

School-based interventions to reduce
health disparities among LGBTQ youth:
Considering the evidence



McCreary
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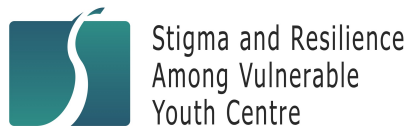


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Executive Summary

Research in Canada and elsewhere have documented significant health disparities for lesbian, gay, bisexual, transgender, queer and questioning (LGBTQ) youth compared to their heterosexual and cisgender (non-transgender) peers. With higher levels of discrimination and bullying, and lower level of family, school, and community support, LGBTQ youth also face higher risks for significant health challenges, including suicidal thoughts and attempts, and problem substance use. However, when LGBTQ youth experience safe and supportive schools, and supportive families, they are much less likely to report these health challenges.

How do we make it better for LGBTQ youth? There is a need for health promotion interventions for LGBTQ youth that can reduce some of these critical health gaps. Schools are an important environment for youth, and a key place where public health professionals, partnering with school staff, can support effective health promotion strategies. Indeed, some of the best strategies for promoting youth health are those undertaken by educators in schools that also contribute to improvements in learning.

In this report we identified and evaluated research evidence for school-based interventions to improve outcomes for LGBTQ youth. We examined the relevance of the research for schools in Canada, and applied the outcomes evidence to a “typical” BC secondary school of 1000 students as a practical example. We also weighed the potential benefits of different school interventions compared to some of the estimated costs of the health outcomes they address. Our goal was to provide evidence-informed guidance on how schools and their public health partners might work together to narrow the health gap for LGBTQ youth.

We conducted an extensive search of the published research literature, including government reports, to identify school-based intervention research. The studies had to include health outcomes for at least some subsets of LGBTQ youth (and heterosexual students if reported), and provide enough detail in the results for us to calculate the potential effects of the intervention for a typical BC school. We rated each of the studies for the strength of its design and methods, and its relevance to the Canadian context. We ultimately found 12 studies that met all of our criteria. All the studies were from North America (2 were from Canada—BC), and 6 of the studies involved population surveys in schools, while the others were small or large convenience samples, including on-line surveys.

There were three types of interventions that were tested in 2 or more studies:

- Gay-Straight Alliances or Gender-Sexuality Alliances (GSAs), school based clubs to support LGBTQ youth and their allies
- LGBTQ-inclusive policies, or anti-homophobia policies in schools or school districts
- LGBTQ-inclusive curriculum

There were also three main areas of health effects that were measured in the various studies:

- Mental health, including emotional distress, suicidal thoughts, and suicide attempts
- Substance use, including tobacco, alcohol and cannabis, as well as problem substance use
- Violence victimization, such as bullying and harassment in school

The weight of the evidence suggests that GSAs are positively linked to better mental health and lower rates of substance use, and in some studies, lower levels of anti-gay discrimination and bullying. Results from studies in Canada show GSAs are also linked to better health for straight youth too, not just LGB youth. (There is still not enough research documenting the potential effects of school-based interventions for transgender youth). The results suggest that in a typical BC school of 1000 students (about 30 of these would be LGB, 70 more would be mostly heterosexual), having a GSA could result in:

- Up to 7 fewer suicide attempts by LGB and straight students, saving the health care system an estimated \$71,540 per school per year;
- 41 fewer students reporting recent binge drinking;
- 16 fewer students with problem substance use.

Results from studies in the USA suggest GSAs could also lead to up to 7 fewer sexual minority students being bullied (this was not tested in Canadian studies).

Several of the studies also provided evidence that LGBTQ-inclusive policies contribute to better health among both sexual minority and heterosexual students. Based on a typical BC school, supportive policies could contribute to:

- As many as 4 fewer suicide attempts
- 37 fewer students binge drinking on 6 or more days in the past month;
- 21 fewer students with problem substance use.

There were two national convenience sample studies, one from Canada, one from the US, and a state-level study from California, focused on the link between LGBTQ-inclusive curriculum and school bullying. Findings were mixed, with the US national study finding lower levels of bullying, and the Canadian national study finding no difference. The designs of the studies make it difficult to determine whether inclusive curriculum improves health disparities.

Thus, a growing body of evidence shows that GSAs and LGBTQ-inclusive school policies are linked to better mental health and substance use outcomes for sexual minority youth and heterosexual youth. These interventions may reduce suicide attempts, saving the health care system significant costs, and may reduce problem drinking and problem substance use among LGB and heterosexual students. Although further rigorously designed studies would confirm these findings, especially those that test before and after an intervention or policy is in place, the weight of evidence suggests these would be useful strategies in improving the health outcomes of LGBTQ youth, and would have benefits for some heterosexual students as well.

More information on how to start a GSA, and examples of LGBTQ-inclusive policies developed by school districts across Canada, can be found at MyGSA.ca, a web resource of Egale Canada.

Introduction

More than two decades of research in Canada and elsewhere have documented significant health disparities among lesbian, gay, bisexual, transgender, queer and questioning (LGBTQ) youth compared to their heterosexual and cisgender (non-transgender) peers (Saewyc, 2011; Coker, Austin & Schuster, 2010). They experience greater exposure to discrimination, harassment, bullying and sexual violence (Friedman et al., 2011), as well as lower levels of family support, school connectedness, school safety, and peer and community supports (Saewyc, et al., 2009; Busseri, Willoughby, Chalmers & Bogaert, 2008).

This combination of higher risk exposures and lower protective factors contributes to higher rates of mental health challenges, health-compromising behaviours, and missed opportunities for health promotion (Saewyc, 2007). For example, studies have persistently identified higher risks for emotional distress, suicidal thoughts and actual suicide attempts among LGBTQ youth in B.C. and elsewhere (Marshal et al., 2011). Research has also documented greater odds of sex while under the influence of alcohol and other drugs, mixed trends in condom and other barrier use, higher rates of sexually transmitted infections, and higher risk for teen pregnancy involvement (Saewyc et al., 2006). A few studies report higher rates of injury and eating disordered behaviors, and studies of runaway and homeless youth find a disproportionate number of LGBTQ youth struggle with unstable housing and hunger (Coker, Austin & Schuster, 2010). LGBTQ youth are more likely to drink alcohol or use tobacco, marijuana and other substances, and may also be more likely to report problems from substance use (Marshal et al., 2008). When it comes to health behaviours, LGBTQ youth in some studies are less likely to be involved in sports and physical activity, to use condoms or other protection when they have sex, and they may even be less likely to use helmets when bicycling and or skateboarding (Saewyc et al., 2007).

Almost all of these health disparities have been linked to higher risk for discrimination and violence, and lower levels of school safety and school connectedness.

Despite the discrimination and violence that contributes to these health disparities, research has also shown that when LGBTQ youth have high levels of support from schools, families, and communities, they do well, even if they have experienced stigma and discrimination.

So how do we make it better for LGBTQ youth? There is a clear need for health promotion interventions for LGBTQ youth, strategies that can reduce some of the critical health gaps between them and their peers. Schools are an important environment for youth, and a key place where public health professionals, partnering with school staff, can support effective health promotion strategies. Indeed, some of the best strategies for promoting youth health are those undertaken by educators in schools that also contribute to improvements in learning and school environments.

We were asked to identify and evaluate the existing research about school-based interventions to improve outcomes for LGBTQ youth, examine the quality and relevance of the evidence for schools in Canada, and weigh the potential benefits of different school interventions compared to the potential costs of the health outcomes they address. The goal is to provide evidence-informed guidance on how schools and their public health partners might work together to narrow the gap.

Methods

There were a number of steps to locate, screen, and review existing research articles, then evaluate their health-related outcomes and extrapolate their effects to the B.C. school context.

Step 1: Literature Search and Selection

Our search was focused on school-based policies and programs that were designed to improve school contexts or promote health for lesbian, gay, bisexual, transgender, Two Spirit, queer, or questioning students. If such interventions also had benefits for heterosexual students, these were noted, but the primary focus was LGBTQ youth.

A structured search of all applicable research indexes and databases has been carried out that reviewed studies reporting a relationship between policies and interventions and effect on health outcomes among youth, with a specific focus on LGBTQ youth.

Search engines and repositories searched included PubMed, PubMed Central (PMC), EBSCOhost, and databases included ERIC, PsycINFO, CINAHL Complete, CINAHL Full Text, Medline, and Cochrane Central Register of Controlled Trials (CCRCT), and Cochrane Database of Systematic Reviews. Google Scholar was also searched. Other ways that articles were obtained were through the references section of other articles, as well as the “similar articles” feature available in some databases.

A search through grey literature, such as government report indexes and publications, was also conducted in an effort to capture reports about interventions that may not have been published in the professional literature. Grey literature databases searched include the Canadian Best Practices Portal for Health Promotion and Chronic Disease Prevention, Canadian Institute of Health Information, and the New York Academy of Medicine Grey Literature Report.

Studies were included if they were published in English, described an actual policy or program intervention in schools, and reported outcome measures from students, whether as statistically significant relationships and/or effect sizes. Articles were excluded if they reported exclusively qualitative findings, including focus group interviews, were retrospective studies of adults who were no longer students, were reviews, news articles, personal accounts, or handbooks.

Search terms used:

LGB, LGBTQ, sexual orientation, sexual minority, lesbian, gay, bisexual, transgender, adolescent, student, youth, intervention, school, program, policy, health, randomized trial

Filters and excluded terms:

Initially, the following key words were excluded from search: "commentary," "editorial," "practice," and "guideline." After a review of search results, no key words were excluded.

Filters used when searching PubMed also included: "RCT (randomized control trial)," "Meta-analysis," "Observational study," "Systematic review," "humans," and "past 10 years".

As a result of these searches, 270 titles and abstracts of both peer-reviewed and grey literature published in the past 10 years that were relevant to the topic were found and screened. For the 25 articles that appeared to fit the criteria from either title or abstract, the complete articles were retrieved and examined more closely. Of these, 13 were excluded, leaving a total of 12 studies that are included in this review.

Four studies were excluded because they involved college/university samples (Ballard, Bartle, & Masequesmay, 2008; Heck, Flentje, & Cochran, 2011; Toomey, Ryan, Diaz, & Russell, 2011; Worthern, 2014). Four studies were excluded from this analysis because the intervention was a global or aggregate measure of school strategies, and therefore no strong conclusions could be drawn about a specific intervention strategy (Hatzenbuehler & Keyes, 2013; Hatzenbuehler, Birkett, Van Wagenen, & Meyer, 2014; McGuire, Anderson, Toomey, & Russell, 2010; Sandfort, Bos, Collier, & Metselaar, 2010). A further five studies were excluded because they involved outcomes that were weak with respect to their connection to specific health care system involvement. Instead, these studies involved outcomes such as student engagement (Seelman, Forge, Walls, & Bridges, 2015), sense of mastery or purpose (Poteat et al., 2015), self-esteem or proactive coping (Craig, Austin, & McInroy, 2013), perceived safety of the student population (Toomey, McGuire, & Russell, 2012), or likelihood of intervening in an anti-LGBTQ harassment situation (Wernick, Desel, Kulick, & Graham, 2013).

Step 2: Evaluating the quality and relevance of the research evidence

Each article included was then assessed for its methodological quality and its relevance or applicability to the B.C. school context. We used a review scoring sheet with criteria for ranking the strength of the research design, sampling (including comparison or control groups), outcome measures reported, the statistical analyses used to evaluate effects (especially effect sizes). The studies were also scored for the similarity or transferability of their context; for example, a study that took place elsewhere in Canada would be ranked higher than one that was conducted in another country, and a study from the USA would be ranked higher than one from a very different cultural and educational context, for example, from a low-income country in Southeast Asia, or Eastern Europe, if such articles exist.

Step 3: Documenting health-related outcomes and calculating effect sizes and other measures of impact

For every article that included findings specific to LGBTQ youth, we calculated effect sizes where they were not already presented. Effect sizes are measures of improvement in health (or reductions in health problems or harms) related to an intervention; they require some sort of comparison group that was not exposed to the intervention. Ideally, such comparisons would be drawn from groups that are randomly assigned to get the intervention or not, but school-based programs are often difficult to randomly assign to a school, especially if the intervention is a school-district wide program or policy. Likewise, ideal study design would evaluate change over time, from before to after the intervention has been implemented. This is important to ensure that the intervention happens *before* the outcomes that are supposedly changed by it.

Effect sizes include such measures as odds ratios, risk ratios, relative risk ratios, Cohen's *d*, Hedges *g*, and η^2 (eta squared). Most of these measures have general guidelines to identify what counts as small, moderate, and large effect sizes. They can also often be transformed from one to another.

In addition to these more general measures of effect size, there is a practical extrapolation of these measures that is often used to interpret health care interventions, called the Number Needed to Treat, or NNT. The NNT is the number of people who need to be exposed to the intervention in order for at least 1 person to have the specific improvement (or reduction in negative outcome). For each effect size in a study that could be transformed to be included in the calculation of NNT, we also report those calculations in the appendix.

Step 4: Extrapolating the outcome-related effect sizes to a “typical B.C. school” case to help weigh benefits and costs—and potential cost savings of the interventions

Although the NNT can be a useful measure of effect size for an individual intervention, how do you make sense of it when the intervention is for an entire school, and the evaluation of outcomes is at the population level (for example, outcomes for all LGB youth, and for all heterosexual youth)? The NNT needs to be converted to a meaningful measure that identifies an estimated number of people in a school whose health may specifically benefit if the intervention is implemented. Our approach is

similar to the Number of Events Prevented formula, which adapts NNT for populations, but we draw on more precise estimates from existing data in BC.

To do this, we defined a hypothetical “Typical B.C. School” that has 1000 students. Given the reported prevalence of LGB youth, mostly heterosexual youth, and exclusively heterosexual youth in schools in B.C., we estimated that a school with 1000 students would have 30 lesbian, gay, and/or bisexual students, 70 mostly heterosexual students where such a group is included in the analyses, and 900 heterosexual students. (Note: Because measures to identify transgender students have not been validated for and included regularly in school-based surveys, and their prevalence in the general population is estimated to be around 2 in 1000 youth, we cannot estimate effects for them in these studies at present).

For this Typical B.C. School case, we then multiplied the hypothetical number of students that make up either the LGB group or the heterosexual group in our Typical B.C. School by the *patient expected event rate*, or PEER, i.e., the prevalence of the health outcome for their sample in the study. This allowed us to identify how many LGB youth, for example, would have reported that negative health outcome in our Typical School if the intervention was not implemented. The NNT tells you how many youth need to be exposed to the intervention for at least 1 student to benefit: the smaller the number, the stronger the effect. But in the case of a policy or school-wide program, the entire school is exposed to the intervention. This is also the case where a program is documented to have effects on the school beyond the students who directly participate in it, for example, if the intervention is a Gay-Straight Alliance whose goal is to change the whole school climate. So we translated the NNT into school-wide effects by

dividing the total number of hypothetical students in each population group by their specific NNT, and then adding those results together, to identify how many students would benefit, or how many fewer students would have the negative outcomes (and in the case of odds ratios and relative risk ratios, this translates directly back into the effect sizes, as a check against the accuracy of the estimate). For studies from the US, we drew on their reported prevalence data to calculate results for a Typical US School of 1000 students, rather than trying to apply it to BC directly. So, for example, we report extrapolations for a typical Massachusetts school when data are from Massachusetts.

Given that such calculations often result in “partial” students, i.e., 1.42 students improved, we rounded those numbers to the nearest whole number.

For some health outcomes, such as suicide attempts, the average costs of dealing with the problem in the health care system or other sectors have been documented, either within B.C. or across Canada. Where such costs per case exist, we then multiplied the number of students who wouldn’t experience the negative outcome by the cost of that outcome, to have a sense of how much would be potentially saved by implementing the program or policy.

Step 5: Synthesizing the findings to develop recommendations

Finally, we drew on all the results that were extracted, calculated, and extrapolated from the various studies to come up with a range of effects, or a range of number of students who would benefit from the intervention, for those studies where that was possible, and the potential costs saved. We used these results to identify the interventions with the highest quality evidence, the strongest effects for the widest range of students (and a variety of health outcomes), and the most likely cost-benefits, to be able to make recommendations about which health promotion efforts appear to offer the most promise.

Limitations to this review and synthesis

As with all such projects, there are limitations that must be taken into account. There are a number of innovative programs, policies and practices that have been developed to promote the health and safety of LGBTQ youth in schools; some of them have been described in the literature, a smaller number have been evaluated, and an even small number have been evaluated with designs that allow effect sizes to be calculated. Our list of interventions is limited by the level of evidence we found in the literature. This does not mean these other interventions do not work, just that they have no evidence one way or another, or they do not have sufficient evidence yet. The calculations we derived from the studies are at best estimates of likely effects, which can be limited by the sampling or research design or measures reported. Studies that focus on a single school or a few schools may not apply to schools that are quite different from them, for example rural schools; on the other hand, studies that include schools from a national sample, or a large number of schools province-wide, would be much more applicable.

And finally, the costs estimated are based on published reports that often are several years old, and so inflation rates, changes in the economy, and rising health care costs may mean these are

undercounts of the current costs. As a result, these may be conservative estimates of cost benefits for particular interventions.

Results

The quality and relevance of the studies found

The evidence base for school-based interventions to improve health outcomes for LGBTQ youth is sparse. Our literature search did not find any studies that used a randomized controlled trial or even quasi-experimental design to investigate the intervention, although it is important to recognize that cluster-randomized trials can be both difficult and expensive when trying to test policies or programs at a population level, such as within schools.

All the studies we reviewed used cross-sectional surveys to collect data. The primary weakness of such designs is they generally cannot ensure that the intervention occurred before the outcome it was supposed to influence, which is a key requirement for inference. That being said, two studies from British Columbia tried to address that common weakness by including information on the length of time the intervention had been in place, and included health outcomes that had occurred within the past month or the past year, so the intervention preceded the outcomes of interest (Konishi, Saewyc, Homma, & Poon, 2013; Saewyc, Konishi, Rose, & Homma, 2014).

Authors of all the reviewed studies acknowledged that stronger evidence could be obtained in studies that incorporated longitudinal, cohort, or quasi-experimental designs that investigated health outcomes both before and after implementation of the intervention.

Only three studies involved Canadian data; the rest were based in the United States.

What health outcomes are most-commonly reported in the studies?

While there are a number of school-related outcomes reported in the intervention studies, such as increased perceptions of safety, more positive school climate, lower levels of skipping school, there were also several different health outcomes evaluated. Mental health issues, especially suicidal ideation and attempts, were assessed as outcomes in 4 of the 13 studies. This is an important health issue to consider, as suicide is the second leading cause of death among adolescents in Canada, and suicidal ideation and previous suicide attempts are key predictors of death by suicide. The Canadian Institute for Health Information has also identified the average cost to the health care system of treating a suicide attempt in 2009 as \$10,220, so that estimate has been used to calculate the potential cost savings from preventing suicide attempts as an outcome. Of course, not all suicide attempts by adolescents result in emergency room visits or in-patient psychiatric hospitalizations, so cost savings may be less than projected by CIHI.

A second common set of health outcomes are various questions focused on substance abuse, including tobacco use, binge drinking, misuse of prescription medications, use of cocaine and other illegal drugs, and multiple negative consequences of substance use, which are criteria for diagnosing substance abuse. These were outcomes tested in 4 studies.

A third health issue included as an outcome in some of the studies is discrimination, victimization or bullying; as a health issue, it can lead to physical injuries, but also mental health problems, including suicidal thoughts and suicide attempts. This was more commonly included as an outcome, in 8 of the 13 studies.

One study also examined risky sexual behaviours as a health outcome affected by the intervention.

Evaluating the evidence for the interventions

School-based interventions linked to health outcomes for LGBTQ youth primarily centred on three different strategies:

1. Gay-Straight Alliances (GSAs) or similar student club.
2. An inclusive anti-harassment or anti-bullying policy that specifically includes sexual orientation.
3. Inclusive curriculum that includes LGBT people, history, issues, information.

A summary of the types of studies reviewed is included in each of the separate sections below.

GSAs

The area with the most abundant research to date deals with GSAs. Eight of the studies selected for full-text review looked at the presence of GSAs in schools.

Half of the studies included population-based samples and an independent objective assessment of whether GSAs were present, while the other half relied on convenience samples and the self-report of students. While three of the studies involved youth from across the U.S., the remainder were local or regional studies (in B.C., Colorado, and Wisconsin). All the studies involved comparisons of students in schools with GSAs to those without GSAs.

GSAs have been associated with more positive school climates (e.g., fewer homophobic remarks, less bullying) and perceived school safety (Russell, Horn, Kosciw, & Saewyc, 2010). With respect to health outcomes, the studies reviewed here look at the presence of GSAs and their relation to suicidality, problematic substance use, and victimization.

The only B.C.-based studies found in the literature review were performed by Saewyc and colleagues. These studies used cross-sectional population-based data from the 2008 B.C. Adolescent Health Survey and involved over 21,000 students in grades 8 to 12. Individual student data was matched with GSA information obtained from school administrators. The studies looked at the relationship between timing of GSAs and substance use (Konishi et al., 2013) discrimination and suicide attempts (Saewyc et al., 2014). To try to sequence the intervention data and the outcome, the study focused on GSAs that had been in place 1 or 2 years, or 3 or more years, compared to no GSA, and outcomes that had occurred within the past year.

Saewyc et al.'s research (2014) found that having longer-established GSAs (those that had been in place for more than three years), as opposed to no GSA, was associated with lower odds of

suicidal ideation and attempts for LGB girls and ideation for boys, even after controlling for levels of despair. Our NNT analysis of this study's results found NNTs for suicidal ideation and suicide attempts among LGB youth and mostly heterosexual students ranged between 4-12 in a school with a GSA. Thus, in a typical B.C. high school of 1,000 students, this intervention could prevent up to 7 LGB students' suicidal ideation, and 2 LGB girls' suicide attempts. Longer-established GSAs were also associated with lower odds of discrimination for both LGB boys and girls. See the summary in the text box below for the overall estimated number of students affected, and the estimated cost savings from preventing suicides.

The second study that used the 2008 B.C. Adolescent Health Survey data looked at the relation between GSAs and substance use (Konishi et al., 2013). This study found that having GSAs in place for at least three years was associated with a lower likelihood of recent binge drinking (NNT= 7) and a lower likelihood of experiencing multiple harms from substance use for lesbian and bisexual girls (NNT = 7) compared to students in schools with no GSA.

These B.C.-based studies also found beneficial effects of GSAs for heterosexual students, although with less striking impact. However, given their much larger population size in a school, this means potentially affecting a much larger number of students. Heterosexual boys in schools with longer-established GSAs were less likely to attempt suicide (NNT=85) and mostly heterosexual girls were less likely to have considered suicide (NNT=12). In addition, among mostly heterosexual boys and girls longer-established GSAs in schools were also associated with lower odds of discrimination. With respect to problem substance use, students in schools with longer-established GSAs reported a lower likelihood of recent binge drinking (having five or more drinks last Saturday) for both boys and girls (NNT=22 and 24, respectively) and fewer problems due to substance use for boys (NNT=32).

Typical B.C. School Example for GSAs: Given a school of 1,000 students, the information from the B.C.-based studies (Konishi et al., 2013; Saewyc et al., 2014) suggest that there would be roughly 12 LGB students, 17 mostly heterosexual, and 86 heterosexual students with recent suicidal thoughts. Similarly, there would be about 8 LGB students, 7 mostly heterosexual students, and 33 heterosexual students in the school who would have had a suicide attempt in the past year. There would also have been 297 students with recent binge drinking, and 12 LGB students and 180 heterosexual students with problem substance use (multiple harms as a result of alcohol or drug use).

But in schools with established GSAs (3 years or longer):

- The number of youth with a past year suicide attempt would have been reduced by up to 7 suicide attempts, or nearly 1 in 7 attempts.
- This could save the health system about \$71,540 in prevented suicide attempts.
- GSAs would also contribute to about 41 fewer students reporting recent binge drinking, or about 14% of students.
- The number of students with problem substance use would be reduced by 2 LGB and 14 heterosexual students, or about 8% of those at risk.

Some U.S.-based studies have also found positive results for GSAs in schools. For example, data from the 1999 Massachusetts Youth Risk Behaviour Survey (YRBS) involving a state-wide representative sample of approximately 3,600 high school youth was matched with program information provided by school principals (Goodenow, Szalacha, & Westheimer (2006). This study found that sexual minority students in schools with GSAs had lower odds of victimization and suicidality compared to those in schools without GSAs, controlling for school characteristics such as size, location, and school safety as well as student demographic variables. Sexual minority students in their sample included more than youth who self-identified as LGB, it included those who engaged in same-gender sexual behaviour. Based on their findings, a GSA intervention could prevent victimization for 6 to 7 sexual minority youth in a typical Massachusetts high school. Furthermore, the intervention could potentially prevent suicide attempts among 7 of the 11 sexual minority youth who would have reported 2 or more suicide attempts, saving the health system \$143,080.

Another study drew on a population-based sample of one county in Wisconsin, which involved nearly 16,000 students in grades 7 to 12 who completed the 2009 Dane County Youth Assessment (Poteat, Sinclair, DiGiovanni, Koenig, & Russell, 2013). GSA data was obtained from an independent organization that supported GSAs in schools. Analyses controlled for several school characteristics such as size, racial diversity, sexual orientation diversity, and student socioeconomic status. In contrast to the findings of Goodenow et al. (2006), this study did not find an association between GSA presence and victimization in the past year. It did, however, find that GSAs were associated with less frequent smoking and drinking in the past year and fewer reports of past year suicide attempts and casual sex in their lifetime; and more so for LGBTQ youth than their heterosexual peers and more so for girls than boys in the cases of suicidality and casual sex. The type of statistical analyses presented did not allow us to convert effect sizes into NNTs and thus extrapolate to a typical school, but the results do suggest significant benefit from the presence of GSAs.

Smaller studies based on convenience samples of youth have also investigated GSA presence. Heck et al. (2014) used survey results based on 475 LGBT high school students recruited through LGBT community and school groups in the U.S. After controlling for demographic variables, childhood trauma, community climate regarding LGBT people, parental acceptance of child's sexual identity, and school victimization, results indicated that GSA presence was associated with lower odds of lifetime use of cocaine, hallucinogens, and marijuana as well as misuse of ADHD and pain medication. Our analysis of these results indicates that between 1 and 4 LGB students in a typical B.C. high school could be prevented from using or misusing these substances if the school had a GSA. The difficulty with these results is that the substance use measures were for any lifetime use, which makes it difficult to determine if the outcome occurred after the presence of a GSA.

A few studies that looked at GSA presence use simpler methodologically, in that they were convenience samples and limited to simple bivariate analyses with no controls for confounding variables. Approximately 300 LGBTQ youth aged 13 to 22 were recruited through LGBTQ-serving agencies, events, and websites in a study by Walls and colleagues. Respondents were

primarily from Colorado. Results indicated a small effect for GSAs and suicide attempts in the past year but not ideation, recent or lifetime substance use (Walls, Wisneski, & Kane, 2013), or victimization in the past year (Walls, Kane, & Wisneski, 2010).

The 2013 National School Climate Survey conducted online by GLSEN includes a sample of 7,898 LGBT students aged 13 to 21 across all of the U.S. (Kosciw, Greytak, Palmer, & Boesen, 2014). The students came from 2,770 different school districts. Results from this survey indicated that students in schools with GSAs were less likely to experience high levels of sexual orientation-based victimization compared to those in schools without GSAs (19% vs. 36%). Another study which used somewhat more sophisticated analyses and data from the 2009 version of the National School Climate Survey found that when GSAs were considered in a model with other school-based strategies such as inclusive anti-bullying policies and inclusive curricula, GSAs were significantly associated with reduction in victimization on the basis of gender expression with stronger effects for transgender than for cisgender youth (Greytak, Kosciw, & Boesen, 2013).

Inclusive anti-bullying or harassment policies

Six of the reviewed studies investigated inclusive anti-bullying or anti-harassment policies, that is, policies that specifically make reference to sexual orientation. Of the six studies described here, three (Goodenow et al., 2006; Konishi et al., 2013; Saewyc et al., 2014) included representative population-based regional samples (B.C. and Massachusetts) of youth and included an independent appraisal of the presence of inclusive policies, while three studies (Chesir-Teran & Hughes, 2009; Greytak et al., 2013; Taylor et al. 2011), used convenience samples involving youth across the U.S. that relied on student self-report about the presence of policies. All of the studies involved comparisons of youth in schools with and without inclusive policies, with the exception of one study (Chesir-Teran & Hughes, 2009), which used a count of the number of inclusive policies as a predictor of outcomes.

Inclusive policies have generally been associated with positive school environments that are safe and supportive; and in their review, Russell, Kosciw, Horn, and Saewyc (2010) cite studies indicating fewer homophobic remarks, less harassment and assault, and more staff intervention in harassment situations. However, few studies have specifically looked at health outcomes. The studies reviewed here explored suicidality, problematic substance use, and victimization.

The work by Saewyc and colleagues in B.C. also looked at the presence of anti-homophobia policies in schools. Information about policies was gathered from schools and school district websites as well as from school administrators. The study found that these policies were associated with a reduced likelihood of past year suicide attempts among LGB youth (Saewyc et al., 2014). Our extrapolation of the findings suggests the intervention could help prevent suicide attempts for 3 out of 8 LGB students who might be at risk in a typical B.C. high school with an estimated cost savings of \$30,660.

Furthermore, the study indicated that longer-established policies (those that had been in place for more than three years) were associated with reduced ideation and attempts for gay and bisexual

boys and attempts for lesbian and bisexual girls. Longer established policies would prevent up to 3 LGB girls from suicidal ideation, and 4 students from suicide attempts, which would save up to \$40,880 in health care costs. There was also an association between longer-established policies and lower odds of discrimination among mostly heterosexual girls.

Some schools in B.C. had both GSAs and inclusive policies, and the study also examined the effects of the combination. Sexual minority girls in schools with both GSAs and LGBTQ-inclusive policies reported reduced odds of suicidal ideation and attempts, and both LGB boys and girls reported less discrimination. This would translate to reduced suicidal ideation for 3 LGB youth, and preventing suicide attempts among 3 youth, for a savings of \$30,660.

As was the case with GSAs, Saewyc and colleagues (2014) also found beneficial, although somewhat weaker, effects of inclusive policies for heterosexual students. Specifically, the presence of inclusive policies was linked to a lower likelihood of past year suicidal ideation among heterosexual girls and sexual orientation discrimination among mostly heterosexual girls. Furthermore, longer-established policies were associated with lower suicidal ideation for heterosexual boys. Although the effect was weaker (a higher NNT) because there are so many more heterosexual students in a school, a similar number of heterosexual students would potentially be influenced by inclusive policies as LGB youth: up to 7 fewer heterosexual girls would report suicidal ideation, and among longer-established policies, up to 9 fewer heterosexual boys would report suicidal ideation.

With respect to inclusive policies and substance use, Konishi et al. (2013) found that the presence of longer-established anti-homophobia policies was not associated with problematic substance use among LGB youth, but it was associated with reduction in regular binge drinking in the past month among both heterosexual girls and boys (NNT=23-26) and multiple harmful consequences in the past year among heterosexual girls (NNT=21).

Typical B.C. School Example for Inclusive Policies: Given a school of 1,000 students, the information from these studies (Konishi et al., 2013; Saewyc et al., 2014) suggest that among 30 LGB students & 900 heterosexual students, there would be roughly 8 LGB students, 7 mostly heterosexual, and 33 heterosexual students in the school who would have had a suicide attempt in the past 12 months. There would also have been 80 students who engaged in binge drinking on 6 or more days in the past month, and 12 LGB students and 180 heterosexual students with problem substance use (multiple harms as a result of alcohol or drug use).

But in schools with inclusive policies for 3 years or longer:

- The number of LGB youth with a past year suicide attempt would have been reduced by up to 4;
- At \$10,220 per student with a suicide attempt, inclusive anti-bullying policies could save the health system about \$40,880 in prevented suicide attempts.
- Up to 37 fewer heterosexual students would report 6 or more episodes of binge drinking in the past month.

The population-based study of youth in Massachusetts based on the 1999 YRBS also looked at policies, the presence of which was obtained from school principals (Goodenow et al., 2006). Having inclusive anti-bullying policies in a school was associated with reduced odds of attempting suicide in the past year even when past year school victimization was included in the model. Our analysis of the results regarding suicide attempts indicated up to 9 fewer sexual minority students in a typical Massachusetts school would report suicide attempts in schools with inclusive policies, saving up to \$91,980. Furthermore, up to 9 fewer students would report multiple suicide attempts, saving up to \$183,960.

Greytak et al.'s (2013) analysis of the 2009 National School Climate Survey which explored several school-based strategies including inclusive policies, GSAs, inclusive curricula, and supportive educators (as assessed through student self-report) found that policies were inversely associated with discrimination based on sexual orientation and gender expression, but only at the bivariate level. Policies were no longer a significant predictor when all strategies were considered together.

In addition, Chesir-Teran & Hughes (2009) used data from an Internet survey of approximately 2,000 queer and questioning youth aged 14 to 18 years old. Participants came from every state in the U.S. They also found no significant association with lifetime sexual orientation victimization. Finally, Taylor et al., (2011) carried out a national climate survey in Canada which included about 3,600 youth. Their bivariate analyses indicated a small effect size for the association between having anti-homophobia policies in school and LGBT youth's experiences of sexual orientation victimization such as physical harassment (80% of LGBT youth in schools with policies had never been physically harassed compared to 67% in schools without policies).

Inclusive curriculum

All three studies were based on convenience samples and self-report measures including those about the curriculum. Two of the studies were based on national climate surveys of youth (one in the U.S. and one in Canada) and the other study was based in California. These three studies compared youth in schools with inclusive curriculum to those in schools without such curriculum. Like inclusive anti-homophobia policies and GSAs, inclusive curriculum has been associated with positive school climate (Russell et al., 2012). The studies reviewed here focus on victimization.

One of the studies (Snapp, McGuire, Sinclair, Gabrion, & Russell, 2015) used data from the 2008 Preventing School Harassment Survey (PSH) developed by the California Safe Schools Coalition. This sample included 581 straight and 388 LGBTQ youth and Allies (i.e., GSA members) aged 12 to 18. Findings suggested that exposure to curricula that was inclusive of LGBTQ people or issues, particularly in sex education and health classes, was associated with decreased bullying in the school but more bullying at the individual level. The multilevel models controlled for sexual orientation and GSA membership.

In contrast, results from the most recent National School Climate Survey in the U.S. indicated that those who had inclusive curriculum in school were less likely to experience victimization

based on sexual orientation (13% vs. 31%) or gender expression (14% vs. 31%) (Kosciw et al., 2014). The corresponding Canadian school climate survey (Taylor et al., 2011), on the other hand, found no relationship between LGBTQ-inclusive curriculum and levels of harassment or assault.

Conclusions

Our review suggests that GSAs and LGBTQ-inclusive anti-bullying/harassment policies may be interventions worth implementing in B.C. schools in order to improve health outcomes for LGBTQ youth. According to Saewyc et al.'s (2013) study, 79% of the schools that were contacted in 2008 did not have a GSA and 81% did not have an explicit anti-homophobia policy. Recent contact with B.C. schools has indicated a large upsurge in schools with policies and GSAs; as of 2014, 36 of the 59 school districts (61%) had an explicit inclusive policy, and the number of GSAs increased from 53 in 2008 to 167 in 2014.

Once a GSA is established, the cost of implementing it would be the cost of about an hour's time per week for a sponsor teacher or public health nurse during the school year, or likely less than \$1,000 per year. Given the cost savings just from prevented suicide attempts could range from \$30,000 to \$183,000, this suggests a significant cost savings to the health care system just in reduced suicidality. The cost of implementing and enforcing policies is harder to quantify, but the benefits are clear for students in B.C., including heterosexual students.

Implications for Research

Like the authors of the studies we reviewed, we feel that even stronger evidence would be obtained from longitudinal, cohort or experimental studies that investigated health outcomes both before and after implementation of the intervention. As well, there are only a few specific types of interventions that have been evaluated in the literature. It is possible that other interventions may be effective, but just have not been tested yet. More high quality evaluations and intervention trials are needed for school-based programs that promote LGBTQ health. Furthermore, work should be done to fully investigate which aspects of these interventions help to make them successful, i.e., what is the mechanism of effect? For example, previous research has indicated that GSAs with longer-serving advisors and that have greater support in the community outside of school were associated with better student well-being (Poteat et al., 2015). As well, it is unclear which elements of LGBTQ-inclusive policies are the most effective, to recommend best practices.

Implications for Policy and Practice

These findings could be useful as one source of evidence for policies and programs across multiple levels of government that can address these health disparities. Starting and sustaining these interventions will require some resources, although it appears to be relatively modest costs. Establishing such interventions will also need support from school districts/school staff, communities, families and the interest of youth themselves, Public health professionals could partner with schools and students in helping to develop GSAs, or share health-related evidence to

support the development of inclusive policies. Supportive policies are often enacted at the school district level, rather than just within individual schools.

While the findings may provide a source of evidence that GSAs and inclusive policies and inclusive curriculum fosters health improvements, they do not provide direct guidance on *how* to effectively set up GSAs, or what effective LGBTQ-inclusive policies include. In Canada, there are a number of resources to help youth and teacher or school nurse sponsors develop and run GSAs, as well as policy examples from school districts in a number of provinces. The website MyGSA.ca has collected many of these resources in a single site.

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**Studies that met the full inclusion criteria and were evaluated are marked with **.

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Appendix: Summary of results for studies with NNT and Typical B.C. school calculations

Study group	Effect size (OR, Cohen's <i>d</i> , Hedges <i>g</i> , η^2)	Patient Expected Event Rate (PEER)	Risk Difference/ Strength of effect	Number Needed to Treat (NNT)	Benefits in Typical B.C. School	
					Numbers prevented	Costs prevented
<p>Konishi, C., Saewyc, E., Homma, Y., & Poon, C. (2013). Population-level evaluation of school-based interventions to prevent problem substance use among gay, lesbian and bisexual adolescents in Canada. <i>Preventive Medicine</i>, 57(6), 929–933.</p>						
<p>Intervention: GSA for 3 or more years Outcome: 5 or more drinks last Saturday</p>						
LGB girls	0.48	.415	-0.161	7	2	n/a
Heterosexual boys	0.81	.341	-0.0457	22	20	n/a
Heterosexual girls	0.81	.294	-0.0418	24	19	n/a
<p>Intervention: GSA for 3 or more years Outcome: 3 or more harms due to alcohol or drug use past year</p>						
LGB girls	0.50	.388	-0.1473	7	2	n/a
Heterosexual boys	0.80	.188	-0.0317	32	14	n/a
<p>Intervention: LGBTQ-inclusive policy for 3 or more years Outcome: binge drinking on 6 or more days in past month</p>						
Heterosexual boys	0.55	.093	-0.0396	26	17	n/a
Heterosexual girls	0.38	.074	-0.0445	23	20	n/a
<p>Intervention: LGBTQ-inclusive policy for 3 or more years Outcome: 5 or more drinks last Saturday</p>						
Heterosexual girls	0.68	.294	-0.0733	14	32	n/a
<p>Intervention: LGBTQ-inclusive policy for 3 or more years Outcome: 3 or more harms due to alcohol or drug use past year</p>						
Heterosexual girls	0.72	.211	-0.0495	21	21	n/a

Study group	Effect size (OR, Cohen's <i>d</i> , Hedges <i>g</i> , η^2)	Patient Expected Event Rate (PEER)	Risk Difference/ Strength of effect	Number Needed to Treat (NNT)	Benefits in Typical B.C. School	
					Numbers prevented	Costs prevented
Intervention: LGBTQ-inclusive policy for 3 or more years Outcome: any alcohol use last Saturday						
Heterosexual girls	0.76	.478	-0.0676	15	30	n/a
Saewyc, E. M., Konishi, C., Rose, H. A., & Homma, Y. (2014). School-based strategies to reduce suicidal ideation, suicide attempts, and discrimination among sexual minority and heterosexual adolescents in Western Canada. <i>International Journal of Child, Youth and Family Studies</i> , 5(1), 89–112.						
Intervention: GSA for 3 or more years Outcome: suicide ideation						
LGB boys	0.07	.349	-0.3128	4	4	n/a
LGB girls	0.44	.438	-0.1826	6	3	n/a
Mostly heterosexual girls	0.58	.258	-0.0902	12	3	n/a
Intervention: GSA for 3 or more years Outcome: suicide attempts						
LGB girls	0.41	.265	-0.1362	8	2	\$71,540
100% heterosexual boys	0.52	.025	-0.0118	85	5	
Intervention: LGB inclusive school policy Outcome: suicide attempts						
LGB boys	0.38	.234	-0.13	8	2	\$30,660
LGB girls	0.55	.265	-0.0995	11	1	
Intervention: LGB inclusive school policy suicide ideation						
100% heterosexual girls	0.84	.115	-0.0166	61	7	n/a

Study group	Effect size (OR, Cohen's <i>d</i> , Hedges <i>g</i> , η^2)	Patient Expected Event Rate (PEER)	Risk Difference/ Strength of effect	Number Needed to Treat (NNT)	Benefits in Typical B.C. School	
					Numbers prevented	Costs prevented
Intervention: LGBTQ-inclusive policy for 3 or more years Outcome: suicide ideation						
LGB boys	0.24	.349	-0.235	5	3	n/a
100% heterosexual boys	0.72	.075	-0.0198	51	9	n/a
Intervention: LGBTQ-inclusive policy for 3 or more years Outcome: suicide attempts						
LGB boys	0.27	.234	-0.1578	7	2	\$40,880
LGB girls	0.33	.265	-0.1587	7	2	
Intervention: Both GSAs and LGB inclusive school policy Outcome: suicide ideation						
LGB girls	0.41	.438	-0.1958	6	3	n/a
Intervention: Both GSAs and LGB inclusive school policy Outcome: suicide attempts						
LGB girls	0.29	.265	-0.1703	6	3	\$30,660
Goodenow, C., Szalacha, L., & Westheimer, K. (2006). School support groups, other school factors, and the safety of sexual minority adolescents. <i>Psychology in the Schools</i> , 43(5), 573–589.						
6% of students were classified as sexual minority youth (self-identified as LGB and/or reported same-sex sexual contact).						
Note: The calculation for numbers prevented in a typical school used the prevalence of sexual minority youth reported in this study, and therefore it would be typical of a Massachusetts school of 1000 students. The costs prevented are based on Canada statistics.						
LGB student support group and dating violence						
Sexual minority youth	.48	.362	-0.1479	7	6	n/a
LGB student support group and 2+ suicide attempts in the past year						
Sexual minority youth	0.29	.182	-0.1214	9	7	\$143,080
LGB student support group and threatened/injured at school						
Sexual minority youth	0.47	.254	-0.116	9	7	n/a

Study group	Effect size (OR, Cohen's <i>d</i> , Hedges <i>g</i> , η^2)	Patient Expected Event Rate (PEER)	Risk Difference/ Strength of effect	Number Needed to Treat (NNT)	Benefits in Typical B.C. School	
					Numbers prevented	Costs prevented
<i>Anti-bullying policy and suicide attempt in the past year</i>						
Sexual minority youth	0.37	.285	-0.1565	7	9	\$91,980
<i>Anti-bullying policy and 2+ suicide attempts in the past year</i>						
Sexual minority youth	.16	.182	-0.1476	7	9	\$183,960
<p>Heck, N. C., Livingston, N. A., Flentje, A., Oost, K., Stewart, B. T., & Cochran, B. A. (2014). Reducing risk for illicit drug use and prescription drug misuse: High school gay-straight alliances and lesbian, gay, bisexual, and transgender youth. <i>Addictive Behaviors</i>, 39, 824–828.</p> <p>Sample: 475 LGBT high school students who completed an online survey. Participants identified as LGBT, identified with another sexual/gender minority group (queer, pansexual, etc.), or identified as heterosexual but had same sex attractions/partners.</p>						
Note: As the prevalence of LGBT youth in the population was not available in this study, the calculation for numbers prevented in a typical school assumes LGBT youth comprise 3% of the student population (as was the case from the British Columbia studies).						
<i>GSA presence & cocaine use</i>						
LGBT youth	0.322	.055	-0.0366	28	1	n/a
<i>GSA presence & hallucinogens</i>						
LGBT youth	0.386	.082	-0.0487	21	1	n/a
<i>GSA presence & marijuana use</i>						
LGBT youth	0.450	.366	-0.1598	7	4	n/a
<i>GSA presence & ADHD medication misuse</i>						
LGBT youth	0.5	.116	-0.0544	19	2	n/a
<i>GSA presence & pain medication misuse</i>						
LGBT youth	0.5	.162	-0.0739	14	2	n/a

