithful. In 2001, Catholics for Choice launched an advertising campaign in the USA, Mexico, the Philippines, South Africa, Kenya, Chile, and Zimbabwe to counter the effects of Cardinal Trujillo's 2003 statements on the permeability of condoms (CFC, "Condoms4Life"). Certain ads pointed out that as many as 4,000 bishops lobby national governments and the UN to restrict the distribution of condoms (CFC, "Condoms4Life"). In 2013, the organization caused a stir in Kenya over a billboard advertisement that featured the message "We believe in God. We believe that sex is sacred. We believe in caring for each other. We believe in using condoms. Good Catholics Use Condoms" alongside an embracing heterosexual couple. (BBC News, "Kenya Condom Advert", 2013). The ad, alongside the rest of the campaign, drew significant criticism from the chairman of the Kenya Conference of Catholic Bishops, Cardinal John Njue, who attempted to have it removed (BBC News, “Kenya Condom Advert”, 2013).

In their own way, the Catholic laity of the world has staged its own silent revolt, albeit more tacitly than the dissenting bishops. Recent studies show that Catholics all over the world have commonly dissented from traditional Vatican condom policy in both thought and practice. Among Catholic populations in each country, 63% of Americans, 60% of Mexicans, 37% of Ghanaians, 79% of Irish, and 47% of Filipinos felt that the Church’s position on condoms should be changed for any reason including the AIDS crisis. (CFC, “Catholics Support the Use of Condoms”). Among Catholic populations in each country, 79% of Americans, 90% of Mexicans, 59% of Ghanaians, 86% of Irish, and 77% of Filipinos agreed that “using condoms is prolife because it helps save lives by preventing the spread of AIDS” (CFC, “Catholics Support the Use of Condoms”). In 2000, a study of young Catholics in six Western countries revealed that nearly all agreed that church teaching on contraception was “out of date” (Maher, Sever, & Pichler, 2008). Perhaps most remarkably, studies conducted by 4 researchers in 1987, 1993, and 1999 found that over time there was a decrease in attachment to the institution of the Church and greater reliance on the individual conscience for sex related issues (Maher et al., 2008).

While the dissenting bishops have taken a conciliatory tone in an attempt to bridge the demands of modernity with traditional Church doctrine, Catholics for Choice has stood up to the Vatican in opposition while maintaining a connection to the faith. Dissent here has been total, showing little regard for the maintenance of traditional relations and views. While the laity has embodied the spirit of the “silent majority”, its dissent is equally as significant. For various reasons, a significant number of Catholics surveyed directly disagreed with Vatican policy, sometimes going so far as to contradict it outright. Such findings seem to represent an overall historical trend, whereby the tendency for dissent has grown among a laity that sees the Vatican as unable to adequately handle the challenges of modernity.

Conclusions

The tendency towards dissent from the traditional policies of Paul VI corresponds directly with the degree of authority possessed by the actor in question. Those members of the Church with the most accountability for the spiritual guidance of others have showed consistent conservatism and a reluctance to wager on new policies. Thus the pope, who Catholics hold to be Christ’s pontiff on Earth, is necessarily conservative because his teachings influence all of the world’s 1.2 billion Catholics. Bishops and archbishops, who are responsible for their own districts, have less accountability overall and are generally more attuned to the needs of their local populations. It is unsurprising that Bishop Kevin Dowling of South Africa has endorsed the use of contraceptives because he represents a limited spiritual constituency that has been devastated by AIDS and can be assisted by condom use. As such, the Bishop has encouraged the use of prophylactics and in doing so has gambled the spiritual well-being of his people by ensuring their immediate physical well-being. Finally, the laity has pursued such a dissident path from traditional policy because these individual Catholics are not responsible for anyone “under them.” They do not face the threat of inadvertently causing a schism or disrupting the ordered character of the Church.

In short, the various degrees of dissent among elements of the Church are best described as reflecting the hierarchical structure of the Roman Catholic Church itself.

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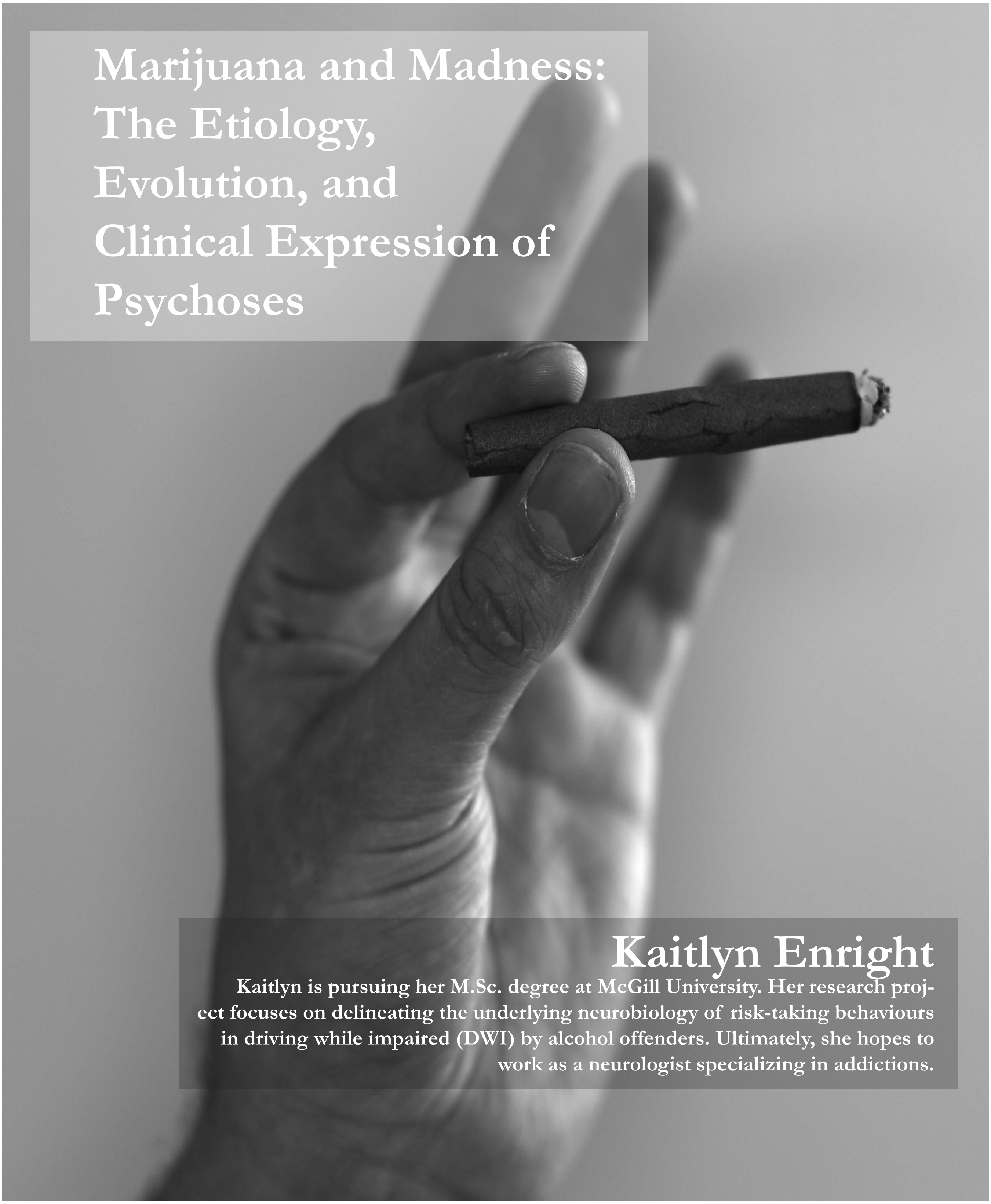
Marijuana and Madness: The Etiology, Evolution, and Clinical Expression of Psychoses



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Background

Epidemiological Data

Throughout the world, cannabis is the most widely consumed illicit drug (EMCDDA, 2008). Dramatic increases in cannabis consumption have been observed in the last 30 years, possibly due to increased social acceptance and legalization in some areas (UNODC, 2012). There has also been a substantial decline in the initial age of use, with overall use remaining primarily linked to youth between the ages of 15 and 25. In 2012, the yearly prevalence of cannabis use among the general population was approximately 5% (UNODC, 2012). However, rates among people with psychiatric disorders, such as schizophrenia, remain consistently 5-10 times higher than the normal population, and the reason for this is unknown (Degenhardt, Hall & Linskey, 2003).

Developed countries are the main consumers of cannabis (see Figure 1). According to the Canadian Addiction Survey (2004), almost half the population (44.5%) has used cannabis in their lifetime and the rate in Quebec (46.4), is slightly higher than the national average. Assuming that prevalence rates will not change significantly over the next few decades, demographic trends suggest that the total number of cannabis users could, in accordance with population growth, increase significantly. Given its prevalence, there is little wonder why cannabis has become so controversial, dividing opinion

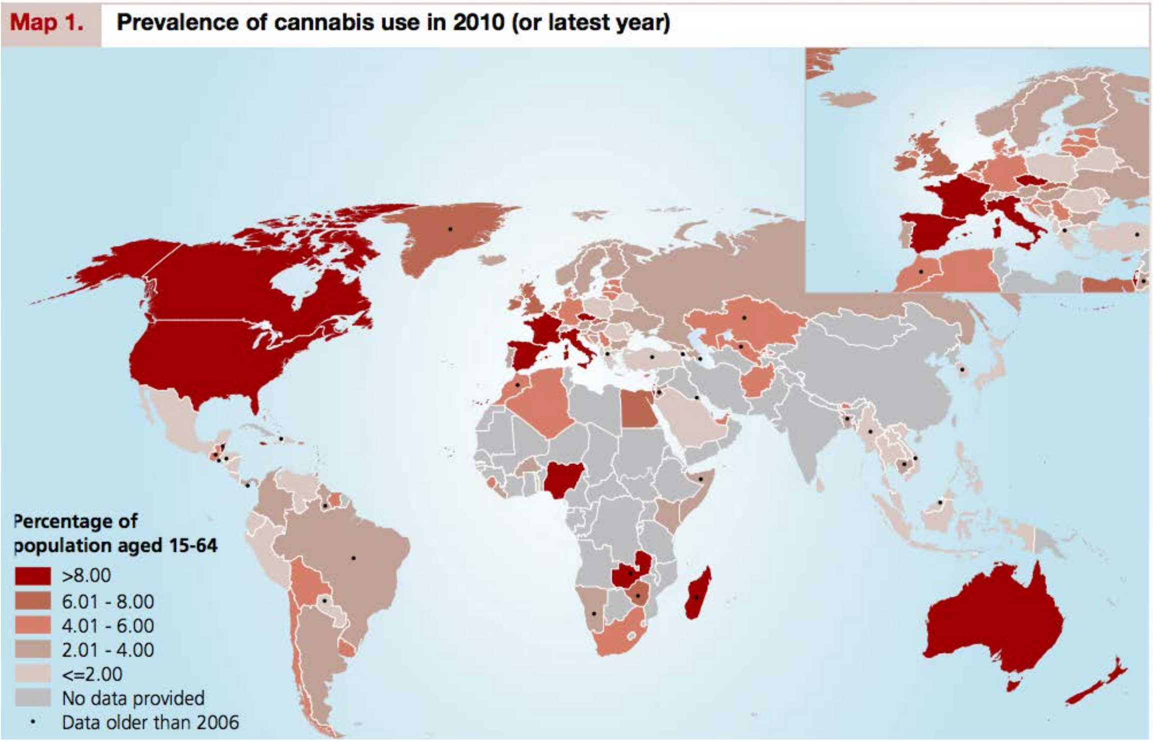


Figure 1. Prevalence of cannabis use among the general population over 15 years of age in 2010. Note that prevalence rates are high in North America (i.e., >8% of the population) (UNODC, 2012).

among policymakers, researchers, law enforcers, and consumers alike (UNODC, 2012).

Characteristics of Cannabis

The main psychoactive ingredient in cannabis is delta-9-tetrahydrocannabinol (THC) (Curan et al., 2002; Luzi, Morrison, Powell & Murray, 2008; Hell et al., 2012). Cannabinoid compounds bind to CB_1 cannabinoid receptors found mainly in the central nervous system, and CB_2 receptors found mainly in the peripheral nervous system (Hell et al., 2012). However, cannabis' primary mechanism of action is to act as an agonist at CB_1 receptor sites, and it is the resulting dopamine release in the nucleaus accumbens and ventral tegmental area that is attributed to the psychotogenic properties of cannabis. It is important to note that dopamine release within these structures is not only involved in the rewarding effects (i.e., euphoria) associated with psychotropic drugs (Hell et al., 2012), but that each of these aforementioned regions has been implicated in the pathophysiology of schizophrenia (Luzi et al., 2008).

Pathophysiology of schizophrenia

The pathophysiology of schizophrenia is incompletely understood. The "dopamine hypothesis of schizophrenia" suggests that a dysfunctional dopamine system causes hypodopaminergia in the frontal regions of the brain, and an excess of dopamine in striatal areas. These processes are proposed to be involved in psychosis, as the hypodopaminergia supposedly results in negative symptoms, such as a blunted affect, and the hyperdopaminergia translates into positive symptoms, such as delusions, which are commonly associated with schizophrenia (Howes & Kupar, 2009). However, many other neurotransmitters have been implicated in the pathophysiology of schizophrenia, such as glutamate (Goff, 2000) and serotonin (Aghajanian & Merek, 2000). There also seems to be a strong genetic component to the disorder, as it has a high heritability (Kukshal, Thelma, Nimgaonkar & Deshpande, 2012).

Neuropsychological and Behavioral Effects of Cannabinoids

Acute effects

Cannabis, or more specifically THC, affects a wide range of central nervous system domains. Its acute effects have been recognized for thousands of years (Goff, 2000), and recent studies have confirmed that cannabis has analgesic and antiepileptic properties, can decrease short-term memory and cognition, and increase relaxation and appetite (Curran et al., 2002; Kuepper et al., 2011; Andréasson, Allebeck, Engström & Rydberg, 1987). Most of these responses occur in a dose-dependent manner (Curran et al., 2002). Of course, as is the general case in psychiatry, the symptomatic expression is never universally specific, but only typical.

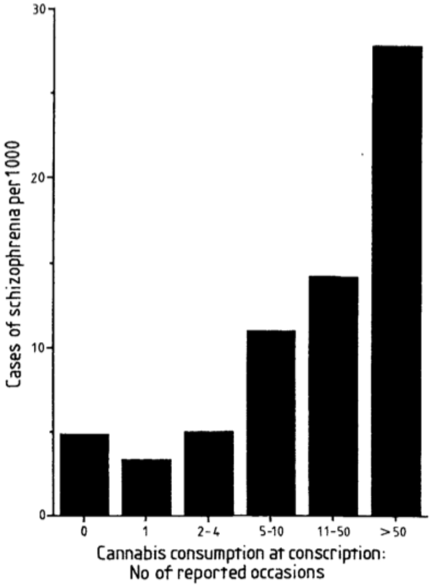
In rare circumstances, a substance-induced psychosis may follow cannabis intake. The expressions appear shortly after consumption, and are similar to the symptoms of schizophrenia, including hallucinations and/or delusions. Fortunately, prognosis is favorable as remission is achievable through abstinence, and usually does not require medical intervention (Henquet, Murray, Linszen & Van, 2005). High doses of cannabis, length of exposure, multiple substance use, use at an early age, certain personality traits, and vulnerability to major mental illnesses, all seem to be contributing factors that increase the likelihood of experiencing a substance-induced psychosis (Kuepper et al., 2011). However, cannabis can trigger brief psychotic episodes in inexperienced consumers with no pre-existing vulnerability to psychoses (Andréasson et al., 1987).

Chronic effects

Early reports of an association between cannabis and schizophrenia became the topic of heated debates amongst the scientific community. After all, if the prevalence of cannabis use has dramatically increased in recent years, then we would expect to see a similar associated increase in the prevalence of schizophrenia. As medical costs associated with schizophrenia rise above 10 million dollars annually in the United States, an increase in its prevalence would have adverse effects on the economy (Henquet et al., 2005). Also, given that the age of first-time use has decreased, youth would be particularly susceptible to the harmful effects of cannabis, and the subsequent risk of psychoses, as it has been shown to have a negative effect on the brain's maturational processes during critical developmental stages (Kuepper et al., 2011). In response to this potential public health crisis, researchers began investigating whether this reported association between cannabis and schizophrenia was true.

Study Review

In 1987, a longitudinal study involving over 45,570 Swedish conscripts demonstrated a convincing association between cannabis and psychosis. It revealed a dose-response relationship between early cannabis use and later development of schizophrenia. The results of this 15-year follow-up indicated a two-fold increase in the relative risk of developing schizophrenia among consumers of cannabis compared to non-users (Andréasson et al., 1987). A later meta-analysis (Henquet et al., 2005) would also confirm this odds ratio. The risk of developing schizophrenia increased exponentially among "heavy users", defined as using on 50+ occasions (Andréasson et al., 1987) (see Figure 2). While intriguing, further investigations into this area of research did not significantly advance until after the second millennium, and thus, the causal link between cannabis and schizophrenia remained unanswered.



Rates of schizophrenia after different levels of cannabis consumption.

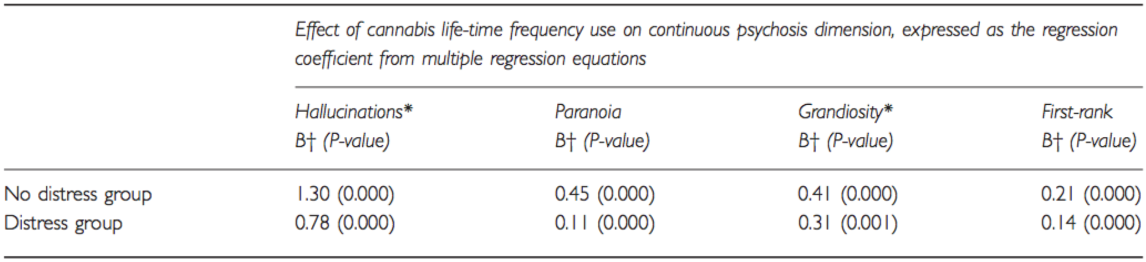
Figure 2. Association between rates of schizophrenia and different levels of cannabis use. Note the dose-response association between the number of occasions of cannabis use and cases of schizophrenia (Andréasson et al., 1987).

Viewpoint #1: Does psychosis induce cannabis use?

The "reverse causality hypothesis" proposes that individuals with a vulnerability to schizophrenia may be predisposed to using cannabis as a means of "self-medicating" their distress (Henquet et al., 2005). Many studies have provided data that is inconsistent with this hypothesis. For example, a cohort study found that the association between cannabis use and psychoses was not influenced by distress invoked by experiences, making the self-medication hypotheses unlikely (Kuepper, 2011) (see Table 1). Also, a 10-year follow-up study showed that psychotic episode at a first follow-up did not predict cannabis use in a subsequent follow-up; therefore, their data do not provide evidence in support of the self-medication hypothesis. Also in this study, the association between cannabis use and psychotic episode was independent of many confounding variables, such as age, sex, socioeconomic status, use of other drugs, urban/rural environment, childhood trauma, and other psychiatric illness. Therefore, the association is unlikely to be the result of common cofactors, and a residual confounding explanation does not provide sufficient analytical capability (Kuepper, 2011). These studies help to address the issue of reverse causality by clarifying the temporal association between cannabis use and psychoses. It is also a common observation that while cannabis users are overrepresented in the schizophrenic population, not all schizophrenics use cannabis (Degenhardt, Hall & Linskey, 2003).

Viewpoint #2: Does cannabis use cause psychosis?

The "causality hypothesis" proposes that consuming cannabis causes psychotic symptoms in users. However, population statistics argue against this hypothesis. For example, in the aforementioned Swedish study, only 3% of the heavy cannabis users went on to develop schizophrenia, suggesting that cannabis might exert its causal role only in vulnerable individuals (Andréasson et al., 1987). Also, statistical applications of the causal model suggest that at the population level, complete elimination of cannabis would not result in a significant reduction in the prevalence of schizophrenia (i.e., < 8%) (Arsenault, Cannon, Witton & Murray, 2004). This is in accordance with observations from the World Health Organization (2000) that prevalence rates of schizophrenia remain constant throughout time, and among differing cultures and geographical regions, despite fluctuations in cannabis use. Therefore, while in rare cases cannabis may cause transient, schizophrenic-like symptoms in the general population, data indicate that cannabis use does not necessary *cause* psychosis. Rather, it may increase the risk of earlier and more frequent relapses, and worsen the overall course of the illness, in those with a pre-existing vulnerability (see Figure 3). This association between psychosis liability and



	Effect of cannabis life-time frequency use on continuous psychosis dimension, expressed as the regression coefficient from multiple regression equations			
	*Hallucinations**	*Paranoia*	*Grandiosity**	*First-rank*
	B† (P-value)	*B† (P-value)*	*B† (P-value)*	*B† (P-value)*
No distress group	1.30 (0.000)	0.45 (0.000)	0.41 (0.000)	0.21 (0.000)
Distress group	0.78 (0.000)	0.11 (0.000)	0.31 (0.001)	0.14 (0.000)

Table 1. Self-medication hypothesis. Effects of cannabis as a function of distress associated with psychotic experiences (Stefanis et al., 2004).

cannabis use has been demonstrated in many studies (Henquet et al., 2005; Degenhardt et al., 2007; Griffith-Lendering et al., 2013).

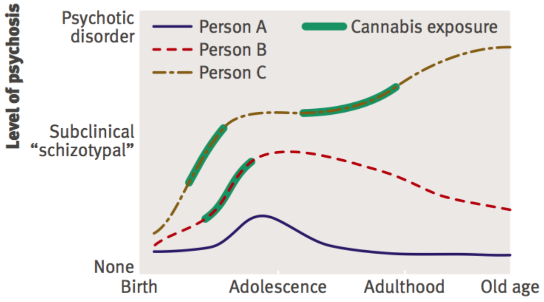


Figure 3. A proposed cannabis-psychosis persistence model. Person A has normal developmental expression of subthreshold psychotic experiences that are mild and transient. Person B has similar expression but longer persistence because of additional environmental exposure (here, cannabis). Person C has prolonged persistence and subsequent transition to clinical psychotic disorder because of repeated environmental exposure - that is, repeated cannabis use (Kuepper et al., 2011).

Causality: The accumulating evidence

According to Henquet and colleagues (2005), causality is plausible if studies meet the following criteria: (i) they report an association between the exposure and the outcome consistently, (ii) show dose-response relationships between the exposure and the outcome, (iii) show that the exposure precedes the outcome, and (iv) show that there is a plausible biological mechanism linking the exposure and the outcome. With the exception of criterion (iv), previous studies have fulfilled criteria (i-iii) for causality. Therefore, there is increasing evidence that the association between cannabis use and psychoses is indeed a causal relationship. However, given that not all cannabis users develop schizophrenia, and not all schizophrenics consume cannabis, it would seem that cannabis is neither a necessary nor a sufficient cause of schizophrenia. Nonetheless, since evidence supports that an association exists, then perhaps cannabis is a component cause of schizophrenia. That is, its influence on psychoses risk may be dependent on another factor(s) (Luzi et al., 2008).

Biological Plausibility – The Mechanism That Explains This Association

In the absence of known causes of schizophrenia, and as evidence indicates that cannabis may be a component of the sufficient cause of the illness, studies have begun investigating the possible biological mechanism(s) underlying this association (Canadian Addiction Survey, 2004), in an attempt to meet the (iv) criterion of causality. One combining factor that has been previously suggested is genetic liability to schizophrenia (Curran et al., 2002). A preliminary study investigating this possibility directly through gene mapping, revealed an association between certain gene alleles and more severe psychotic outcomes following cannabis use (Henquet et al., 2006). However, these finding have not been replicated and their validity has been questioned (Zammit et al., 2011). However, a study by Caspi and colleagues (2005) supports the genetic vulnerability hypothesis as they found an interaction between a polymorphism in the catechol-O-methyltransferase gene and exposure to cannabis. Specifically, they found a five-fold increase in the likelihood of developing schizophrenia among cannabis users with the Val allele for the COMT gene (see Figure 4). Unfortunately, studies investigating direct measures of a gene by environment interaction are in their preliminary stages, and there are many complicated issues associated with gene mapping. For example, it is unlikely that the disor-

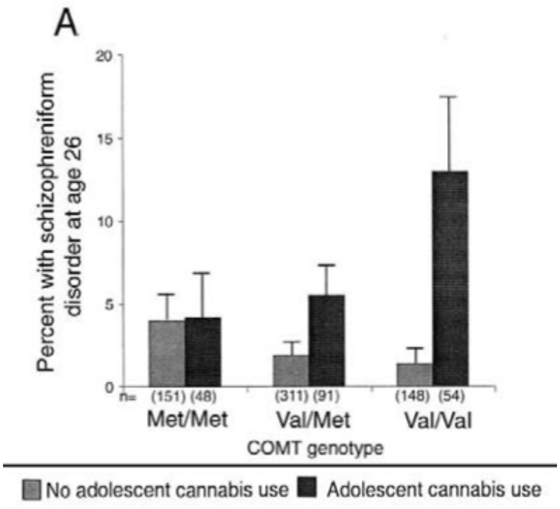


Figure 4. The influence of adolescent-onset cannabis use on adult psychosis is moderated by variations in the COMT gene (Caspi et al., 2005). Shown is the percentage of individuals meeting diagnostic criteria for schizophreniform disorder at age 26.

der can be attributed to a single gene or mutation. Therefore, in the meantime, more tenable experimental designs which investigate indirect measures of a gene by environment interaction should be proposed. Especially considering the social and economic costs of schizophrenia, studies investigating the possible factor(s) associated with strengthening cannabis' influence on psychoses risk are warranted.

Objectives

Investigate whether an underlying mechanism of a gene by environment interaction explains the association between early cannabis use and later development of psychoses. If our predictions are confirmed, this research could point to original approaches for detection and individualized intervention of high-risk individuals.

Hypotheses

A double-blind, placebo-controlled crossover design will be used to explore the following hypotheses: *Hypothesis 1)* schizophrenic patients, and their first-degree relatives, will show a significantly greater sensitivity to the cognitive impairments of cannabis, compared to control subjects; and *Hypothesis 2)* schizophrenic patients, and their first-degree relatives, will show significantly greater psychotic symptoms in response to cannabis, in comparison to controls.

Methods

Measures

Cognitive assessment and analyses of current psychotic experiences will be assessed by a series of self-administered questionnaires.

Procedures

The entire protocol consists of two seperate visits to the lab, seperated by one week. At each visit, participants receive either THC intravenous injections (1.5mg/70kg), or a saline solution, in randomized order. The infusion rate will be set to 20 minutes.

Expected Results

Thirty minutes after the completion of THC administration (T2), which represents the height of intoxication, both schizophrenics *and* first-degree relatives of schizophrenics are expected to show significant cognitive impairments and significant increase in psychotic symptoms, in comparison to control subjects. Compared to their first-degree relatives, schizophrenics will demonstrate an increased vulnerability to the cognitive impairments and psychotic symptoms at of cannabis.

Anticipated Conclusions

If we find that first-degree relatives of schizophrenic patients are significantly impaired by the cognitive and psychotic effects of cannabis, compared to controls, then this would provide evidence supporting a gene-environment interaction underlying the relationship between cannabis use and psychoses. Furthermore, the repeated finding that schizophrenic patients are significantly more vulnerable to the cognitive and psychotic effects of cannabis, compared to controls, will confirm the reliability of previous studies. Lastly, the finding that schizophrenic patients are still significantly more impaired than their first-degree relatives, would indicate the possibility that a protective mechanism exists in a non-clinical population.

Implications

This study provides an indirect means of investigating the influence of genetic risk on the causal association between cannabis use and psychoses. Our results will identify whether genetic risk to psychosis is an objective biological marker capable of delineating a high-risk subgroup from within the heterogeneous cannabis-using population. If this is shown, such a group may be targeted in early identification and intervention programs.

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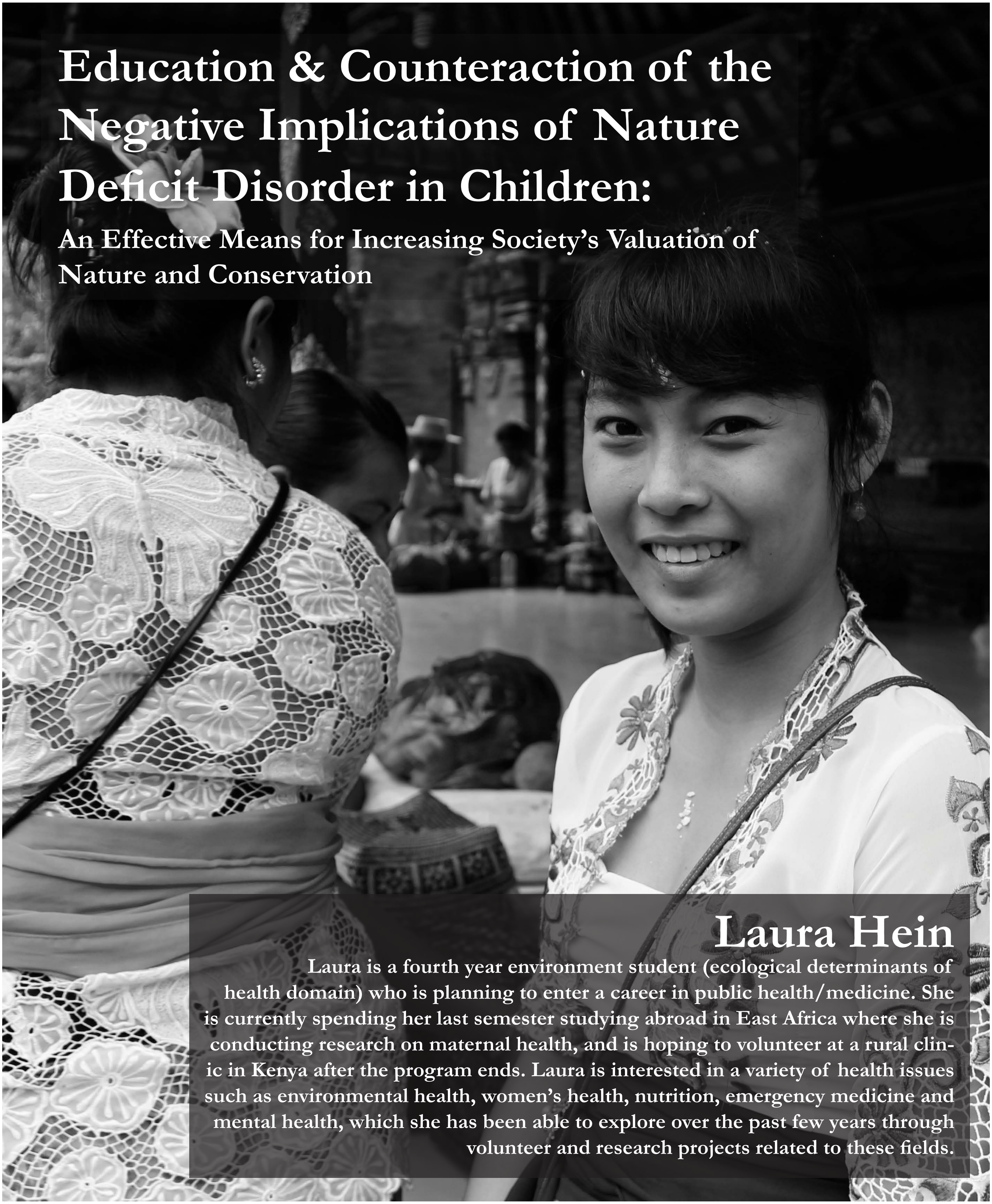
Education & Counteraction of the Negative Implications of Nature Deficit Disorder in Children:

An Effective Means for Increasing Society's Valuation of Nature and Conservation



Laura Hein

Laura is a fourth year environment student (ecological determinants of health domain) who is planning to enter a career in public health/medicine. She is currently spending her last semester studying abroad in East Africa where she is conducting research on maternal health, and is hoping to volunteer at a rural clinic in Kenya after the program ends. Laura is interested in a variety of health issues such as environmental health, women's health, nutrition, emergency medicine and mental health, which she has been able to explore over the past few years through volunteer and research projects related to these fields.

Most people are acutely aware that we are living in a time of environmental crises. At an increasing rate, pollutants are being released into the atmosphere, soil, and water, natural areas destroying wildlife, and exploiting fisheries, fertile land, and water. Other resources are becoming more scarce, an increase in vector-borne diseases, and meteorological events are becoming more severe. This is all occurring under the context of an increasingly warm planet and exponentially growing levels of human population and consumption (Cullinan, 2011). Attempts have been and are continuing to be made to increase concern for our environment to protect the well being and prevent the demise of both human and nonhuman beings on our planet. Although some attempts have been successful, such as the Montreal protocol, which led to significant decreases in the rate of atmospheric ozone depletion, the general trend is that people are too apathetic to tackle and combat the current state of environmental crises.

With this in mind, the question arises: why we are continuing to destroy the world around us when we know that it is harming us, and what can we do about it? There are several reasons why such attempts at environmental salvation have likely been unsuccessful. Firstly, messages that are aimed at changing such behavior often involve behaviors from which the actor would not be directly benefited or harmed if he or she failed to pursue them (Davis, 1995). Secondly, people are more susceptible to discounting the well being of the future in decision-making when they are distanced from nature (Van der Wal et al., 2013). Thirdly, people are currently becoming more isolated from their surroundings, and it is unlikely that people will have concern for the environment unless they spend time outdoors (Logan & Selhub, 2012). My belief is that increasing information about nature deficit disorder can both directly and indirectly tackle problems associated with initiating pro-environmental decision making, and will also lead to an overall increase in the reverence that society has for the Earth.

To begin with, a description of what nature deficit disorder (NDD) is, what has caused it, and what its implications are for our children must be provided. Nature deficit disorder is a general term for the negative effects that children experience from not spending enough time in nature, which are influencing all areas of life including mental, emotional, cognitive, social, and physical well-being (Louv, 2005). This term was coined by Richard Louv, a non-fiction author, which was described in his book *Last Child in the Woods-Saving our Children from Nature Deficit Disorder.* Nature deficit disorder is becoming a more serious phenomenon as children, especially those in the Western world, are spending less and less time outdoors (Louv, 2005). For example, one study in the U.S. interviewed mothers and discovered that only 26% of their children played outside every day, while 70% of these mothers recalled having played outdoors every day when they were growing up (Charles & Louv, 2009).

Firstly, the mental health of children is suffering as they are spending more time indoors, where they no longer receive the mental health benefits of playing outside. Such mental health associated with playing outdoors include decreased irritability and anger, heightened attention, and improved mood and relaxation (Logan & Selhub, 2012). In fact, it has been demonstrated that more relaxed brain waves, slower heart rates and lower blood pressures can be derived from simply viewing scenes that have vegetation in them (Logan & Selhub, 2012). Thus, not surprisingly, it has demonstrated symptoms of mental illnesses such as depression, anxiety, behavioral conduct disorders, and attention deficit hyperactive disorder can be alleviated when children play outside (Wolf & Flora, 2010; Louv, 2005). Because children are not receiving these psychological benefits from playing outdoors, there has been a sharp increase in the number of children that are being diagnosed with and medicated for mental illnesses such as depression and A.D.H.D. For example, a report published in 2003 announced the period of time five years prior, there was a 60 percent increase in the number of children prescribed antidepressants-the largest increase was among preschool children (Louv, 2005). Such increases in rates of depression can in part be attributed to the decrease in the amount of time that children are spending playing outside. Additionally, up to 30% of children in certain schools are now being prescribed Ritalin (Louv, 2005). However, it is highly unlikely that many of these children are being misdiagnosed with A.D.H.D because they are eliciting signs associate with the disorder. For example, when children are not allowed to play outside and "get out their energy," they are more likely to fidget and will have a decreased ability to pay attention in class (Louv, 2005). Thus, many of these children may be "cured" by simply spending more time playing outside (Louv, 2005).

In terms of educational and cognitive benefits, it has been demonstrated that children who learned in an outdoor settings showed benefits in language arts, math, social studies, and science, not only in terms of test scores but also in problem solving skills, motivation to learn, and self-esteem (Louv, 2007). Additionally, spending time outdoors has been shown to have a positive influence on children' imaginations and creativity, such as by being more likely to make up their own games and rules when playing in more natural areas rather than on flat playgrounds (Louv, 2007). Unfortunately, with the increase of nature deficit disorder and the infrastructure that allows for it, children are failing to receive these educational and cognitive benefits associated with spending time outdoors.

Interestingly, children who play outside tend to have more friends than those who spend the majority of their time inside, and it has also been demonstrated that racial minorities and females are more likely to be included when children are playing in natural areas (Louv, 2005). Children suffering from nature deficit disorder will unlikely experience such benefits.

In addition to the cognitive, psychological, and social benefits children are receiving from not spending enough time indoors, they are also suffering in terms of their physical health. For example, between the years 1988-1989, obesity rates in children increased by 36 percent among children between the ages of two and five, largely due to decreases in the frequency in which children are playing outside (Louv, 2005). Indeed, children who play outdoors are much more likely to be physically active and tend to have better immunity than those who tend not to (Baranowski et al., 1993; Grahn et al., 1997). In fact, the sheer proximity to green spaces is positively correlated with increased levels of health and physical activity (Stigsdotter et al, 2010). Specifically, improvements in physical activity in children have demonstrated improved agility, fine motor coordination, balance, and physical health benefits associated with low levels of stress (Grahn et al., 1997). One such reason for improvement is that brain connections that improve coordination and balance are stimulated when people are presented with the more challenging environments that exist outdoors, which tend to have uneven and complex surfaces that include things like slopes, tall brush, and boulders (Fjortoft, 2004). These physical health benefits are examples of what children who do not play outside will largely fail to receive.

The question that then follows is what are the societal and contextual factors that are contributing to the continual expansion of nature deficit disorder in children? The largest factors that are contributing to this phenomenon involve the combination of a rise in the use of technology in children, increased safety concern among parents for their children playing outdoors unsupervised, increased neighborhood rules that limit the way in which and areas in which children can play, a lack of sufficient time to play outside, a decreasing provision of environmental and outdoor education in schools, and decreasing availability of green space (Louv, 2005).

In terms of technology, we currently find ourselves in a day and age in which the use of various technologies including laptop computers, cell phones, iPods, iPads, and television are becoming more frequently used each year (Louv, 2005). In fact, in America, children between the ages of eight and eighteen have been found to spend around 75 hours each week on electronic media, which includes an average of playing video or Internet games for almost three hours and watching T.V. for five hours each day ("Daily Media Use," 2010). Thus, children are choosing to spend more time on these "gadgets," which can often be very addicting, rather than playing outside. For example, one fifth grader, when questioned about why he preferred playing inside better, replied matter-of-factly, "'cause that's where all the electrical outlets are'" (Louv, 2005).

Additionally, we are entering a day and age where there is an increasing fear for so called "stranger danger," as the media repeatedly publishes sensationalist stories of horrific events, such as child abductions and rapes (Louv, 2005). As exposure to media stories increases with the expansion of social media, people become more exposed to these sensationalist stories. These news reports are causing parents to believe that child abductions and other criminal acts towards children occur frequently and are becoming a more prevalent issue, when in reality, the number of child abductions by strangers has remained steadily at around one hundred per year in the U.S. for the past two decades (Louv, 2007). Additionally, the total number of violent acts directed towards young people has actually decreased to levels lower than those even in 1975 (Louv, 2007). Thus, parents may be much more anxious than they need to be about their children playing outside, and could enhance the safety for their children of playing outside by giving them a cell phone to carry in case of an emergency and having them play with other friends (Louv, 2005). There is even the argument that if parents are too protective over their children, the children will not be able to develop a sense of independent judgment, street smarts, and self-esteem, which may put them at an even higher risk for getting into dangerous situations (Louv, 2005).

One reason why there have been cuts to environmental and outdoor education has to do with the legislation of the No Child Left Behind Act ("No Child Left Inside," n.d.). This act has led to increasing funding for math and reading-subjects in which teachers are now feeling pressured to have their students succeed, at the cost of learning about other subjects ("No Child Left Inside," n.d.). For example, many teachers are drawing attention and resources away from teaching social studies and science, and are therefore decreasing the amount of time they spend on outdoor education and field trips where these subjects are often taught. This is due to increasing pressures for their students to perform well on standardized tests for math and science ("No Child Left Inside," n.d.). In addition, many teachers are no longer teaching science material that will not be tested for on standardized tests for science subjects ("No Child Left Inside," n.d.).

Finally, although not the primary factor in the decrease in the amount of play that children are getting indoors, there has been a decrease in the amount of available green space over time population and consumption decreases, leading to deforestation and development where natural areas once existed.

Along with increases in the use technological devices and a decrease in the perceived safety for children of playing outside, there have also been a growing number of rules placed on children that are restricting the areas and ways in which they can play (Louv, 2005). Some examples of such restrictions, which are either placed by the cities or neighborhood associations, include: bans on tree house building out of fear that they may pose a fire hazard, or making it illegal to construct a tree house unless a building permit is obtained, banning building forts in certain areas, prohibiting chalk drawing or adding basketball hoops to neighborhoods in order to preserve a certain manicured look in the area, and rules that limit where people are allowed to walk in natural areas (Louv, 2005). Thus, often times communities are contributing towards the isolation from the outdoors that children are currently experiencing, rather than striving to combat it.

Now that nature deficit disorder has been defined and contextualized, the belief that increasing awareness about this disorder is key for increasing pro-environmental thought and behavior will not be discussed.

One prevalent reason that messages about the harm humanity is causing to the Earth and the call to action are not being heard likely have to do with the fact that the actions people are being asked to take in order to preserve the environment are often abstract, in that the benefits of the changes they are asked to make cannot be directly perceived or received by the person taking the action (Davis, 1995). For example, if one sells one's car and starts using public transportation to get to where he/she need to go, he/she will not be able to perceive the decrease in greenhouses gases and pollution that are emitted each day because of the action taken. In addition, the individual will be unable to perceive the direct benefit to him/herself associated with this decrease in emissions. For example, one will is in fact not likely to be-personally less as risk for respiratory disease from air pollution because he/she individually has stopped driving a car. In fact, one study that investigated how messages should best be framed in order to communicate important information regarding environmental protection found that, "intentions to participate in environmentally-responsible behaviors are best fostered through communications which present simple, clear, and understandable actions prevented in a context which stresses how the target will be personally, negatively affected if they continue to be inactive participants in environmentally-responsible behaviors" (Davis, 1995). Thus, according to this theory, a pro-environmental message like, "stop driving your car to work" may be ineffective because the person cannot comprehend or measure how they, specifically, will benefit from their own actions. In addition to being ineffective at changing behavior, it seems unlikely that these types of messages would increase the extent to which people care for the environment.

Increasing education and awareness about nature deficit disorder is one example of the type of message that would successfully promote an environmental behavior in which if the person does not engage in the behavior the messages is trying to promote, he/she will be "personally negatively affected" by failing to do so (Davis et al, 1995). For example, if the parent notices that their daughter is socially isolated, obese, unhappy, or doing poorly in school is because she are not spending enough time outdoors, the parent will likely feel a direct obligation to resolve this problem by making sure their child plays outside more, as they will benefit directly by having healthier, happier children. In this situation, parents and possibly their children, will be able to monitor directly the benefits that their actions in having their children play outside more will bring about (which was not possible in the air pollution example presented above). Thus, parents will likely take information about what nature deficit disorder is and how it can be combated seriously due to the fact that if they do not, they will continue to be directly, negatively, affect by failing to do so. Because information regarding nature deficit disorder and how it can be reversed will be likely be taken seriously, parents and communities will likely begin to have an increased reverence for the environment overall, as they realize the importance that it holds for well-being of their children, and maybe even begin to experience some of these benefits themselves as they spend more time outdoors with their children.

Next, in order for people to have concern for nature and conservation, and to be able to think about the long-term consequences of their actions, it has been demonstrated that people must be exposed directly to nature, which is mediated in part by increases in empathy (Logan & Selhub, 2012; Schultz, 2000). For example, one study suggested that increased exposure to nature likely increases *nature relatedness* (the realization and appreciation for the fact that all things in the world are interrelated), which was found to be positively correlated with pro-environmental attitudes and behaviors, such as in regards to pet ownership or vegetarianism (Nisbet & Zelenski, 2009).

Therefore, a paradox exists in which our children, the world's future decision makers, are becoming more and more isolated from nature, while they will be in a position in the future where they will be required to a larger extent than ever before to make pro-environmental decisions in order to protect their well-being. What can be deduced is that in order for our children and future generations to have the empathy for nature that will motivate them to protect it, it is necessary that they become re-acquainted with it. This process can be explained by social psychological theory. When one spends time in nature, they will begin to feel that they are a part of the environmental community, and will therefore incorporate nature into their concept of their "self" (Mayer & Frantz, 2004). Thus, if nature begins to feel like a part of them, destroying nature would be equivalent to destroying oneself (Mayer & Frantz, 2004). The understanding that oneself is intricately connected to the larger whole can be an effective means to increase compassion for the environment around us has been shared by many such as Aldo Leopold, who expressed in his book *A Sand County Almanac,* "we abuse land because we see it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect" (Leopold 1949). The concept he discusses- discovering that individuals are embedded in the world rather than separate from it could effectively be enhanced if we were to spend more time with our natural surroundings.

Then the question arises- how can we motivate individuals to spend more time outside? Increasing the amount of time that people spend outside and thus the extent to which they care for the environment could be facilitated by increasing awareness about the effects that nature deficit disorder is having on children. As parents learn about the terrible effects that nature isolation is having on their children, they may be more likely to make sure that their children spend time outdoors, and to push for society to provide the infrastructure and resources necessary to allow for it. If children are able and encouraged to play outside more, they will receive more exposure to nature and will therefore have increased levels of appreciation and concern for Mother Earth, assuming the idea that exposure to nature is necessary in order to have concern for it (Logan & Selhub, 2012). In doing so, we can ensure that children are developing a love and appreciation of the natural environment from a young age. This will ensure that this love and appreciation for nature is not something that we try and coerce people to feel when they become adults, but rather something that develops naturally from childhood. Additionally, parents today may also experience increases in empathy for nature as they play outside more frequently with their children. Thus, parents can help to alleviate and prevents symptoms that their children are experiencing of nature deficit disorder while at the same time helping to create a future generation of individuals who are willing and ready to combat the environmental crises as they become more compassionate about the Earth through spending time with it.

Finally, the discount effect is one of the reasons that sparking changes in thought and actions pertaining to the environment is so difficult. The discount effect refers to the fact that we will value receiving a reward immediately more than we value receiving that reward, or an even larger one, in the future (Vander Wal et al., 2013). This is one of the most prevailing problems contributing towards the environmental crises, as people are valuing short-term over long-term well being. For example, the overexploitation of marine fisheries is largely attributed to the fact that nations believe it is more important to provide people with an unlimited amount of fish in the here and now than to ensure that there is enough leftover for future generations which could be achieved through sustainable fishing practices (McGinn, 1998).

The fundamental reason that discounting is so rooted into human thought and behavior stems from an evolutionary instinct-which is no longer relevant for many people in the world, but still exists within us. Our ancestral cave people lived in a time when food was difficult to acquire and conditions were often dangerous, which meant that valuing short term over long term rewards often meant the difference between life and death (Van der Wal et al., 2013). Unfortunately, this tendency to discount the future has carried through to current generations and has dangerous implications for the world we currently live in.

It has been demonstrated in several studies that individuals who are exposed to nature may be highly susceptible to discounting the future (Van der Wal et al., 2013). This may be because when one is in a more natural environment, he or she may be more aware that he or she is embedded in the natural world, and may therefore be more likely to make decisions that are better for the environment as a whole (Leopold, 1949). For example, those who are told to walk through an urban area or to view pictures of urban areas are more likely to demonstrate the discount effect than those who are told to walk through a natural areas or view pictures that had vegetation. The extent to which they discounted the future was determined by discovering that those exposed to natural settings were more likely to choose receiving smaller monetary rewards immediately over receiving larger receiving larger monetary rewards 90 days from the study day (Van der Wal et al., 2013).

With such studies in mind, it becomes evident that increasing awareness about nature deficit disorder will indirectly decrease the extent to which these children may be vulnerable to the discount effect when they become adults responsible for making decisions that can either protect or hurt the environment. If children begin to spend more time outdoors from a young age after parents become more educated about the dangers of nature deficit disorder, these children will likely be less susceptible to the discount effect when they become adults. This would be due to a combination of having early exposure to natural settings at a young age, and the fact that those who are exposed to and appreciate nature at a young age are more likely to have concern for it when they grow up (Van der Wal, 2013; Logan & Selhub, 2012; Mayer & Frantz, 2004).

In conclusion, if combatting nature deficit disorder is to be used as means in order to increase the care current and future generations have for the environment and therefore the extent to which they will protect it, specific, viable, and effective solutions must be investigated for getting children to play outside again. There needs to be an increase in education about this issue, which could be brought about by having health care professionals and physicians distribute flyers and put up posters that have information about this phenomenon (Louv, 2007). In addition, factors that have caused nature deficit disorder to become so prevalent in the first place must each individually be targeted.

In terms of technology, parents could help to engage their children in fun and exciting activities outdoors that provide them with fun alternative to using electronic media (Louv, 2005), such as planning scavenger hunts for their children outside, or engaging in outdoor art projects together that involve using flowers, leaves, etc. This, in addition, could be paired with restricting use of electronic devices, which could be paired with information provided directly to the child on the benefits of playing outside rather than spending their time on "gadgets" (Louv, 2005). Parents may feel bad if they are restricting the amount of time that children use electronics for everyday. However, the benefits of doing so largely outweigh the costs of doing so. Additionally, as a child spends more time outside, he or she will likely begin to appreciate the fact their electronic use was restricted.

The idea that "your kids will thank you

later" expressed above has been directly drawn from my own childhood experience. When I was a child, I used to watch hours and hours of television each day. One day, while my siblings and I were watching television after preschool, my mother walked into the room, jabbed the power button, and announced that she had had it with our sedentary indoor lifestyle and that from that point onward, television watching was forever banned from our household. As I wailed and convulsed on the rug in hysterics, my little fists punching the sofa, I felt certain that my world had come to an end. But what I would not realize for some time was that this household television ban would be the best gift that my parents could ever have given me, as my days became filled with rich and fulfilling memories such as: watching with amazement as a butterfly emerged from a cocoon, unfolded its wrinkled wings, and took its first flight, turning over logs to look for wiggling earthworms, learning that I could plant sprigs of certain plants and they would grow in the ground, and climbing the sugar maple tree in my front yard, descending only when the branches narrowed and wavered ominously under my feet. When reflecting on my childhood, I can say with confidence that spending my time sitting inside passively watching the screen could never have replaced these moments of exploration, imagination, learning, joy, fascination with the intricacies of life, and the empathy and compassion for nature that grew inside through this connection to nature, which I consider to have been vital for every stage of my development.

In terms of increasing available green space, there could be an expanded effort by community members push their cities and governments to not only protect more of the existing green space, but also to re-green certain areas (Louv, 2007). Such re-greening could be conducted through converting abandoned plots of land into green spaces, arranging new housing developments such that they surround a central green area, and increasing the number of community gardens or green roofs in cities (Louv, 2007).

In terms of safety, it is necessary that parents become aware that the likelihood that their children will be harmed while playing outside unsupervised is very low, especially if they are with friends and have a cell phone. Parents should also be encouraged to allow their to play in a more free manner, such as allowing them to climb trees, go outside when it is raining, play in the mud, and run around on uneven terrain (Louv, 2005). In order to lift the safety concerns that parents have for children, they must be educated about the benefits that their children would receive from this type of free play, and become aware that they may be causing their children more harm than good by placing so many rules on them to protect them from dangers they believe to be more frequent and serious than they likely are in reality (catching a cold, scraping one's knee, etc.)

Additionally, there should be increasing education to cities and neighborhood associations about the negative effects children are experiencing due to these rules and regulations about where children can play. This could be bolstered by an increased involvement of parents and community members to fight such stringent regulations in their communities.

Finally, decreasing the occurrence of nature deficit disorder and therefore increasing the extent to which children and future generations care for the environment could be provided by increasing the amount of outdoor and environmental education and exposure that children receive in school. In opposition to the No Child Left Behind act, a coalition formed who have cleverly named their group, "No Child Left Inside." This group is aware of the negative impacts that children are experiencing from not spending enough time in nature, and are therefore working towards encouraging congress to pass a legislation that would require the scope of the No Child Left Behind Act to be expanded to include environmental education ("No Child Left Inside," n.d.). Thus, more initiatives such as these that directly target the education system could help to decrease symptoms of nature deficit disorder by sending kids back outside, which will in turn increase the extent to which they care for the environment (Logan & Selhub, 2012; "No Child Left Inside," n.d.).

In taking these measures to reverse nature deficit disorder, there will hopefully be an increase in the overall respect and love that people have for the Earth, which will be revealed in their decision-making and actions.

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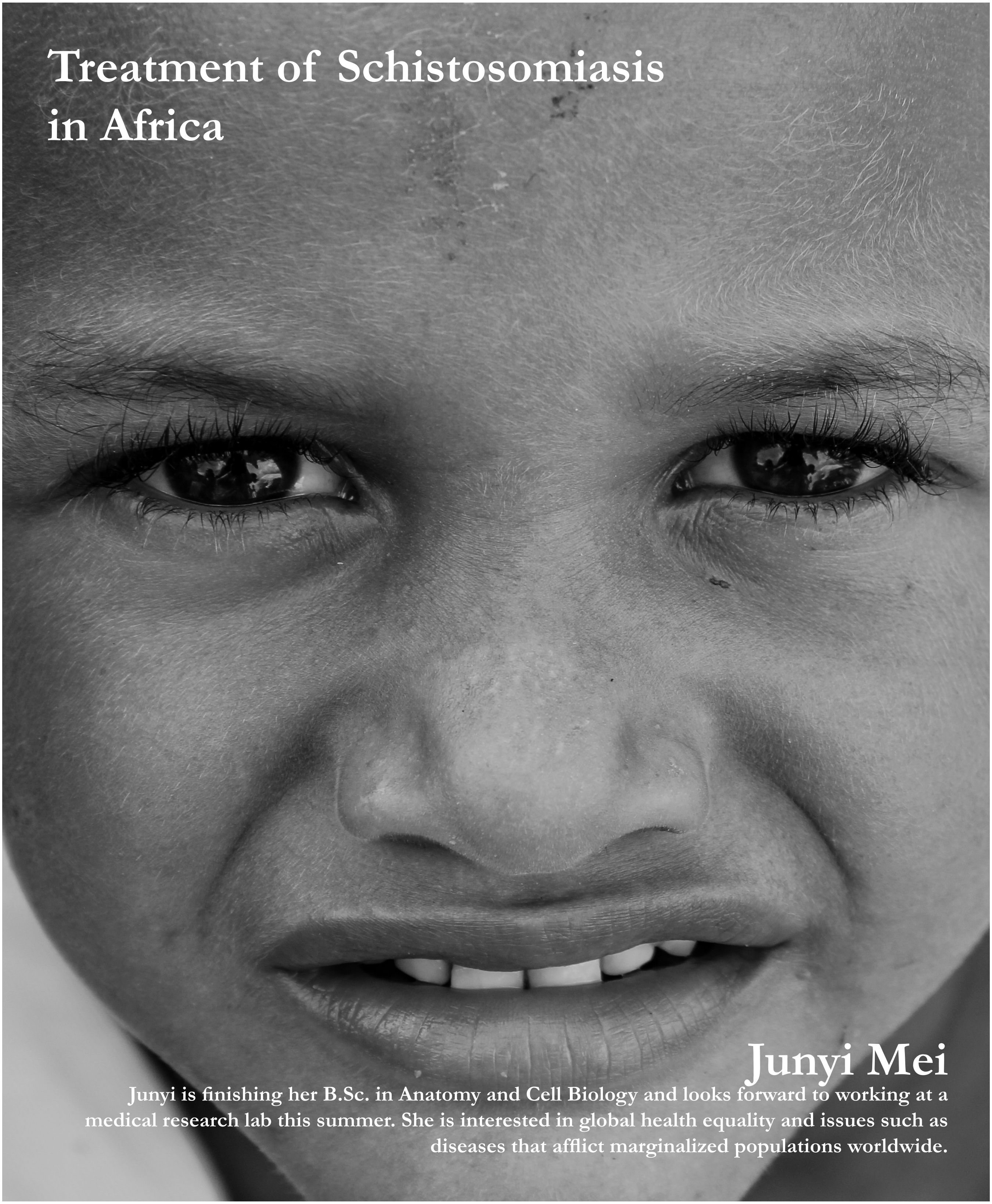
Treatment of Schistosomiasis in Africa



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Schistosomiasis is part of a group of diseases that generally afflict the poorer regions of the world. These diseases are collectively called neglected tropical diseases because historically, little funding has been put into researching cures or treating the afflicted population; instead, efforts have been focused on more fatal diseases, such as AIDS, tuberculosis, and malaria (WHO, 2013). Schistosomiasis is caused by tropical flatworms whose larvae enter the body directly through the skin and develop into reproducing adult worms (Thétiot-Laurent et al., 2013). The body's reaction to the worms' eggs results in chronic "abdominal pain, diarrhea, and blood in the stool," which, over time, causes permanent damage to the vital organs of the body (WHO, 2013). Although schistosomiasis has a low mortality rate, severe economic and health consequences arise from this debilitating disease; it impairs growth and cognitive development in children and decreases productivity and quality of life in adults (WHO, 2013). Over 90% of cases are found in Africa, affecting over 200 million people (Steinmann et al., 2006; Utzinger et al., 2009) and causing more than 200,000 deaths each year (WHO, 2013). This number is likely to be an underestimation since lighter infections may not be detected by current diagnostic methods (King, 2010). These factors make schistosomiasis a significant global health issue.

In recent years, more and more people have become aware of neglected tropical diseases, and both donors and governments have started to invest money and research efforts to treat schistosomiasis on a global scale. International organizations, such as the World Health Organization (WHO), have also coordinated efforts to implement treatment in various African countries. In 2002, the WHO passed Resolution WHA 54.19, aimed at decreasing the number of children infected by schistosomiasis by 75%. Although this target has not been achieved, some progress has been made. A decade later, the WHO passed Resolution WHA 65.21 to encourage governments to intensify the control of schistosomiasis by calling countries with lower transmission rates into action (WHO, 2013). The development of praziquantel, a safe and effective drug for treating schistosomiasis, has accelerated these efforts (Stothard et al., 2009). It has been included in a rapid impact package of several drugs, used in mass drug implementation campaigns that have been met with considerable success (Rollinson et al., 2013). However, issues arise as to what future course of action should be taken to build on this success and strive towards elimination of the disease altogether. For sustainable control of schistosomiasis, morbidity control programs should continue to be used in the short-term, but they should be complemented and eventually replaced by environmental measures in the long-term.

Morbidity-Control Programs

Morbidity control programs have been widely successful. After the introduction of praziquantel in Germany in the 1970s, it has become the sole commercially available drug used for the treatment of schistosomiasis (Hotez et al., 2010). Praziquantel is cheap, at just 20 cents per dose, safe for children and pregnant women alike, and extremely effective against adult worms (Doenhoff et al., 2009). Cure rates of 80 to 90 percent have been observed (Doenhoff et al., 2009). The latter half of the twentieth century saw praziquantel become increasingly affordable on the international market (Stothard et al., 2009). In 2008, Merck KGaA, a biochemical company, partnered with WHO to further make available the drug through the Merck Praziquantel Donation Program which donates 200 million tablets over the next decade to treatment efforts. Morbidity control programs are based on preventative chemotherapy, which involves the mass administration of drugs to a population once or twice a year without the need for individual diagnosis (USAID, 2009). Since many of those afflicted have neither the knowledge nor resources to seek treatment, these programs are comparatively effective in treating those in need without too high a cost (Hotez and Fenwick, 2009).

In addition, mass drug administration of several drugs together, which are safe to take even if one is not infected is viable due to the "considerable geographical overlap and co-infection" of many neglected tropical diseases (Brooker et al., 2009) and eliminates the need of individual screening. A rapid impact package of five drugs has been developed to treat five of the most harmful neglected tropical diseases all at once (Giving What We Can, 2012). Due to the "strong safety profile" of the drugs, not only can nurses and doctors administer them but, with some basic training, volunteers and teachers as well (Stothard et al., 2009). To target school-aged children who are most at risk, the drugs are administered through schools, taking advantage of the existing "educational infrastructure and resources" (Miguel and Kremer, 2004). The drugs keep for four years without refrigeration, reducing distribution costs (Giving What We Can, 2012). These factors all help to alleviate the strain on already overwhelmed local health systems, as well as reduce the costs of undertaking such an enormous task. Morbidity control programs have been overall successful. In 2009, 21 out of the 76 (27.6%) afflicted countries reported to the WHO a total of 19.6 million people who had been treated (Rollinson et al., 2013). In addition to the development of a suitable drug, administration aspects have been streamlined to reduce costs while making a significant impact.

Although morbidity control based on mass drug administration has been fairly successful in the short-term, it is not sustainable due to certain limitations of the drug and the inability of administration programs to accommodate them. Praziquantel is not as effective against worms in the larval stage and does not prevent reinfection (Rollinson et al., 2013); hence, treatments must be repeated annually in highly afflicted populations and every two years in other areas (Hotez and Fenwick, 2009). Problems also exist in the administration of treatment through these campaigns. Although school-aged children, who have the highest risk of being infected, are targeted, an estimated 40% of children in sub-Saharan Africa are not enrolled in schools (Rollinson et al., 2013). Infants and preschool children are also not treated (Stothard et al., 2013). Efforts have been made to widen the target population to include other high-risk group such as pregnant women and those who work in infected waters (Savioli et al., 2009). A move towards community-based intervention has been made to close this "significant treatment gap" (Stothard et al., 2013). Still, less than 50% of the high-risk population receives treatment, while many healthy people in the areas of administration are treated unnecessarily. An improvement could be in "initial disease surveillance," to focus drug delivery on the areas that truly need it (Stothard, 2009). The geographical distribution of schistosomiasis is being mapped with Bayesian geo-statistical modelling, using data collected primarily through school-based questionnaires, microscopy, and reagent strips (Chammartin et al., 2013). These methods require a minimum of tools and staff, but are not, unfortunately, the most accurate (Rollinson et al., 2013). New diagnostic tests are still in development; for example, a new test called POC-CCA is currently being tested, whose "accuracy, performance time, and cost all surpass the universally used Kato-Katz test" (Speich et al., 2010; Colley et al., 2013).

Even if preventative chemotherapy programs have been met with considerable success, there is the need to improve "identification of the most vulnerable groups and promote equitable access" (Gray et al., 2010) while maintaining the low levels of morbidity that have been achieved. Campaigns would have to be repeated yearly because, once interrupted, morbidity could return to pre-treatment levels within 18 months to 2 years (Gray et al., 2010). As a result, morbidity-based control programs need continuous input of money over many years and rely on ceaseless funding by external donors and governments. Solely using morbidity control programs cannot be considered effective because they are not sustainable with the current resources available.

Funding

The lack of funding prevents sustainable treatment of schistosomiasis. There are severe shortages of praziquantel; Merck KGaA's donation of 200 million tablets a year is just a small fraction of what is required (Hotez et al., 2010). Even though each praziquantel tablet costs just 20 cents, the scale of the goal is enormous: approximately $100 million a year is required to purchase the 1200 million praziquantel tablets needed to treat a target of 400 million people (Hotez and Fenwick, 2009). Furthermore, Hotez and Fenwick estimate ancillary costs (including delivery, advocacy, training, monitoring, and evaluation) of an additional $100 million. These efforts must then be sustained over several years. Evidently, treating such a large population is extremely costly. In recent years, the Bill and Melinda Gates Foundation and other private donors, the U.S. and British governments, and major pharmaceutical companies have donated large sums of money to treat neglected tropical diseases, with over $350 million committed until 2013 (Gray et al., 2010). However, Hotez and Fenwick estimate that funds of two to three billion over the next five to seven years are required to sustain treatment efforts. Although funding in this area has greatly increased with growing international interest in these diseases, it remains vastly short.

Secondly, efforts made by various groups—charities, governments, the WHO—must be coordinated. In recent years, there has been significant progress in integrating different programs into larger, more effective initiatives. These donor agencies have collaborated with several afflicted African countries and WHO and its regional offices to implement treatment for neglected tropical diseases (Stothard et al., 2009). In addition, a variety of different collaborative approaches to treating schistosomiasis have been initiated, such as the Schistosomiasis Control Initiative (SCI), CONTRAST, and SCORE (Stothard et al., 2009). Nevertheless, even with better coordination efforts, the lack of funding limits what can be done to sustain the treatment of schistosomiasis.

Environmental Measures

Preventing infection by improving environmental factors is another approach to treating the schistosomiasis epidemic. In particular, transmission-based control programs should be explored in addition to morbidity- based ones (Rollinson et al., 2013). Snail control through biological and chemical means, sanitation, and health education are some of the environmental means that can be used to limit the transmission of schistosomiasis (Gray et al., 2010). Past successes in eliminating schistosomiasis in countries such as Egypt, Brazil, and China have demonstrated the effectiveness of complex, sustained national integrated programs based on these means (Utzinger et al., 2005) when complemented by morbidity control. In Africa, waning rates of compliance in preventative chemotherapy campaigns have been observed because people in the treatment areas may not be sufficiently aware of the significance of the health problem at risk due to the low mortality rates of the disease (Rollinson et al., 2013). Health education in schools and communities to increase knowledge and understanding of schistosomiasis transmission is important for increasing treatment participation. Snail control, on the other hand, has not been sufficiently developed and has been found to be costly and environmentally damaging (Fenwick et al., 2011).

Afflicted countries must take ownership of schistosomiasis control through political commitment and active community involvement (Aagaard-Hansen et al., 2009). Doing so would empower the local people, for they would be in control of their own health. Local research networks and integration of vertical programs into existing health care systems should also be pursued, in addition to national control programs (Aagaard-Hansen et al., 2009). Such an approach would be beneficial for both donors and recipients: as recipient countries take matters into their own hands, donors no longer need to give as much support as before and can focus funds on research and other long-term solutions. Although the quickest and cheapest way to obtain results is no doubt through morbidity control, it is only a temporary fix that cannot be sustained. Permanent long-term results can only be achieved through environmental health measures aimed at creating a lasting improvement in sanitation and living conditions (Rollinson et al., 2013).

However, such measures are comparatively difficult to implement at this point. The WHO targets for safe water, sanitation, and hygiene are far from being met (WHO, 2010). An effective national control program would require significant political commitment to organize the complex inter-sectorial collaboration and community involvement needed for “the design, implementation, and long-term monitoring of the impact and cost-effectiveness of hygiene, water, and sanitation interventions” (Rollinson et al., 2013), something that afflicted countries do not yet have. The health and social institutions in many of the afflicted African countries are not yet sufficiently developed to take control of such a large task; some have neither enough desire nor resources to do so (Rollinson et al., 2013). Even if a national control program were to be implemented, past examples in other countries have demonstrated that success in schistosomiasis control comes gradually (Utzinger et al., 2005). Thus, continuous support from donors and governments are necessary for such a program to take place and be sustained over many years. At present, it is not feasible; instead, morbidity-based programs should be continued in the short-term while more permanent fixes are being developed.

Researching a Cure

The need for research is omnipresent in both the short-term and long-term. There is always the risk of the flatworms developing drug resistance against praziquantel; consequently, signs of resistance should be carefully monitored and research and development of an alternative drug must stay ahead. Since the development of a vaccine would be an immense step in eliminating schistosomiasis, vaccine research should also be a priority (Gray et al., 2010). With growing interest in neglected tropical diseases in recent years, more research is being done. Incentives offered by governments and public-private partnerships encourage companies to invest in new drugs and vaccines for neglected tropical diseases. For example, the U.S. Food and Drug Administration priority review voucher is awarded to a company that has obtained approval for their treatment and can later be used "to accelerate review of an unrelated drug" (USAID, 2009). The multidisciplinary CONTRAST project established an African research network for local schistosomiasis research and an open-access global neglected tropical diseases database for data sharing to promote "effective research partnership" (Bergquist, 2013). In addition to drug and vaccine development, research could focus on diagnostic tools as well as on the acceptability of diagnostic and screening procedures and determinants for treatment seeking practices and adherence, among other social science factors (Aagaard-Hansen et al., 2009). Although there are many research efforts in progress, insufficient funding restricts these efforts (Keiser and Utzinger, 2012); furthermore, the drug development pipeline is long and takes many years for applicable results (Stothard, 2009). Thus, treatment of schistosomiasis continues to rely on morbidity control programs.

Conclusion

Although large-scale preventative chemotherapy has proved to be an "affordable, feasible and effective strategy" for schistosomiasis control in African countries (Rollinson et al., 2013), limitations of praziquantel necessitate continuous donor support over many years. Control programs based solely on morbidity control will be neither completely effective nor sustainable, but transmission control through environmental measures is not yet practical. Afflicted African countries currently do not have enough desire or resources to implement a national control program focused on improving sanitation, health systems, and health education (Rollinson et al., 2013). Therefore, morbidity control programs should be continued in the short-term. Perhaps, reducing the disease in the short-term would help give the afflicted population tools to break free of the so-called poverty cycle, where being sick with disease impairs one's ability to work or achieve one's full potential and thus, perpetuates one's poverty. The afflicted countries can then develop the resources needed for long-term management of schistosomiasis and move towards the ultimate goal of elimination. In the long-term, there should be a shift to national integrated control programs centered on improving sanitation, health systems, and health education in afflicted countries, as demonstrated by past successes in China, Brazil, and Egypt (Stothard et al., 2009). Such an approach gives permanent benefits while empowering local governments. All in all, widespread treatment and elimination of schistosomiasis is possible, but considerable time and effort, with the cooperation of many parties, are needed to achieve such a goal.

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