

5-2017

Estimating Costs and Benefits Associated with Evidence-Based Violence Prevention: Four case studies based on the Fourth R program

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Citation of this paper:

Crooks, C. V., Zwicker, J., Wells, L., Hughes, R., Langlois, A., & Emery, J. C. (2017). Estimating costs and benefits associated with evidence-based violence prevention: Four case studies based on the Fourth R program. *The School of Public Policy*

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Four case studies based on the Fourth R program

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Funding: Funding for this paper was provided by the Public Health Agency of Canada through an Innovation Strategy grant to the first author.

Introduction

Teen dating violence (TDV) and violent delinquency/violent crime¹ are widespread social issues in Canada that have significant repercussions for young adults, their families and society. The effects associated with these issues can be devastating and have a lasting impact on an individual's physical, psychological and behavioural functioning. Teen dating violence is often broadly defined to include three types of behaviours: (i) psychological or emotional aggression (verbal intimidation, threats of violence, jealous behaviour, put-downs, isolating one's partner from family or friends); (ii) physical aggression (physical assault); and (iii) sexual aggression (attempted or completed non-consensual sexual acts, verbal sexual harassment; Teten et al., 2009). In comparison, violent crime (also known as crimes against the person) involves the use or threatened use of violence against a person, regardless of the relationship. Behaviours classified as violent crime include homicide, attempted murder, assaults and sexual assault, among others.

Researchers working in the areas of TDV and youth violence often point out the need for a preventive approach to stop the violence from occurring in the first place (Andresen and Linning, 2014; Berger and Waldfogel, 2011; Bowlus, McKenna, Day and Wright, 2003; Corrado, Leschied, Lussier and Whatley, 2015; Mahony, 2010). These approaches, known as indicated or secondary prevention, focus on youth who have additional risk factors for engaging in these behaviours or who have demonstrated these behaviours in the past (O'Connell, Boat and Warner, 2009). Taking a preventive approach involves reducing the number of new occurrences of TDV and acts of violent crime by providing young people with the skills they need to prevent violence and make healthy relationship choices. Investing in prevention now results in better outcomes and cost savings later (Andresen and Linning, 2014; Bowlus et al., 2003; Wells, Emery and Boodt, 2012). Providing effective prevention programming for adolescents is not only an ethical obligation, it becomes a prudent economic decision, reducing both individual costs in victimization and social costs incurred in numerous systems including health, justice and child welfare (Bowlus et al., 2003).

Research suggests schools can be effective community settings for initiatives that prevent teens from becoming involved in violent dating relationships and intervene where such abuse is already occurring (De Koker, Mathews, Zuch, Bastien and Mason-Jones, 2014; Ellsberg et al., 2015). A Canadian program that has demonstrated effectiveness in reducing dating violence along with other risky behaviours is the Fourth R (Relationships).² The Fourth R is a universal approach that focuses on the underlying relationship dynamics common to dating violence, unsafe sex, substance use and peer violence (Wolfe, Jaffe and Crooks, 2006; see www.youthrelationships.org for more program information). Through multiple studies, the Fourth R has demonstrated the reduction of dating violence, increased condom use

¹ Violent crime (also called crimes against the person) involves the use or threatened use of violence against others, including homicide, attempted murder, assaults, etc. (Perrault, 2015). Delinquency is used to denote these same behaviours and a wider range of anti-social behaviour. Violent crime is a criminology construct and tends to be used in justice-focused publications whereas delinquency is used more widely in the developmental psychology literature looking at pathways from childhood to adolescence and into adulthood. We use the terms somewhat interchangeably in this paper and attempt to use the term that fits with the concept/literature being described.

² The Fourth R refers to relationships. The program is based on the concept that relationship knowledge and skills can and should be taught in the same core curriculum areas traditionally referred to as the three Rs (i.e., 'reading, 'riting and 'rithmetic).

among sexually active youth, and the providing of a protective effect on violent crime³ for maltreated youth in a large sample of adolescents (Crooks, Scott, Ellis and Wolfe, 2011; Crooks, Scott, Wolfe, Chiodo and Killip, 2007; Wolfe et al., 2009; Wolfe, Crooks, Chiodo, Hughes and Ellis, 2012).

In this paper, we will look at the cost-effectiveness argument for investing in violence prevention programs using the Fourth R as an example. First, we discuss the social impact and annual economic costs associated with intimate partner violence (IPV) and violent crime among youth. Second, we examine four case studies of how the Fourth R has been implemented in different phases and in different jurisdictions. Finally, we discuss the cost-effectiveness of investing in school-based prevention activities. Throughout this report, we utilize Canadian data and estimates where such data are available; where U.S. estimates are used, we note that this is the case.

Intimate partner violence in Canada

Intimate partner violence is violence in a relationship that includes “any attempt to control or dominate another person physically, sexually, or psychologically, causing some level of harm” (Werkele and Wolfe, 1999, p. 436). It includes any type of violence within personal dating relationships, whether those involved are current or former partners, common-law partners or marital spouses. In 2013, there were more than 90,300 victims of police-reported cases of violence by an intimate partner (Sinha, 2015). In 2014, for the first time, the government of Canada included questions on dating violence in the General Social Survey and found that almost one in 10 (nine per cent) individuals who had dated during the previous five years reported that they had experienced abuse which included limiting contact with family or friends, name-calling and threats, sexual violence and physical violence (Canadian Centre for Justice Statistics, 2016). IPV has consistently been found to be reported more often by females in Canada and internationally, with young Canadians more frequently reporting rates of intimate partner violence⁴ (Sinha, 2012).

Youth are at a greater risk of intimate partner violence than adults (Zwicker, 2002, as cited in Silverman et al., 2001). Adolescence presents a unique opportunity to target youth before they become chronic offenders (Craig, Schumann, Petrunka, Khan and Peters, 2011; Zwicker, 2002). By the age of 15, 71 per cent of Canadian youth have stated that they were in a relationship⁵ (Mahony, 2008). Between the ages of 15-24, the rate of female, male and total spousal victims of police-reported spousal violence was 2,285, 547 and 1,688 per 100,000 population, respectively (Sinha, 2012). Of those in a relationship, the

³ In this study violent crime was measured by specific items taken from the general delinquency scale of the NLSCY, including (for example), fought with someone to the point where they needed care for their injuries; been in a fight where you hit someone with something other than your hands; carried a knife for the purpose of defending yourself or using it in a fight; threatened someone in order to get their money or things; and, tried to force someone to have sex with you.

⁴ The highest proportion of IPV victimization was reported by those 34 years and under. In Canada in 2011, there were 20,294 reported incidents of dating violence and 7,661 reported incidents of spousal violence among young Canadians between 15 and 24 years of age (Sinha, 2012).

⁵ Young people aged 12 to 14 years of age represent one per cent of all dating partner violence reported to the police in 2010 and 93 per cent of all victims of dating violence in these age groups were female.

prevalence of IPV is higher than what adults report.⁶ Furthermore, these numbers represent the tip of the iceberg, as they include only incidents reported to police.

Aside from IPV's emotional and physical impact on victims and their families, there are high societal costs. A 2009 study on spousal violence conducted by Canada's federal Department of Justice estimated the costs of spousal violence to be over \$7.4 billion⁷ (Zhang, Hoddenbach, McDonald and Scrim, 2013). In another study that focused specifically on women who have left abusive partners in Canada, the estimated costs were calculated to be \$13,162.39 per woman⁸ (Varcoe et al., 2011). Moreover, these costs often extend beyond the interpersonal relationships for years afterwards in the form of health and legal costs (Varcoe et al., 2011; Jones et al., 2006).

Violent crime among Canadian youth

Whereas IPV occurs in intimate relationships by definition, violent crime refers to all forms of violence towards persons regardless of their age or relationship status. A significant risk factor for violence is age. More than one-third of youth have engaged in some type of violent crime by the age of 14 (Savoie, 2006). Data from the *Statistics Canada Youth Court Survey (2013/2014)* reveal that in 2013/2014 approximately 30 per cent of cases processed in youth aged 12-17 were attributed to violent crimes⁹ (Alam, 2015). With age, the risk of violence decreases (Sinha, 2012). In Canada, the rate of violence peaks around 18 years of age and then generally reduces¹⁰ (National Crime Prevention Centre, 2012). Although not all adolescents engage in delinquency, those who do have been found to be at a higher risk for continued behaviour during adulthood (Carrington et al., 2005; Loeber and Farrington). It is estimated that five per cent to 15 per cent of youth involved in the justice system become serious offenders with lengthy criminal careers (Day et al., 2011). Furthermore, many adult offenders began engaging in criminal activities during adolescence. Andrews, Bonta and Wormith (2004), indicated that among 955 adult offenders, 43.6 per cent had been arrested prior to age 16. Intervening with young offenders could thereby reduce their lifetime engagement in violent crimes. Males have been found to commit more violent crimes than females (Craig et al., 2011) and are 78 per cent more likely to appear in youth court (Alam, 2015).

There is also a strong association between child maltreatment and violent delinquency (Crooks et al., 2008; Currie and Tekin, 2006; Fang and Corso, 2007; Lansford et al., 2007). Maltreated children are also more likely to maltreat their own children (Berger and Waldfogel, 2011). There is a cycle of violence in which child maltreatment is associated with perpetration of violence later in life (Currie and Tekin,

⁶ In 2011 there were 27,000 reported incidents of IPV by female youth between the ages of 12 and 18 years.

⁷ The costs include justice system costs (criminal and civil justice systems), victim costs (health care, mental health issues, productivity losses, intangible costs), and third-party costs (funeral expenses, loss of affection/enjoyment to family members, costs to other persons harmed/threatened, social service operating costs, losses to employers, negative impact on children exposed to SV and other government expenditures).

⁸ These costs were broken down into costs to the public sector (\$11,369.77) and costs to the private sector (\$1,792.62) and were calculated based on costs following a woman leaving an abusive relationship.

⁹ In Canada in 2008, 1,111 per 100,000 children and youth reported being victims of violent crimes (Ogrodnik, 2010).

¹⁰ Sixty-two per cent of cases processed through the Canadian youth courts involved adolescents between 16 and 17 years of age, while teens aged 12 to 15 represented 38 per cent (Alam 2015, Juristat). This finding was also corroborated by other researchers who found that crime rates in adolescence peak around the age of 16 (Carrington, Matarazzo and de Souza, 2005; Moffitt, 2001 as cited in Craig et al., 2011).

2006). Thus, investing in evidence-based programs that attenuate the effects of child maltreatment can have an impact not only on the participants themselves, but also on the next generation of children.

Costs have been estimated for youth crime (unlike for TDV). Government expenditures span six public domains including remedial education, health care and social services, social assistance and the criminal justice system, resulting in a per-female and per-male cost of \$244,056 and \$229,236 respectively (Craig et al., 2011). For those in grades 7-9 the estimated average costs for these domains for both males and females was \$81,585 (Craig et al., 2011). However, these youths do not stop accruing costs simply because they become adults. Violent behaviour in adolescence is predictive of violent behaviour during one's lifetime. Cohen and Paquero (2009) estimated that a prevention program that successfully diverts one 14-year-old high-risk juvenile from a life of crime could save between \$2.6 million and \$5.3 million (calculated in U.S. dollars). This paper uses data from the Fourth R program to demonstrate how reductions in dating violence and serious violence against persons can be translated into significant cost savings across a number of sectors.

Teen dating violence as a precursor of IPV

Although official statistics document significant IPV among youth ages 15-24, these statistics miss much of TDV for two reasons. First, as noted, they reflect only the minority of violence that is reported to police. Furthermore, there is evidence that significant TDV occurs prior to age 15; U.S. research has identified prevalence among youth as early as Grade 6 (Simon, Miller, Gorman-Smith, Orpinas and Sullivan, 2009). A working estimate may be that TDV occurs in 25 per cent of teen dating relationships (Wolfe et al., 2001), with about nine per cent of adolescents (possibly limited to those who are actually in dating relationships) being physically victimized by their dating partners each year (U.S. Centers for Disease Control, 2012). Psychological aggression is the most common form of TDV, especially in early adolescence, although Canadian research indicates that, for teens, physical, psychological and sexual abuse often occur in tandem (Sears and Byers, 2010). Research also indicates that about one in four girls experiences verbal sexual coercion or rape/attempted rape by a date or acquaintance each year (see for example Maxwell, Robinson and Post, 2003). Sexual abuse and coercion are highly correlated with sexual cyber-dating abuse; that is, sexual abuse via electronic social networking, such as electronically circulating embarrassing photographs of the victim. One study found that victims of sexual cyber-dating abuse were seven times more likely than non-victims to have also experienced sexual coercion, and perpetrators of sexual cyber-dating abuse were 17 times more likely than non-perpetrators to have also perpetrated sexual coercion (Zweig et al., 2013). Cyber-dating abuse of all types has become common, with American studies reporting that 32 per cent of students in Grade 7 (Cutbush et al., 2012) and 56 per cent of students in Grade 9 (Cutbush et al., 2010) had been a victim of electronic dating aggression.

Researchers have investigated the link between involvement in TDV (as a perpetrator or victim) and later IPV perpetration. A study conducted by Exner-Cortens and colleagues (2017) using a U.S. nationally representative sample (The National Longitudinal Study of Adolescent to Adult Health) showed that male and female adolescents who experienced physical and/or psychological adolescent dating violence were more likely to experience IPV victimization approximately five years later. The emerging picture is complex in that both victimization and perpetration during adolescence raise risks for later perpetration. Two of these studies have used data from the National Longitudinal Study of Adolescent Health — ADD Health (a nationally representative school-based study of youth in grades 7 to 12 during 1994-1995) and the author concluded that in that population adolescent dating violence is highly predictive of IPV

(Manchikanti, 2011). Using data from the same longitudinal survey, Cui and colleagues found that being a victim of violence during adolescence was a significant predictor of violence victimization in romantic relationships in young adulthood. Furthermore, their findings suggest that being a victim in relationships during adolescence was also predictive of violence perpetration in relationships in young adulthood (Cui, Ueno, Gordon and Fincham, 2013).

Given that adolescent dating violence is one of the strongest precursors to IPV in adulthood (Smith, White and Holland, 2003; Spriggs, Halpern and Martin, 2009; Williams, Connolly, Pepler, Craig and Laporte, 2008), it is essential to focus on preventive education with intervention strategies designed to help young people who are just beginning to enter into personal dating relationships. Costs have not been estimated for TDV specifically; therefore, in order to estimate costs, the assumptions include the link between TDV and IPV such that costs can be estimated based on the proportion of IPV assumed to be avoided.

Effective prevention programming: The Fourth R (Relationship)

The Fourth R is an initiative that includes a range of violence prevention and healthy relationships programs developed for school and community settings. Fourth R programs differ with respect to age/grade level and format. All Fourth R programs are based on the contention that relationship skills can be taught the same way as many other academic or athletic skills — through breaking down the steps and giving youth lots of guided practice (Wolfe, Jaffe and Crooks, 2006). The Fourth R was developed by a consortium of researchers, educators and psychologists. The original program was developed to align with the Ontario Ministry of Education’s curriculum expectations for healthy living, within the Grade 9 physical and health education credit. Since 2001, the program has expanded to be used in schools throughout Canada. It has also been implemented in numerous U.S. states and internationally.

There are many program options available beyond the original Grade 9 program, most of which continue to align with curriculum expectations to minimize barriers to implementation (compared to add-on programs). These programs include healthy living curriculums for grades 7-9 and English curriculums for grades 9-12. There are slightly different versions of these curriculums that align with every province’s and territory’s specific expectations to ensure that educators around Canada can meet their teaching requirements by implementing the program. Additional versions of the Fourth R have been developed for different First Nations perspectives. Most recently, a version for small groups was developed with an enhanced mental health focus, called the Healthy Relationships Plus Program. There is a supported literacy version of the HRPP for youth with lower literacy levels, and an LGBTQ-specific version is under development for use in school-based gay/straight alliances or community support groups for LGBTQ youth. The Fourth R offers various in-person and online teacher training options, including opportunities to become master trainers (i.e., a train-the-trainer model whereby school districts and community organizations can have their own trainers certified as Fourth R trainers).

How do we know the Fourth R works?

The Fourth R team has published numerous studies evaluating the program and its implementation. The initial cluster randomized control trial (RCT) with the Grade 9 program included 20 schools with over 1,700 students aged 14 to 15 years. Students were surveyed before receiving programming, and 2.5 years after the program. Results indicated that physical dating violence was about 2.5 times greater among control (i.e., standard health education) versus intervention (i.e., Fourth R) students at the 2.5 year follow-up, and that the intervention impact was greater for boys than girls. For example, the Fourth

R intervention improved condom use in sexually active boys compared to their counterparts in the control condition (Wolfe et al., 2009). In addition to reducing negative behaviours, observational data demonstrated an increase in effective peer resistance skills among Fourth R students compared to the control group (Wolfe et al., 2012).

Beyond the Fourth R's universal impacts, there is evidence that the program had a protective impact for vulnerable youth. Analysis of the RCT data indicated that there was a protective effect for youth with a history of multiple forms of maltreatment with respect to lowering the likelihood of engaging in violent delinquency (Crooks et al., 2007). Furthermore, this buffering effect was still evident at the two-year follow-up (Crooks et al., 2011). Similarly, a quasi-experimental evaluation of the Fourth R in Alaska found a similar pattern of increased benefits for youth with significant histories of maltreatment and other adverse experiences (Siebold, Crooks, Exner-Cortens, Hegge, Prunella and Moore, 2014). These findings provide a promising indication that not only is the Fourth R beneficial for all youth; it may be particularly beneficial for youth who need it most.

In addition to strong findings with the Grade 9 program, the evidence base has recently been extended to include younger students. A province-wide evaluation in Saskatchewan showed that youth in the Grade 8 program demonstrated improved knowledge about violence, awareness about the impacts of violence, and an increased ability to identify healthy coping strategies (Crooks, Scott, Broll, Zwarych, Hughes and Wolfe, 2015). In this study, surveys were collected post-intervention from 1,012 Grade 7 and 8 students within 55 schools randomized to intervention or control conditions in school divisions across the province. Although the time frame of this study precluded follow-up data and an evaluation of behavioural change, the findings are promising in the context of the extensive evidence surrounding the Grade 9 program. Two years of successive developmentally appropriate programming are identified as a best practice by CASEL (2013), and the results of this study support the notion that the Fourth R program meets this criterion.

Economic evaluation of Fourth R

As stated above, the initial RCT demonstrated efficacy in that the Fourth R significantly reduces adolescent dating violence (Wolfe et al., 2009) and violent delinquency (Crooks et al., 2007, 2011). Using the outcomes from the Fourth R RCT, we conduct a cost-benefit analysis from the perspective of the public payer for services. This analysis requires quantification of the costs and the outcomes in dollars so that the benefits produced by the intervention can be compared to the cost. Where possible, analyses from the perspectives of society and the family are included, data permitting. Costs relate to the Fourth R intervention implementation and vary based on location and phase of implementation. To illustrate a range of costs associated with the Fourth R program, we provide four case examples that are currently implementing the Fourth R — one is a district-wide implementation from the Thames Valley District School Board (a large school district in southern Ontario), two cases are from the Northwest Territories, and one case is from the province of Alberta. The measure of benefit is derived from the primary outcome measures described in the RCTs including estimates of costs associated with intimate partner violence and violent delinquency. All measurement and analytic assumptions made for the base case analysis are clearly stated, and estimates in terms of costs avoided for the benefits are drawn from published sources. A five per cent discount rate was applied to outcomes and costs extending beyond one year.

Calculating cost savings associated with reduction in dating violence

The initial Fourth R trial had 1,722 students participate and we estimate half or 813 of these are boys. Sixty per cent or 1,041 students reported having dated in the past 12 months and we estimate half of those, or 349, are boys. Table 1 reports the percentage of students who reported dating violence in control and intervention groups. From these estimates we determined the number of IPV cases avoided. To estimate net present value (NPV) we adjusted the number of students to reflect the prevalence rate of IPV in adults at six per cent (Sinha, 2012; Wells, Emery and Boodt, 2012).

Societal costs in Canada associated with public and private expenditures due to IPV for women aged 19-63 (average age 39.4) were estimated on average at \$13,162.39 per woman¹¹ (Varcoe et al., 2011). Using a five per cent discount rate, we estimate the NPV of costs avoided at age 15 assuming this six per cent IPV in adults (Sinha, 2012).¹² For students who dated in the past 12 months, the avoided costs were \$55,762.42 or \$53.57 per student.

¹¹ These costs were broken down into costs to the public sector (\$11,369.77) and costs to the private sector (\$1,792.62).

¹² Discounting is a mathematical procedure for adjusting future costs and outcomes of health-care interventions to present value or adjusting for differences in the timing of costs (expenditure) compared to health benefits (outcomes). For each year (n) in the future, the value of costs or benefits is multiplied by $(1/(1 + D)^n)$ where D is the discount rate. (Drummond, O'Brien, Stoddart and Torrance, 1997; Severens and Milne, 2004).

Table 1. Dating violence-avoided cohort costs of intimate partner violence from Fourth R (accounting for lower prevalence in adults)

	Number of teens in Fourth R trial	Per cent of students reporting dating violence in control (%)	Per cent of students reporting dating violence in intervention group (%)	Per cent reduction in dating violence (%)	Number of IPV cases avoided in youth	Adjustment for prevalence in adults (assuming 6% IPV in adults)	NPV of costs avoided for Fourth R trial assuming 6% IPV in adults (CAD)	Costs avoided per student (CAD)
Physical dating violence: all students	1,722	9.8	7.4	24.5	41.3	61.22	\$103,266.90	\$32
Physical dating violence: students who dated in past 12 months	1,041	19.2	15	21.9	43.7	31.25	\$55,762.42	\$53

Calculating cost savings associated with reduction in violent delinquency

Subsequent analysis of the RCT data found that the Fourth R prevention program had a buffering effect in youth with maltreatment histories, lowering their likelihood of engaging in violent delinquency. In the trial, 20 per cent of youth reported experiencing one type of childhood maltreatment and 10 per cent reported experiencing two types. Four per cent, three per cent and two per cent reported experiencing three, four and five types of childhood maltreatment, respectively (Crooks et al., 2007). These percentages were used to determine the number of students with maltreatment in the Fourth R two-year follow-up populations of 1,520 students. The cross-level interaction of child maltreatment and intervention condition on probability of violent delinquency (two years post-intervention) is shown in Table 2. These probabilities were used to determine that 36.86 students were not violently delinquent due to the Fourth R's buffering effect. Based on an estimated cost of violent delinquency for grades 7-9 of \$81,585, including government expenditures for delinquency in youth spanned across six public domains including remedial education, health care and social services, social assistance and the criminal justice system (Craig et al., 2011), the avoided costs of violent delinquency associated with the Fourth R trial are \$3,007,223 or \$1,978 per student (Table 3).

Table 2. Reductions in violent delinquency in students with history of childhood maltreatment

Number of forms of childhood maltreatment	Per cent of students reporting maltreatment in Fourth R study	Delta change in probability of violent delinquency	Number of students with maltreatment in Fourth R	Number of children not violently delinquent due to Fourth R
1 type	0.2	0.05	304	15.2
2 types	0.1	0.075	152	11.4
3 types	0.04	0.075	60.8	4.56
4 types	0.03	0.075	45.6	3.42
5 types	0.02	0.075	30.4	2.28
Total	0.39		592.8	36.86

Table 3. Summary of Fourth R-related avoided cohort costs due to reduced dating violence and reduced violent delinquency

	Costs avoided for Fourth R trial (CAD)	Costs avoided per student (CAD)
Physical dating violence	\$55,762	\$32
Avoided annual costs associated with violent delinquency	\$3,007,223	\$1,978
Total		\$2,010

Additional cost savings not included in this analysis

In addition to the RCT findings with respect to reduced dating violence and delinquency, there was also an increase in condom use, particularly among sexually active boys (Wolfe et al., 2009). We looked at calculating associated savings for these findings, but are not including those in this paper as too many assumptions were required to translate those findings into costs. Presumably, increased condom use results in additional savings associated with reduced sexually transmitted infections and teen pregnancy, but those are outside this paper's purview.

Pathways to scaling up Fourth R in education systems

In a cost-benefit analysis, typically the costs of the intervention program are estimated for one scenario. However, implementing prevention programs in complex systems is not a straightforward venture. Although program effectiveness is an important component of scaling up with the education system, it is not sufficient for achieving positive prevention benefits. Unlike many areas of public health, there is not an effective delivery system for effective interventions in Canada and effective programs can sit on shelves just as easily as ineffective ones. The education system is a complex structure that is a provincial/territorial responsibility and this requires thoughtful implementation and sustainability efforts across multiple stakeholders. In the case of the Fourth R, initial implementation and subsequent scale-up have occurred through a number of avenues (Crooks, Zwarych, Hughes and Burns, 2015). In some cases, the program starts with one keen teacher or school, and in other places it is brought in at the

school district level. Sometimes, there is key support from a community partner or the department¹³ of education. Other implementation models are built on community-university partnerships. The different implementation and scale-up pathways have different strengths and challenges. There are also different costs associated depending on the implementation pathway.

Implementation is a process, not an event. It is important to recognize that there are different phases from adoption of a program to implementation district-wide. For the Fourth R, there is an adoption phase that can include capacity building in a site and adapting programming to be more culturally relevant, an implementation phase that may include significant external support, and finally, a sustainability phase where the ongoing monitoring and renewal of the program is internalized in the system (Crooks et al., 2015). Different costs are associated with these different stages and activities.

To illustrate a range of costs associated with the Fourth R, we use four case examples that show a range of costs. These four cases are currently implementing the Fourth R — one is a district-wide implementation from the Thames Valley District School Board, two cases are from the Northwest Territories, and one case is from the province of Alberta (Table 4).

These cases differ in a number of ways, including which implementation phase they are in. In the Northwest Territories, the last four years have been a phase of intensive capacity building and adaptation, which has required significantly more resources than program implementation alone. Moving forward, the Northwest Territories can now focus on implementation because of the strong foundation that has been built. This implementation process will be less expensive than the last several years have been. We are providing costs both for the adaptation and adoption phase, as well as projected implementation costs moving forward as two separate cases. In Alberta, the implementation and scale-up have evolved in the context of a unique community-university-government partnership as part of a larger provincial strategy to end family violence. Finally, the Thames Valley District School Board case has the benefit of 15 years of experience co-developing the Fourth R program with the developers at the University of Western Ontario, and has reached a sustainability phase.

In addition, successful scale-up models require some form of centralized leadership. The Fourth R can become sustainable, but it is not self-sustaining. Each year, somebody must take the responsibility to schedule (and fund) new training opportunities to address teacher turnover. When a new version is released to match revised curriculum expectations, somebody must develop a distribution plan to ensure that previously trained teachers receive the updated materials. As new program extensions become available, somebody must decide whether their board, province or territory intends to adopt the new program. This leadership role can be integrated into an existing role in the school division, it can be housed in a community partnership, it can be held at the department level or it can be shared across some combination of these. In the earliest phases of adoption, the Fourth R team often provides significant support with these leadership functions.

In Table 4 below, key descriptors of the cases are presented, including the year they started Fourth R implementation, the current phase of implementation and where the leadership resides.

¹³ Some provinces and territories have a department of education, while others have a ministry of education. We are using department of education to refer to the provincial/territorial authority that oversees education.

Table 4: Phase and leadership models for each case example

Case study	Year Fourth R launched	Implementation Phase	Leadership	Description
1. Northwest Territories	2012	Adaptation and adoption	Years 1-4 - heavily based in Ontario national team	Combination of national education co-ordinator, researcher, other master trainers from Ontario
2. Northwest Territories		Implementation	Years 5-forward - transition to department of education	Transition to ½ day per week role at department
2. Province of Alberta	2012* * previously some division-level implementation	Implementation	Shift: The Project to End Domestic Violence - a university-based project	Healthy Youth Relationships provincial co-ordinator, part-time researcher, associated administrative costs
3. Thames Valley District School Board	2001	Sustainability	Division	Integrated into part of the Safe Schools Co-ordinator portfolio

Using the cost-per-student estimates presented in Table 3, we have scaled up the benefits for each of the case studies described in Table 5. Beyond implementation phase, the case studies included in this analysis differ in a number of ways, including scope (i.e., there are more students in the Thames Valley District School Board than in the entire Northwest Territories), systemic factors (such as higher teacher turnover rates in the Northwest Territories and more movement among teachers in Alberta compared to Thames Valley where health teachers tend to stay in the same role), and logistics (such as cost of travel within the area). In the section below, we briefly describe each of the case examples and different costs associated with implementation.

Table 5. Benefits of Fourth R implemented in three regions

	Per student	N.W.T. intervention grades 7, 8, 9	AB intervention grades 7, 8, 9	TVDSB intervention grades 7, 8, 9
Number of grade 7, 8, 9 students (# students)	1	1,633	34,922	155,507
Physical dating violence annual avoided costs (CAD)	\$32	\$52,877 *	\$1,130,774 *	\$5,035,317 *
Avoided annual costs associated with violent delinquency (CAD)	\$1,978	\$3,230,793	\$69,091,082	\$307,661,269

*Based on percent-age of students who dated in the past 12 months

Case study 1: Adaptation and preliminary adoption model in the Northwest Territories

The demographics of the Northwest Territories are quite different than the other sites in terms of a smaller number of students (1,633 students in grades 7-9 with 98 teachers across the whole territory), greater geographic distance among schools and a larger percentage of First Nations youth. Other systemic differences include a much higher rate of teacher turnover compared to the other cases, in part because many teachers up north are young professionals from southern Ontario who have gone to the Northwest Territories to teach for a year or two, then return to the south once they have enough experience to be competitive in job markets closer to their families. It is not out of the question for a school to lose all of its teachers in a given year, especially in smaller communities.

A school board's Aboriginal liaison contacted the Fourth R in 2010 with an interest in implementing it in a specialized program for high-risk youth that was being rolled out as part of a larger project funded by the National Crime Prevention Centre (Lafferty, 2012). During the first year, the Fourth R was implemented in the specialized program in Yellowknife, as well as in an outlying community. From that early pilot with high-risk youth, the Fourth R has expanded significantly to numerous other divisions. Developing a strong foundation in the Northwest Territories required significant partnership work and adaptation of materials. Notably, the Fourth R team worked with a steering committee and other educators to develop Dene-informed adaptations to the program. A curriculum writer integrated these revisions, numerous video resources were developed to increase the relevancy of the materials for youth in the Northwest Territories, and the Fourth R national education co-ordinator made frequent trips to meet with different stakeholders and support policy development. When all of these initial costs are calculated as one-time start-up costs, and given the relatively small number of students over the first four years, the cost per student during this phase in the Northwest Territories was \$129. (Appendix 1).

Case study 2: Full implementation model in the Northwest Territories

Although costly, there is no question that ensuring authentic partnerships and developing relevant materials was critical for the program's success in the Northwest Territories (Crooks, Hughes and Sisco, 2015). In 2013, the Fourth R team began to work more closely with the department of education. The Fourth R national implementation co-ordinator played a significant role in the development of the first Safe Schools policy in the Territories. In 2015, the department made a significant commitment to implementing the Fourth R throughout the Territories. The education department funds the materials and trainings, and trainings are conducted by the core Fourth R team located in London, Ont. The Fourth R national co-ordinator continues to provide implementation and scale-up support. There is a transition underway to developing and using master trainers within the Northwest Territories, which will reduce the costs associated with bringing in trainers from Ontario in future years. In the first year of this new plan, numerous master trainers were certified and trainers from Ontario are currently co-training with them; in years two and onwards, the Northwest Territories will provide their own training. The investment over the first four years to develop culturally appropriate materials and capacity (through master trainers, etc.) will result in a much lower cost estimated to be between \$15 and \$33 per student (see Table 6).

Case study 3: Implementation model in the province of Alberta

In 2011,¹⁴ the director of Shift: The Project to End Domestic Violence initiative, located at the faculty of social work at the University of Calgary, approached the Fourth R team to explore the possibility of collaborating on a supported, province-wide scaling of the program. The provincial strategy was designed with a scale-up process intended to reach 50,000 students over five years (2012-2017). Over the first four years of the strategy, Shift and the Fourth R have collaborated to implement the program province-wide. From April 2015-March 2016, the Fourth R strategy reached 9,705 students in grades 7 to 9 in 106 schools. Over all four years of the strategy (2012-2016), almost 35,000 students have been reached. Although numerous master trainers have been developed in Alberta, the majority of trainings were still provided by the core Fourth R team, which required travel and training fees. Significant support for planning trainings, recruiting schools and monitoring implementation has been provided by Shift staff, most notably a provincial Alberta Healthy Youth Relationships strategy director, and a research co-ordinator. The majority of funding for the Fourth R comes from the Alberta government and other private donors, through Shift. Based on actual numbers of teachers trained, costs in Alberta over the past four years are estimated to be between \$10 to \$23 per student (see Table 6).

Researchers at Shift and Western University have conducted significant implementation research over the past four years and have identified numerous systemic challenges to scale-up in Alberta (Dozois, Wells and Crooks, 2015; Exner-Cortens, Esina, Wells, Crooks and Hughes, 2016). Notably, many school divisions do not schedule sufficient hours for implementation in health class, there is significant movement among middle-school teachers with respect to their teaching assignments, and there is not strong encouragement from the ministry of education to implement evidence-based programs. Given these challenges, Shift is finishing the current year (2016-2017) with the existing cost structure and then

¹⁴ Prior to 2011, the Fourth R had been used sporadically by a few school divisions in Alberta. At one time it was widely used in a major school division, but significant changes in funding and structuring of Safe Schools in that division led to a reduction in sustainability efforts.

will be implementing a new model of supported implementation. The costs associated with this new model are not yet known because it is still in the design phase.

Case study 4: Sustainability model in the Thames Valley District School Board

The Thames Valley District School Board (TVDSB) is one of the largest districts in Ontario and includes 153 schools serving 15,507 students in grades 7, 8 and 9. The TVDSB has a unique role in the development, piloting and evaluation of the Fourth R in that the program was developed within the school board, the lead curriculum writer has always been a TVDSB educator, and the first RCT was conducted in the board. Beyond the Fourth R, TVDSB has a history of leadership in violence prevention (Crooks et al., 2012) and has led the province in a number of initiatives, including being the first district in the province to have a full-time Safe Schools co-ordinator, as well as the first district in the province to implement a district-wide Safe Schools survey of all students. Both of these innovations are now the legislated responsibilities of all Ontario schools.

Early implementation of the Fourth R in the TVDSB was paid for by grant funds obtained by the Fourth R research team. Over time, the district has taken over more responsibility for the program's sustainability. Now, the leadership role is housed in the school division; the TVDSB has assigned a Safe Schools learning co-ordinator the duties of co-ordinating the Fourth R's implementation. This person co-ordinates the annual training and has a budget to cover all supply costs to release teachers to attend the training. The total costs associated with supply coverage are estimated to be \$41,650. The board has negotiated an electronic licensing agreement with the Fourth R at a cost of \$1.25 per student and prints its own copies of the materials for its teachers at an initial cost of \$19,849. Thus, at this juncture, the TVDSB provides an excellent example of a sustainability model for the Fourth R, with estimates of per-student costs ranging from \$3 to \$5 (see Table 6).

Cost of case studies:

Assuming a five-year horizon for delivering the Fourth R in each of the case studies presented, we calculated the number of students "dosed" over five years and training costs required over five years (four years for Alberta). The costs of training in the Northwest Territories and the TVDSB included face-to-face training and binder costs, online training, shipping costs and supply coverage. In the Alberta case study there were no shipping or online training costs incorporated; however, support staff, management and evaluation costs were incorporated in these estimates. For the first year the cost for delivery of the program for all students in grades 7, 8 and 9 was estimated (Table 6). For years two to five a range of costs was estimated¹⁵ either for the number of students entering Grade 7 only (minimum estimate)¹⁶ or for all new students in grades 7, 8 and 9 (maximum estimate).¹⁷ This range was chosen to account for student and teacher turnover, which is variable between years. Notably, for Alberta, due to changes in program delivery over four years (based on retrospective data), and a large number of students starting the program in Grade 7 in years two to four compared to year one, the estimated costs in these years are higher. Annual co-ordinator costs were incorporated into the per-student cost

¹⁵ Training costs were discounted at five per cent.

¹⁶ To determine the number of students "dosed" by trained teachers over five years, we assume that there are the estimated number of students in the three grades, 7, 8 and 9 in year one, then for each subsequent year there are one-third the number of new students exposed to the curriculum through the three grades.

¹⁷ We assume there would be the number of students in year one freshly dosed in each of the five years.

estimate and ranged from \$5,000 to \$10,000 per year (depending on the model). The implications of these per-student costs are that the high turnover¹⁸ assumed leads to high training costs in relation to the small numbers of students. Based on these assumptions, the cost per student ranges, including a co-ordinator in the Northwest Territories, Alberta and the TVDSB are \$15-33, \$10-23 and \$3-5, respectively (Table 6).

Table 6: Cost estimates for Fourth R implementation in three case studies

	Case study 2: N.W.T.		Case study 3: Alberta		Case study 4: TVDSB	
	Number of students	Training costs (\$)	Number of students	Training costs (\$)	Number of students	Training costs (\$)
Year 1	1,633	\$33,470	3,663	\$130,853	15,507	\$80,883
Year 2	544	\$14,625	3,098	\$137,750	5,005	\$31,124
Year 3	544	\$14,625	2,780	\$138,580	5,005	\$31,124
Year 4	544	\$14,625	5,062	\$151,575	5,005	\$31,124
Year 5	544	\$14,625	N/A	N/A	5,005	\$31,124
Annual co-ordinator costs	N/A	\$10,000	N/A	\$5,000	N/A	\$5,000
Cost/student no co-ordinator (min-max)	\$10 to 21		\$9 to 22		\$2 to 5	
Cost/student with co-ordinator (min-max)	\$15 to 33		\$10 to 23		\$3 to 5	

Discussion

Beyond the obvious ethical imperative to reduce victimization, preventive and evidence-based programs can have a significant impact on taxpayer dollars by taking action before negative outcomes occur (Aos, Miller and Drake, 2006). Researchers have consistently argued that investing in evidence-based prevention now could result in better outcomes and cost savings later (Andresen and Linning, 2014; Wells et al., 2012; Bowlus et al., 2003). Wells, Emery and Boedt (2012) state that the benefits of preventive programming “outweighed the costs by as much as 6:1” (Wells et al., 2012, p. intro). Thus, not only is it an ethical obligation, but it is also a sound economic decision to invest in prevention so as to reduce both individual costs in victimization and social costs associated with these issues (Bowlus et al., 2003).

In this paper, we used data from a rigorous RCT that documented reductions in dating violence as well as reductions in violent crime among maltreated youth to monetize the avoided costs associated with these impacts. Based on the assumptions outlined in this paper, we showed significant anticipated

¹⁸ For a conservative estimate, an annual turnover of 50 per cent was used.

reduced costs for both dating violence (i.e., \$32/student) and violent crime (i.e., \$1,978/student). The relatively low savings for IPV were in large part due to the low base rates of dating in the sample (i.e., approximately seven per cent). In addition, we did not include temporal costs of TDV because there are not reliable estimates. Clearly, there are direct costs in terms of medical and social services required. There are also more distal costs (potentially realized in outcomes such as teen pregnancy due to the link between TDV and increased pregnancy; Family Violence Prevention Fund, 2010).

In addition to calculating costs avoided, we calculated costs per student to implement the program. Notably, we calculated these costs for an adaptation/adoption phase (i.e., Northwest Territories 2011-2016), an implementation phase (i.e., Northwest Territories 2016-forward), an implementation and scale-up phase that arose from a community-university partnership (i.e., Alberta), and a sustainability phase (i.e., Thames Valley District School Board, current and projected). Table 7 below depicts the costs avoided and cost per student for each case example. We also express the benefit: cost as a ratio (i.e., how many dollars are saved for each dollar expended). Finally, we have included the 2011-2012 Statistics Canada estimates of education costs per student in the jurisdiction and expressed the program cost as a percentage of the overall education cost.

Table 7: Summary of benefits and costs across cases

Case	Northwest Territories 2016-	Province of Alberta 2015-2016	TVDSB (Ontario) 2016-
Implementation phase	Implementation	Community-research, implementation and scale-up partnership	Sustainability
Program cost per student	\$15-33	\$10-23	\$3-5
Cost avoided per student	\$2,010	\$2,010	\$2,010
2011-2012 education costs per student	\$24,465	\$14,298	\$12,289
Program costs as a percentage of education costs	0.1%	0.1%	0.04%

Overall, the cost per student differs, in part because of the phase of implementation and in part because of other demographic realities. Nonetheless, even the highest estimate (i.e., during the adaptation and adoption phase in the Northwest Territories) pales in comparison to the costs avoided, and results in a 15:1 ratio. That is, even during the most expensive example including start-up costs in the Northwest Territories (\$129/student), the per-student benefits (\$2,010 per student) of the program have the

potential to lead to \$15 in cost savings for every \$1 invested. Furthermore, in comparison to the average student costs for education, the program costs are minuscule: 0.5 per cent during the adaptation and adoption phase in the Northwest Territories, 0.1 per cent moving forward in the Northwest Territories, 0.1 per cent of education costs in Alberta, and .04 per cent for students in the Thames Valley District School Board.

Limitations

The calculations in this paper are based on a number of assumptions, each of which has sources of error. For example, there is an assumption of equal effectiveness of the program in different settings. Although RCTs have been conducted in both Ontario and Saskatchewan, it is not feasible to conduct one in every context. This assumption of even efficacy has not been tested. We were also unable to control for other individual, community or societal-level factors that may contribute to a change in dating violence not connected to the Fourth R; however, a cluster RCT is designed such that those factors are assumed to be comparable for the intervention and control groups. Another limitation was our inability to calculate cost estimates related to sexual health outcomes based on the finding that the Fourth R increases condom use among sexually active males (because most costing data are estimated based on female sexual health outcomes, not male). A third limitation is that the RCT findings for reduced physical dating violence were for male perpetration, but the cost estimates in the literature are mainly based on female victimization. Finally, although a two-year follow-up for this type of RCT is considered gold standard for the field, a longer follow-up (i.e., following the youth into young adulthood) would have provided more reliable estimates of the preventive impact and the program's cumulative cost savings.

Summary

Overall, despite the different costs to implement the Fourth R based on geographic realities, implementation models and stage of implementation, there is a significant cost savings in all cases. With respect to the Northwest Territories, it was more expensive to do the upfront work, but those initial investments set the stage for a rapid scale-up once the foundation was in place (Crooks, Hughes and Sisco, 2015). In Alberta, the additional costs associated with developing a research and evaluation strategy was an important investment as it identified numerous systemic challenges that need to be addressed for more sustainable scale-up to occur. As Alberta develops its new supported implementation model, it will be important to assess the cost of that as well. One of the challenges of this work is determining where the intervention starts and ends — is it the program implemented in schools or is it the larger delivery system? Developing accurate costs for these components is an important future direction and one that is best accomplished prospectively. Nonetheless, even with these different pathways, the current analyses indicate that there are substantial cost savings related to the prevention of dating violence and violent delinquency. These additional data will be an important piece of the discussion about prevention investments in an era of increasing financial constraints and fiscal accountability.

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Appendix 1

Costs associated with start-up phase in the Northwest Territories

Costs in first 5 years	Per year		Total over first 5 years
Adaptation of curriculum to include Dene perspective			\$5,000
Development of localized video resources (3 videos/locations)			\$21,350
Materials – hard copies			\$19,100
Materials – e-licensing copies			\$1,600
Trips for national education co-ordinator	\$8,000		\$40,000
Other trips	\$4,000		\$20,000
N.W.T. co-ordinator	\$10,000		\$50,000
Focus groups and report writing	\$2,500		\$10,000
Developing master trainers			\$4,630
Total costs first five years			\$171,680
Number of students by year	Years 1 and 2	115/ year	\$1,327
	Year 3	265	
	Years 4 and 5	416/ year	
Cost per student			\$129/student