

Human Papilloma Virus, Vaccination and Social Justice: An Analysis of a Canadian School-Based Vaccine Program

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Social justice has strong historical roots in public health. This does not mean that we always understand what it entails when conducting an ethical analysis of a particular public health program. This article shows that Powers and Faden's theory of social justice can provide important insights and nuance to such an analysis. The Ontario human papilloma virus vaccination program that is underway in Canada provides an important and timely case where we can surface ethical issues pertaining to social justice that may otherwise remain unarticulated in the context of this program. This analysis focuses on the normative issues raised by the prioritization of a school-based program for girls only. It also examines the relevant domains of well-being identified in Powers and Faden's theory to see whether the program is likely to enhance the well-being of those for whom it is most important. Finally, the role of vaccines in general in promoting well-being is discussed.

Introduction

The historical roots of public health in social justice are strong. But what do we mean by social justice, and how do we know whether a public health intervention will create or lessen inequity and which inequities are unjust? What factors need to be taken into consideration before we can make the claim that something will help remediate unjust inequities? In their book, *Social Justice: The Moral Foundations of Public Health*, Madison Powers and Ruth Faden ask us to consider not only just the distributional aspects of justice but also those aspects which pertain to the remediation of the conditions which create social injustice and interfere with the well-being of particular groups (Powers and Faden, 2008). In their non-ideal theory of justice, in contrast to similar capability approaches (Sen, 1979; Nussbaum and Sen, 1993; Nussbaum, 2001), the *realization* of human well-being is morally important, as opposed to merely providing the conditions for its achievement. Their articulation of domains of well-being, and their discussion about priority setting provides us with a set of useful ways of thinking about social justice, and focuses our attention on a number of issues that will help us to determine whether a particular public health intervention is likely to improve the well-being of the worst off in our society.

For public health, the realization of well-being frequently involves taking measures to prevent ill health. Vaccines have been one of the most successful public health tools for preventing disease at the population level. However, vaccines can have the paradoxical effect of creating iatrogenic inequities (Olowokure *et al.*, 2003) and increasing the burden of disease (Panagiotopoulos and Georgakopoulou, 2004), despite the fact that vaccination programs produce large absolute reductions in population-level risk of disease (Crowcroft *et al.*, 2012). This makes vaccines an interesting ethical case to examine from a social justice perspective. In addition, as Verweij and Dawson have pointed out, determining whether the target of preventive activities such as vaccines should be specific 'high-risk' groups, or the population as a whole is something that merits close consideration (Verweij and Dawson, 2012).

This article will use the case of the school-based human papilloma virus (HPV) vaccination program in Ontario, Canada, to illustrate how Powers and Faden's theory of social justice can add nuance and depth to the discussion of public health and social justice. This case demonstrates that their theory allows for a broadening of relevant moral concerns and causes us to take a second look at a public health intervention that has been labelled in Canada a 'no brainer' (CBC Radio, 2007). At first glance, this program seems to be one

that has the potential to improve the lot of those most likely to die from cervical cancer, and reduce disease burden in those who contract other related conditions from HPV infection. However, when we examine how this program will foster well-being across the domains of health using Powers and Faden's theory, and when we examine how priorities were set it becomes less certain that this particular vaccination program will meet the requirements for a socially just public health intervention, as Powers and Faden have defined them. This is not to say that vaccines do not have a place in a public health strategy to address cervical cancer.

It is worth noting that it is particularly difficult to raise concerns around public health vaccination programs as the discourse around vaccination is polarized. Public health in developed countries struggles to maintain immunization rates that are necessary for herd immunity for a number of diseases such as measles and pertussis, despite the access barriers being removed for the most part. Sub-optimal uptake of available vaccines is a serious public health problem; therefore, it is necessary to state at the outset that this article is by no means intended to call into question the value of vaccines in general. Indeed, if this were an article about the HPV vaccine and social justice in the context of global health, the moral arguments would look very different. If we cannot tolerate critical analyses of public health programs, even when they are aimed at important technologies such as vaccines, then we are impoverishing the moral discourse in public health. It is important to state outright then that this article is not an 'anti-vaccine' argument, but a pro-social justice analysis of a public health program that happens to use a vaccine as the technology of intervention.

Social Inequity and HPV-Related Disease

Owing to the fact that there is a social gradient in cervical cancer deaths both globally (Parikh *et al.*, 2003; Ueda *et al.*, 2006; McCarthy *et al.*, 2010; Vasilevska *et al.*, 2012; Jemal *et al.*, 2011; Singh *et al.*, 2007; Simard *et al.*, 2012) and nationally in Canada (Mackillop *et al.*, 1997; Ng *et al.*, 2004; Booth *et al.*, 2010), and because cervical cancer is so closely associated with poverty and underserved populations (CSDH, 2008; Crowcroft *et al.*, 2012), social justice is highly relevant to any normative analysis of interventions aimed at reducing cervical cancer incidence and mortality. The HPV vaccine program in Ontario thus

makes a good case for analysis with Powers and Faden's theory.

According to Powers and Faden, the job of justice 'is to specify those background social and economic conditions that determine whether certain inequalities . . . should be seen as unfair' (Powers and Faden, 2008). As is the case for most risks for chronic diseases, risks for cervical cancer in Canada are not distributed equally across the population. The introduction of universal Pap screening resulted in declines in cervical cancer incidence and mortality among all income groups, with the biggest reductions for low-income women in Canada (Ng *et al.*, 2004). Despite this, a socioeconomic gradient in cervical cancer persists (Mackillop *et al.*, 1997; Ng *et al.*, 2004; Booth *et al.*, 2010), and the prevalence of cervical cancer among other marginalized groups of women, especially recently immigrated and Aboriginal women, is also higher than that of the general population (Hislop *et al.*, 2004; Herring *et al.*, 2006; McDonald and Kennedy, 2007; Donnelly *et al.*, 2009; Lofters *et al.*, 2010; Redwood-Campbell *et al.*, 2011; Khadilkar and Chen, 2012). This has been attributed to poor reproductive and primary health care, poor access to care, low socioeconomic status and associated behaviours such as smoking and poor nutrition (Parikh *et al.*, 2003; Herring *et al.*, 2006; Lippman *et al.*, 2007; McDonald and Kennedy, 2007; Donnelly *et al.*, 2009; Khadilkar and Chen, 2012).

Given that the Canada Health Act enshrined the principle of universality that articulates that all are entitled to the same level of care (Legislative Services Branch, 2012), any disease that is linked to poor quality of care and difficulty in accessing care, as cervical cancer is proven to be, ought to be deemed 'unjust'. This is not just because it violates a legally enshrined principle, but because the Canada Health Act codifies the moral value Canadians place on equity in health entitlements (Romanow, 2002). Indeed, one Canadian study states that their findings 'impl[y] that unique barriers to screening exist for women from lower-income neighbourhoods, and that these barriers are not eliminated by Canada's universal health care system' (Elit *et al.*, 2012). We can thus argue that the cervical cancer social gradient in Canada is the result of a morally significant inequality, as defined by Powers and Faden, because it is the result of structural inequities (Parikh *et al.*, 2003) that violate the Canadian principle of universality. Highly preventable deaths from cervical cancer that takes years to develop are the end result of sustained barriers to reproductive and primary health care services, and poor immune status that results from social deprivation. According to Powers and Faden

then, this is one of those inequalities in health that ought to matter most. What is not clear is how best to improve the well-being of the poorest and most marginalized women in Canada who are the ones who end up dying from cervical cancer. HPV vaccination is one possible method that deserves close examination.

Using Powers and Faden's approach to examining whether or not a public health intervention improves the *actual* well-being (as opposed to one's capacity to achieve well-being) of the most disadvantaged in society, a number of issues can be raised about to this program. I will attempt to explore these issues with reference to the relevant domains of well-being they deem crucial to the normative analysis of public health: Health, Respect and Self-determination. The other domains, i.e. Personal security, Reasoning and Attachment, are not particularly relevant in this instance, so they will not be addressed in this analysis. In addition, Powers and Faden's insights into the just setting of priorities and the place of cost-effectiveness considerations in public health priority setting are also relevant. Powers and Faden also feel it important to base our moral analysis on real-world data, so let us turn now to a discussion of the particulars of the Ontario program.

Ontario's HPV Vaccination Program

On the eve of a provincial election in September 2007, the Ontario Liberal Government introduced a federally funded, school-based HPV vaccination program for girls in Grade 8 who are 13 years old. The Merck-Frosst vaccine, Gardasil®, confers immunity against four (6, 11, 16 and 18) of the 100+ strains of HPV. It is the most expensive childhood vaccine for mass use at \$400 CAD for the three required doses. Despite the Federal government's allocation of \$300 million for the program, uptake has been low. Provincial coverage estimates for the first 3 years of the school-based HPV vaccination program for girls were calculated as: 51 per cent (2007–2008), 58 per cent (2008–2009) and a preliminary estimate of 54 per cent in 2009–2010 (which is likely low because it excludes extended eligibility beyond age 13 years) (Wilson *et al.*, 2013).

HPV is a sexually transmitted infection (STI) that is associated with the development of cervical cancer in women, genital warts and cancers and some throat cancers in both men and women. Strains 16 and 18 are responsible for 70 per cent of all cervical cancer cases

and vaccination against these strains is most effective before onset of sexual activity (NACI, 2007). Cervical cancer accounts for 1.1 per cent of all female cancer deaths in Canada, with approximately 140 women dying each year of the disease in Ontario (PHAC, 2006). By comparison, 1951 women die of breast cancer and 2782 women die of lung cancer each year in Ontario (Canadian Cancer Society and National Cancer Institute of Canada, 2006). HPV is transmitted easily through non-penetrative sexual contact, yet it is usually transient: within 1 year of exposure to HPV, about 70 per cent of infected women clear the infection on their own, and within 2 years 90 per cent will clear the infection (PHAC, 2006; Castellsagué, 2008). It is therefore a small group of women with persistent high-risk HPV infections (i.e. chronic carriers) who are at greatest risk for developing cervical cancer (Castellsagué, 2008). As Castellsagué notes, '... studies demonstrate that persistent cervical infection by high-risk HPVs precedes the appearance of the CIN [neoplastic cervical lesions] and is required for the development, maintenance and progression of these lesions. Epidemiological studies in multiple populations show consistently that the bulk of the infections by HPV always precedes the bulk of the neoplasias by one or two decades' (Castellsagué, 2008).

Following Merck Frosst's lead (Zimet, 2006), the Ontario school-based program frames Gardasil® as a cervical cancer vaccine, not an STI vaccine. It is based on the misleading presentation of cervical cancer as a public health 'crisis' in which HPV infection is deliberately but incorrectly conflated with cervical cancer (Herring *et al.*, 2006; Sama, 2010). The mass vaccination program against HPV in Ontario is not aimed at eradicating the virus. If this were the case, the strategy would include males (now approved for Gardasil® in Canada in 2010) in order to achieve herd immunity. However, there is some preliminary indication that there is a possible herd immunity effect emerging despite the lack of a population-based approach to vaccination (Kahn *et al.*, 2012). Also, in order to achieve a comprehensive reduction in deaths from cervical cancer at the population level, it would require a vaccine conferring immunity against more strains than the four targeted by Gardasil®, as there are other oncogenic strains of HPV that cause the remaining 30 per cent of cervical cancers. Because of this, Pap screening continues to be necessary for women who receive the vaccine, and there is some suggestion that there is an increase in non-vaccinated HPV types present in those who have received the vaccine (Kahn *et al.*, 2012).

Priority Setting

Let us turn now to a discussion of whether or not the Ontario HPV vaccination program ought to be a matter of priority for public health. At the outset, we must be clear that public health in Ontario did not make the decision to prioritize the delivery of the HPV vaccination to the population of Canada. That decision was made when the Federal Government allocated \$300 million CAD for the provision of the vaccine. Despite the fact that this decision was taken under a cloud of accusations of conflict of interest and undue influence (Gillespie, 2007; Talaga, 2007) on the part of the Federal government, it would have been very difficult for public health in Ontario to have refused the money. Ontario did have the say, however, over how its \$117 million share would be spent. We can question, however, whether the Federal government's decision was reflective of the kind of public input on health priorities that Powers and Faden argue ought to inform priority setting (Powers and Faden, 2008) or whether the availability of the vaccine itself created a technological (and/or political) imperative.

First, just looking at the numbers of deaths in Ontario (140 per year), cervical cancer does not look like something that needs urgent attention from public health. As noted above, women die far more frequently from other cancers, never mind other causes. However, who is dying of cervical cancer is morally relevant, since these women are socially disadvantaged, and the inequities that give rise to their having persistent HPV infection over many years are unjust. Thus, we could argue that Powers and Faden would consider this a legitimate matter for prioritization. In addition, the burden of disease from throat, anal and other genital cancers, and from anal and genital warts is not insignificant, although whether or not these other cancers and genital warts would have been prioritized had a vaccine not come along is at least worth questioning.

The Use of Cost-Effectiveness/Utility Analyses

Powers and Faden have suggested that there are four generations of thinking about cost-effectiveness analysis, and their own thinking on the matter has developed as a response to these discussions, while being grounded in their moral theory of justice (Faden and Powers, 2000). They are clear that cost-effectiveness ought not trump social justice considerations in the way that it so often does when it comes to public

health policy decisions (Powers and Faden, 2008). As they have argued, 'there is a special moral urgency to remediating the conditions of those whose life prospects are poor across multiple dimensions of wellbeing' (Powers and Faden, 2008). Thus, they argue that cost-effectiveness and cost-utility analyses are only two of the possibly relevant factors that need to be considered when determining public health priorities.

As Powers and Faden have pointed out, cost-effectiveness is used in contexts in which institutional budgets are 'heavily dictated by political concerns and the sphere of influences on policy choices is largely a matter of advising decision-makers on how best to get the most health-related benefits given the health-specific budget constraints under which they operate' (Powers and Faden, 2008). This certainly seems to be the case for Ontario, as the Federal government created the context in which the programmatic decisions would be taken. Cost-effectiveness and utility analyses have been the primary mechanism used for policy analysis in this case (PIDAC-I, 2012). The Provincial Infectious Disease Advisory Committee for Immunizations (PIDAC-I) in July 2012 continued to make recommendations based on cost-effectiveness analysis (Tully *et al.*, 2012) and a more recent Canadian meta-analysis has shown, with some limitations, that adolescent vaccination is more cost-effective when compared with cytology screening alone (Seto *et al.*, 2012). While the first analysis examined the bivalent vaccine (Tully *et al.*, 2012), PIDAC-I and the meta-analysis found that the quadrivalent vaccine is the only cost-effective option (PIDAC-I, 2012; Seto *et al.*, 2012) because of the additional 'numerous small benefits' of its protective effects against genital warts which added to the overall reduction of treatment costs to the system. However, including boys in the program exceeds the traditional cost-effectiveness threshold of \$US50,000 per QALY, even when non-cervical cancers are included (Seto *et al.*, 2012). It is highly unlikely then that boys will ever be included in the school-based program.

The Seto *et al.* analysis had some important limitations that are relevant. Some of the studies in the analysis presumed high cervical cancer screening compliance (up to 90 per cent), which the study authors claim 'may potentially underestimate the cost-effectiveness with screening alone' (Seto *et al.*, 2012). Conversely, some studies underestimated the level of screening compliance (as low as 1 per cent), which would result in an overestimation of cost-effectiveness (Seto *et al.*, 2012). Clearly then, the cost-effectiveness is closely related to screening compliance, and the population of women who die of cervical cancer would thus

fall within the population of women for whom the vaccine would be highly cost-effective given their poor access to screening. It is possible that a program that targeted only those women who are at high risk of cervical cancer would be even more cost-effective than the current school-based program, since this is a much smaller target population. This raises the important question of why not design a targeted program for women who are at highest risk of dying of cervical cancer? More on this later.

One study included in the Seto *et al.* analysis found that targeting men who have sex with men (MSM) specifically appears to be cost-effective, because of their elevated risk for anal cancer (Kim, 2010). One could argue then that a traditionally marginalized population such as MSM ought to also be included in a program that targets those at the highest risk from HPV infection, where highest risk is defined as those people who are most likely to contract cancer from HPV infection. This brings us back to Verweij and Dawson's question about how we define 'high risk', and whether or not to perform targeted interventions based on this definition, or to take a population-based approach (Verweij and Dawson, 2012).

Powers and Faden's work provides the basis for adding a notion of social vulnerability to the biological. Those who are most socially disadvantaged are clearly to be prioritized under their theory of social justice. Combine this with the biological sense of vulnerability associated with being at high risk of dying from cervical cancer, or from anal cancer, and we can create a compelling moral argument for prioritizing the vaccination of these two 'high-risk' groups. It is possible that this is even more cost-effective than the current, school-based program, despite the loss of the potential cost-saving from reducing genital warts and the other cancers associated with HPV infection.

Why chose to protect one high-risk group over another simply on the basis of gender? Powers and Faden would likely point out that this seems to be morally problematic given the moral uniqueness of life-saving (by preventing anal cancer), which seems in this case to have taken a back seat to the 'numerous small benefits' of preventing genital warts.

Another problem with this kind of cost-effectiveness analysis from a moral perspective is that the comparators used in the analyses to date are limited in scope to health benefits and costs of one preventive measure over another, be it one vaccine against the other, or a vaccine against cytological screening. As Powers and Faden point out, 'one of the major limitations of the traditional form of cost-effectiveness analysis is that it

does not necessarily provide a basis for comparison of different kinds of public health or health care programs . . . ' (Powers and Faden, 2008). What is missing from the economic analysis of the HPV vaccination program is an analysis that puts the vaccine head to head with other interventions designed to improve long-term access to cytological screening, or to improve access to reproductive health services for these socially and biologically vulnerable groups. It would be helpful to know the impact of spending \$1.17 million (Ontario's share of the Federal pot) on improving access to reproductive and primary healthcare services to women and MSM at the low end of the socioeconomic scale, and on improving their nutritional status. Interventions aimed at improving the immunological status of people vulnerable to persistent HPV infection would likely show health benefits beyond reductions in HPV-related illnesses, although they would not be captured in tradition cost-effectiveness analyses. It is likely that interventions aimed at root social causes of diseases such as cervical cancer would be much more 'efficient' or create more 'utility' and enhance more domains of well-being than the domain of health alone.

Powers and Faden identify an additional problem with cost-effectiveness analysis in that it 'too narrowly focuses attention on the costs the agency itself bears' (Powers and Faden, 2008) and fails to take into account the costs to individuals who may benefit from the vaccine but are excluded from the vaccine program. The vaccine is not as effective in this population that is likely post-sexual debut, but it is still recommended and promoted by public health. So despite the fact that the Ontario program is promoted as a one aimed at cervical cancer, it leaves older women at risk now and for the next 20 years with their only recourse being to pay for the vaccine out of pocket, which is simply not a feasible option for those most at risk. Powers and Faden argue that these kind of modest costs for individuals that are left out of economic analyses do not constitute injustices, but in this case where the cost of the vaccine puts it out of reach of the women who need it most, we may well consider this an injustice. Alternatively, an intervention aimed at redressing the social conditions that strongly contribute to cervical cancer would have captured this population of women, and perhaps increased the cost-effectiveness of the intervention. As it is, the cost of omitting these women from the public health strategy has not been included in analyses.

Let us now turn to look at the relevant domains of well-being that Powers and Faden identify that are relevant to our analysis.

Health

Powers and Faden work with what they call an 'ordinary language understanding of physical and mental health that is intended to capture the dimension of human flourishing that is frequently expressed through the biological or organic functioning of the body' (Powers and Faden, 2008). Vaccine safety is thus relevant to their conception of health, and despite a preliminary lack of safety and efficacy data for girls 9–13 years old (Rabin, 2006), the vaccine appears to pose minimal risk to children (Klein, 2012). There is a lack of long-term data, but that is not unusual for vaccines that are recently introduced.

What is worrying is that there does not seem to be any investigation into the possibility that 'a school-based program of the type being instituted in Canada might miss people from the same demographic who currently have low cervical screening rates' (Lexchin, 2010). In a survey of Canadian street youth, almost 30 per cent of girls had dropped out of school prior to Grade 8 (NACI, 2007), and so would not be vaccinated in the context of this program. While the school-based program is more likely to reach those who typically would not have access to reproductive health information and services because of a taboo against premarital sex in their families and communities (Zimmerman, 2006), it is possible that the unpalatability of vaccinating girls against an STI would also mitigate against their uptake of the vaccine, particularly in high-risk immigrant families. So whether this program will simply miss those who are most at risk is a question that needs to be answered, because if those who need it most do not receive it, this is morally significant for a non-ideal theory of social justice. In addition, the estimates of cost-effectiveness will be inaccurate if the vaccine does not reach those women most likely to die of cervical cancer.

It is also unknown whether the immunity Gardasil® confers through mass vaccination will allow other carcinogenic strains of HPV to become dominant (Lippman *et al.*, 2007). Certainly there are other, less oncogenic strains of HPV currently that may become problematic if the strains in the HPV vaccines become less prevalent. This will require further study and vigilance on the part of public health in order to avoid the negative consequences for health if it were to occur.

There seems little doubt that for those who are vaccinated (and even possibly for those who are not but receive some protective effect), the protection it confers is very good. Remove the problems in the program related to 'delivery', and there seems to be a morally compelling case for using the vaccine on health

grounds alone. Thus, we can consider this program to be in line with what Powers and Faden consider the positive function of public health as it attempts to provide a 'levelling-up' measure for those women who typically fall below the sufficiency threshold in terms of reproductive health in particular. There are, however, many who will receive the vaccine that are already above the sufficiency threshold. So while the theory does not demand complete equality, it is doubtful that this intervention will have a flattening effect on the social gradient in reproductive health in Ontario, even though it may result in a slight 'levelling-up' effect across the gradient. This is less of a concern for a sufficiency theory, however; so long as those who are most disadvantaged reach the level of sufficiency, gradients are much less of a concern. Removing concerns about delivery of the vaccine to those who need it most is morally problematic from a non-ideal social justice perspective and may cause this 'levelling-up' effect to remain in the realm of the possible but not realized.

Respect

For Powers and Faden, respect for others and self-respect are essential aspects of well-being. Respect for others 'requires the ability to see others as independent sources of moral worth and dignity and to view others as appropriate objects of sympathetic identification' (Powers and Faden, 2008). In an important way, the Ontario program is respectful of those who are socially disadvantaged and therefore at higher risk of dying of cervical cancer. As Powers and Faden point out, this is important because respect for others is 'closely linked to self-respect as well' (Powers and Faden, 2008). They go on to argue that the capacity for self-respect is related to a person's 'capacity to see oneself as the moral equal of others and as an independent source of moral claims based on one's own dignity and worth' (Powers and Faden, 2008). The preservation of (or at least the avoidance of further destruction of) self-respect by avoiding a possibly stigmatizing targeted vaccine strategy is morally worthwhile. For the kind of stigmatization that could result from a targeted campaign is an example of what Powers and Faden would term a lack of 'recognition respect', and is an injustice in its own right, particularly if it leads to the internalization of invidious judgements and a subsequent erosion of self-respect (Powers and Faden, 2008). Indeed, it seems in this case, public health forwent a more cost-effective approach in favour of one that provides minimal benefit to most but that protects

those at high risk of (re)-stigmatization and further marginalization.

We should ask, though, is the Ontario program respectful of those who are at low lifetime risk of having any negative consequences from HPV infection? Recall that 90 per cent of infections are cleared within 2 years. This means that even if infected with the relevant strains of HPV, it does not necessarily, or even often, result in genital warts or cancer. Thus, the majority of girls receiving the vaccine are receiving no, or very little benefit. While the vaccine appears to be safe, as with any vaccination, it is not risk free. Perhaps this is justified, however, given the alternative is a potentially stigmatizing, program aimed at those who are ‘high risk’.

Self-Determination

Self-determination, according to Powers and Faden, is not just about having the capacity to make choices, which falls more within the scope of their Reasoning domain of well-being (Powers and Faden, 2008). It is about being able to effectively shape the course of our lives, through the making of a series of decisions as free from constraint as possible, while acknowledging there will always be certain limitations (Powers and Faden, 2008). For public health, knowing when it is morally acceptable to infringe on people’s abilities to make self-determining choices, and when to use coercion can be tricky, especially as ‘some large arena of non-interference is necessary . . .’ (Powers and Faden, 2008).

In Western liberal democracies, a premium is put on self-determination, and putting restrictions on this, even for the sake of the public good is often a hard selling point for public health. It behooves us then, to pay particular attention to public health issues that may affect self-determination, because of the primacy we place upon it, and also in light of the fact that individual compliance with public health measures is often crucial to a public health response to infectious diseases.

While the conflation of HPV infection with cancer achieves the aim of making the vaccine more palatable for parents who are loathe to sexualize their daughters at such a young age, it is deliberately misleading. So in some sense, this program is coercive. The need for accurate information about the risks from HPV infection may be trumped, however, by the importance of this deception to the uptake of the vaccine.

There is another sense in which this program has the potential to negatively impact self-determination, however. The conflation of risk factors with diseases and the amplification of risk are nothing new. The advent of

genetic testing heralded in an era in which the ‘worried well’ became a whole new target population for health promotion and the biotechnology sector (Petersen and Lupton, 1997; Lippman, 2000). Within the broader context of women’s health ‘choices’, women at the bottom end of the social gradient of health cannot choose better nutrition, or choose to access to some or better reproductive services, or primary healthcare. Society in general, and public health in particular, has structured their choice around their acceptance or rejection of a (highly profitable) technological intervention aimed at mitigating a risk factor, rather than an intervention that could actually redress the social conditions at the root of this particular disease (and many others).

We must question whether a campaign that offers socially deprived women a technological option for addressing socially determined risk is truly going to cultivate women’s self-determination in a meaningful way for those who are most vulnerable to coercion and systemic oppression. This kind of technological intervention has the potential to constrain the discourse around what women can ‘choose’ when it comes to their health by framing ‘choice’ merely as an expression of individualism (Lippman, 1999), i.e. should I get the shot or not? Thus, the focus is on their choice of whether or not to get vaccinated, rather than on whether or not they can live lives that are self-determined, free from the kinds of impediments that poverty, poor immune status and social deprivation present.

Powers and Faden use Aristotle’s account of the helmsman to throw light on their notion of self-determination (Powers and Faden, 2008), and the social and political context in which it operates, to show that our choices are bounded. They are bounded just as the helmsman’s choices of where to sail are bounded by wind, waves, coastlines and rocky shoals. It is important that public health remain vigilant about the perils that constrain where sailors can guide their ships, and though public health can throw a life-line in the form of a vaccine, this will never be enough to ensure the sailor’s well-being. Public health needs to help sailors to build better boats that are resistant to hazards that are both natural and the result of societal injustice.

Conclusions

Powers and Faden’s theory of social justice has provided a nuanced lens through which to examine the Ontario HPV vaccination program. While this analysis by no means captures all facets of their theory, their insights

about priority setting and the limitations of particular kinds of economic analyses in the justification of public health priority setting have revealed the problem of privileging 'many small benefits' over life-saving benefits. We see this in the Ontario program in the exclusion of MSM and older, at-risk women from the program. Looking at the various domains of well-being, we can see that when it comes to the domain of health, for those who receive the vaccine, their health will be improved. Whether or not it will reach those women at highest risk remains to be seen, but the potential is there. The Ontario program's most socially just aspect is its promotion of the Powers and Faden notion of well-being that involves 'recognition respect' and self-respect for and in the most socially and biologically vulnerable women. This is evidenced in the adoption of a broader, school-based approach instead of a targeted approach.

While the program will go some way to improving the ability of women to self-determine the course of their lives, Powers and Faden's theory reminds us that we must not rely solely upon this program to redress the social conditions that allow cervical cancer to develop in socially disadvantaged women. For these are the very same conditions that are the result of social injustice, and that prevent both men and women from actually achieving well-being across all of the domains. For this reason then, we can hope that in places where the HPV vaccination is used successfully, that it will not lead public health to focus solely on disease prevention in place of improving overall population health. For this would make the actual realization of well-being for society's least well off far less likely.

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Conflict of Interest

None declared.

References

- Booth, C. M., Li, G., Zhang-Salomons, J. and Mackillop, W. J. (2010). The impact of socioeconomic status on stage of cancer at diagnosis and survival: a population-based study in Ontario, Canada. *Cancer*, **116**, 4160–4167.
- Canadian Cancer Society/National Cancer Institute of Canada (2006). *Canadian Cancer Statistics 2006*. Toronto, Canada.
- Castellsagué, X. (2008). Natural History and Epidemiology of HPV Infection and Cervical Cancer. *Gynecologic Oncology*, **110**, S4–S7.
- CBC Radio. *The Current* (2007). The Ontario government is taking a shot at saving lives. Aired 3 August 2007. Available at <http://www.cbc.ca/thecurrent/2007/200708/20070803.html> [accessed 19 May 2009].
- Crowcroft, N. S., Hamid, J. S., Deeks, S. and Frank, J. (2012). Human Papilloma Virus Vaccination Programs Reduce Health Inequity in Most Scenarios: A Simulation Study. *BMC Public Health*, **12**, 935.
- CSDH. (2008). *Closing the Gap in a Generation: Health Equity Through Action on the Social Determinants of Health*. Geneva: World Health Organization.
- Donnelly, T. T., McKellin, W., Hislop, G. and Long, B. (2009). Socioeconomic Influences on Vietnamese-Canadian Women's Breast and Cervical Cancer Prevention Practices: A Social Determinant's Perspective. *Social Work in Public Health*, **24**, 454–476.
- Elit, L., Krzyzanowska, M., Saskin, R., Barbera, L., Razzaq, A., Lofters, A., Yeritsyan, N. and Bierman, A. (2012). Sociodemographic Factors Associated with Cervical Cancer Screening and Follow-up of Abnormal Results. *Canadian Family Physician*, **58**, e22–e31.
- Faden, R. and Powers, M. (2000). Inequalities in Health, Inequalities in Health Care: Four Generations of Discussion about Justice and Cost-Effectiveness Analysis. *Kennedy Institute of Ethics Journal*, **10**, 109–127.
- Gillespie, K. (2007). Girls to get Cancer Vaccine. *The Toronto Star*, 2 August 2007.
- Herring, D. A., Waldram, J. B. and Young, T. K. (2006). *Aboriginal Health in Canada: Historical, Cultural, and Epidemiological Perspectives*. 2nd edn. Toronto: University of Toronto Press, Scholarly Publishing Division.
- Hislop, T. G., Teh, C., Lai, A., Ralston, J. D., Shu, J. and Taylor, V. M. (2004). Pap Screening and Knowledge of Risk Factors for Cervical Cancer in Chinese Women in British Columbia, Canada. *Ethnicity & Health*, **9**, 267–281.

- Jemal, A., Bray, F., Center, M. M., Ferlay, J., Ward, E. and Forman, D. (2011). Global cancer statistics. *Cancer Journal for Clinicians*, **61**, 69–90.
- Kahn, J. A., Brown, D. R., Ding, L., Widdice, L. E., Shew, M. L., Glynn, S. and Bernstein, D. I. (2012). Vaccine-type Human Papillomavirus and Evidence of Herd Protection after Vaccine Introduction. *Pediatrics*, **130**, e249–e256.
- Khadilkar, A. and Chen, Y. (2012). Rate of Cervical Cancer Screening Associated with Immigration Status and Number of Years Since Immigration in Ontario, Canada. *Journal of Immigrant and Minor Health*.
- Kim, J. J. (2010). Targeted Human Papillomavirus Vaccination of Men Who Have Sex with Men in the USA: A Cost-Effectiveness Modelling Analysis. *The Lancet Infectious Diseases*, **10**, 845–852.
- Klein, N. P. et al. (2012). Safety of Quadrivalent Human Papillomavirus Vaccine Administered Routinely to Females. *Archives of Pediatrics & Adolescent Medicine*, **166**, 1140–1148.
- Legislative Services Branch. (2012). Consolidated Federal Laws of Canada, Canada Health Act, available from: <http://laws-lois.justice.gc.ca/eng/acts/C-6/page-1.html> [accessed 1 November 2012].
- Lexchin, J., Arya, N. and Singh, S. (2010). Gardasil, the New HPV Vaccine: The Right Product, the Right Time? A Commentary. *Healthcare Policy*, **5**, 26–36.
- Lippmann, A. (1999). Choice as a Risk to Women's Health. *Health, Risk and Society*, **1**, 281–291.
- Lippman, A. (2000). Geneticization and the Canadian Biotechnology Strategy: The Marketing of Women's Health. In: Miller, F., Weir, L., Mykitiuk, R., Lee, P., Sherwin, S. and Tudiver, S. (eds), *The Gender of Genetic Futures: The Canadian Biotechnology Strategy, Women and Health*. Toronto: York University, pp. 32–41.
- Lippman, A., Melnychuk, R., Shimmin, C. and Boscoe, M. (2007). Human Papillomavirus, Vaccines and Women's Health: Questions and Cautions. *Canadian Medical Association Journal*, **177**, 484–487.
- Lofters, A. K., Hwang, S. W., Moineddin, R. and Glazier, R. H. (2010). Cervical Cancer Screening among Urban Immigrants by Region of Origin: A Population-Based Cohort Study. *Preventive Medicine*, **51**, 509–516.
- Mackillop, W. J., Zhang-Salmons, J., Groome, P. A., Paszat, L. and Holowaty, E. (1997). Socioeconomic status and cancer survival in Ontario. *Journal of Clinical Oncology*, **15**, 1680–1689.
- McCarthy, A. M., Dumanovsky, T., Visvanathan, K., Kahn, A. R. and Schymura, M. J. (2010). Racial/ethnic and socioeconomic disparities in mortality among women diagnosed with cervical cancer in New York City, 1995–2006. *Cancer Causes & Control*, **21**, 1645–1655.
- McDonald, J. T. and Kennedy, S. (2007). Cervical Cancer Screening by Immigrant and Minority Women in Canada. *Journal of Immigrant and Minor Health*, **9**, 323–334.
- NACI. (2007). National Advisory Committee on Immunization Statement on human papillomavirus vaccine. *Canada Communicable Disease Report*, **33**, 1–31, Available at www.phac-aspc.gc.ca/publicat/ccdr-rmtc/07pdf/acs33-02.pdf [accessed 9 September 2012].
- Ng, E., Wilkins, R., Fung, M. F. K. and Berthelot, J. -M. (2004). Cervical Cancer Mortality by Neighbourhood Income in Urban Canada from 1971 to 1996. *Canadian Medical Association Journal*, **170**, 1545–1549.
- Nussbaum, M. (2001). *Women and Human Development: The Capabilities Approach*. Cambridge: Cambridge University Press.
- Nussbaum, M. and Sen, A. (1993). *The Quality of Life*. Oxford: Clarendon Press.
- Olowokure, B., Spencer, N. J., Hawker, J. I., Blair, I. and Smith, R. L. (2003). Changing Socioeconomic Risk Factors for Invasive H. influenzae Disease after the Introduction of Conjugate Vaccine. *Journal of Infection*, **46**, 46–48.
- Panagiotopoulos, T. and Georgakopoulou, T. (2004). Epidemiology of Rubella and Congenital Rubella Syndrome in Greece, 1994–2003. *Eurosurveillance*, **9**, 17–19.
- Parikh, S., Brennan, P. and Boffetta, P. (2003). Meta-Analysis of Social Inequality and the Risk of Cervical Cancer. *International Journal of Cancer*, **105**, 687–691.
- Petersen, A. and Lupton, D. (1997). *The New Public Health: Health and Self in the Age of Risk*. 1st edn. London: Sage.
- PHAC. (2006). Management and Treatment of Specific Infections: Genital Human Papillomavirus Infections. In: *Canadian Guidelines on Sexually Transmitted Infections*. Ottawa: PHAC, Available from: <http://www.phac-aspc.gc.ca/std-mts/sti-its/cgsti-lcits/section-5-5-eng.php> [accessed 9 September 2012].
- PIDAC-I. (2012). *Recommendations for Human Papillomavirus Vaccination*. Ontario: Public Health Ontario.

- Powers, M. and Faden, R. (2008). *Social Justice: The Moral Foundations of Public Health and Health Policy*. 2nd edn. USA: Oxford University Press.
- Rabin, R. (2006). A New Vaccine for Girls: But Should it be Compulsory? *New York Times*, 18 July 2006.
- Rambout, L. et al. (2007). Prophylactic Vaccination Against Human Papillomavirus Infection and Disease in Women: A Systematic Review of Randomized Controlled Trials. *Canadian Medical Association Journal*, **177**, 469–479.
- Redwood-Campbell, L., Fowler, N., Laryea, S., Howard, M. and Kaczorowski, J. (2011). 'Before You Teach Me, I Cannot Know': Immigrant Women's Barriers and Enablers with Regard to Cervical Cancer Screening among Different Ethnolinguistic Groups in Canada. *Canadian Journal of Public Health*, **102**, 230–234.
- Romanow, R. (2002). *Building on Values: The Future of Health Care in Canada*. Ottawa: The Romanow Commission Report.
- Sama. (2010). Concerns around the human papilloma virus vaccine. *Indian Journal of Medical Ethics*, **7**, 38–41. Available from <http://www.ijme.in/pdfs/181de38.pdf> [accessed 9 September 2012].
- Sen, A. (1979). *Equality of What?*, Tanner Lecture on Human Values. Stanford University, 22 May 1979.
- Seto, K., Marra, F., Raymakers, A. and Marra, C. A. (2012). The Cost-Effectiveness of Human Papillomavirus Vaccines: A Systematic Review. *Drugs*, **72**, 715–743.
- Simard, E. P., Fedewa, S., Ma, J., Siegel, R. and Jemal, A. (2012). Widening socioeconomic disparities in cervical cancer mortality among women in 26 states, 1993–2007. *Cancer*, **118**, 5110–5116.
- Singh, G. K., Williams, S. D., Siahpush, M. and Mulhollen, A. (2007). Socioeconomic, Rural-Urban, and Racial Inequalities in US Cancer Mortality: Part I-All Cancers and Lung Cancer and Part II-Colorectal, Prostate, Breast, and Cervical Cancers. *Journal of Cancer Epidemiology*, pp. 1051–1057.
- Talaga, T. (2007). *Lobbyists Boosted Vaccine Program*. *The Toronto Star*, 16 August 2007.
- Tully, S. P., Anonychuk, A. M., Sanchez, D. M., Galvani, A. P. and Bauch, C. T. (2012). Time for Change? An Economic Evaluation of Integrated Cervical Screening and HPV Immunization Programs in Canada. *Vaccine*, **30**, 425–435.
- Ueda, K., Kawachi, I. and Tsukuma, H. (2006). Cervical and corpus cancer survival disparities by socioeconomic status in a metropolitan area of Japan. *Cancer Science*, **97**, 283–291.
- Vasilevska, M., Ross, S. A., Gesink, D. and Fisman, D. N. (2012). Relative risk of cervical cancer in indigenous women in Australia, Canada, New Zealand, and the United States: A systematic review and meta-analysis. *Journal of Public Health Policy*, **33**, 148–164.
- Verweij, M. and Dawson, A. (2012). Risk, Risk Groups and Population Health. *Public Health Ethics*, **5**, 213–215.
- Wilson, S. E., Harris, T., Sethi, P., Fediurek, J., Macdonald, L. and Deeks, S. L. (2013). Coverage from Ontario, Canada's school-based HPV vaccine program: The first three years. *Vaccine*, **31**, 757–762.
- Zimet, G. D. (2006). Understanding and Overcoming Barriers to Human Papillomavirus Vaccine Acceptance. *Current Opinion in Obstetrics and Gynecology*, **18**, S23–S28.
- Zimmerman, R. K. (2006). Ethical Analysis of HPV Vaccine Policy Options. *Vaccine*, **24**, 4812–4820.