Attachment 6: Evidence Review of Hospital-based Violence Intervention Programs and Preliminary Assessment of their Feasibility in the Toronto Context (July 2019)

This documents summarizes the findings from a rapid assessment of the evidence on violence interruption models, with particular emphasis on the hospital-based violence intervention model of violence interruption. It also includes a preliminary review of various considerations in determining the relevance and feasibility of hospital-based violence intervention programs (HVIPs) for the Toronto context.

Overview of Violence Interruption Models

There are a number of prevention models that aim to reduce the harms of violence exposure or prevent further perpetration and escalation of violence. These models are often described as interrupter models, as they aim to interrupt the cycle of violence. The focus is often on preventing retaliatory violence, particularly when a group or gang-related act of violence may result in an ongoing cycle of tit-for-tat violence. These models involve identifying those at risk and working to address the risk factors for violence through brief and intense multi-component interventions to stop violent behaviour. This may include conflict mediation, individual or group counselling, family counselling, and parental training, community engagement, and access to various resources.[27,28,29,30]

There are three general models that vary in their implementation, including which groups lead or participate in the program (e.g., emergency department or hospital, law enforcement, social services, and/or community stakeholders).[27,28,29,30] Focussed deterrence models tend to be led by law enforcement and involve identifying specific offenders and offending groups, mobilizing a diverse group of law enforcement, social services, and community stakeholders, framing a response that uses a varied menu of sanctions ("pulling levers") to stop them from continuing their violent behavior, including using both sanctions and rewards, and direct, repeated communication with the individuals and groups in order to stop their violent behavior. Street outreach programs employ street, gang, and youth workers to deliver a similar form of intervention but are typically not led by law enforcement. Hospital-based intervention programs are led by emergency departments or trauma units and intervene with those presenting with serious assault-injuries and who are likely at risk of future injury. There are also many hybrid models such as community street outreach programs linked to a local hospital, such as some Cure Violence models.

Evidence demonstrates the benefits of interventions focusing on youth who have a history of violence exposure in curtailing future violence, particularly focused deterrence and hospital-based violence intervention programs.[27] A recent meta-analysis found that focused deterrence had the largest direct impact on reducing crime and violence when compared to other approaches. For example, one review of 10 programs found that 9 of 10 of these reduced homicide rates by between 34 and 63 percent.[27] Evaluations of programs like Cure Violence that incorporate peer workers show mixed results and success may be related to how the program is implemented.[27] The evidence on hospital violence based interventions is described in the next section. No systematic reviews of street outreach programs were found; however, evaluations of individual programs, primarily Cure Violence, show mixed results and that success may be related to how the program is implemented rather than the model itself.[27,30] The following section summarizes the evidence on hospital-based violence intervention programs.

Overview of Hospital-based Violence Intervention Programs

Over the past decade, hospital-based violence intervention programs (HVIPs) emerged in the United States to address high rates of violent injuries and the incidence of repeat injuries, particularly for

members of marginalized communities most affected by violence.[a] HVIPs identify patients admitted to an emergency department (ED), trauma unit or clinic, and link them with hospital and community-based resources to help prevent violent re-injury by addressing underlying risk factors for violence. Most HVIPs engage youth, but others work with victims as young as seven and those well into middle age. Clients receive a brief intervention and/or case management services that include system navigation, and may include other family members. Beyond reducing re-injury (recidivism) or death, HVIPs seek to improve outcomes in other areas such as violence-related attitudes and behaviour, mental well-being, substance use, school attendance, family dynamics, and access to employment.

Though there is variation across HVIPs to fit local contexts, the following are considered essential elements:

a) recognition that violence is preventable and there are modifiable risk factors associated with violent injury, including poor education, lack of job opportunities, post-traumatic stress disorder (PTSD), substance use, and lack of positive role models;
b) a quick response to take advantage of the "golden or teachable moment" when the client is amenable to receiving care;
c) culturally competent frontline workers who can quickly build rapport and a trusting relationship;
d) efforts to address retaliation explicitly in addition to the other risk factors;
e) a trauma-informed approach that includes linkages to mental health resources;
f) provision in the community of services post-hospital discharge for a significant time; and
g) collaborative engagement with communities affected by violence in planning, implementation and evaluation.[1,2,3]

HVIPs across the United States receive funding from a variety of sources such as hospitals, community-based grants, and foundation grants. Local, state, and federal public health or criminal justice government funding may also support some programs.[8]

Methodology

A rapid assessment process was used to identify and review the most recent peer-reviewed published evidence on HVIPs. Particular emphasis was placed on identifying syntheses of evidence and higher quality individual studies (e.g., systematic reviews, meta-analyses). Two databases were searched and references of relevant articles were hand-searched to identify additional articles. No restrictions on year of publication were used. Table 1 below summarizes the search strategy. As there were no published data on the only known Canadian implementation of an HVIP, consultation with the lead investigator for that program informed this review.

Search Results

Based on the above search strategy, 10 articles were found that met the inclusion criteria and were included in this review. This includes three systematic reviews, two evidence reviews using systematic methods, and 5 individual studies of a particular program. One of these evidence reviews was found in the grey literature but met the inclusion criteria as it included a systematic assessment of the evidence of the effectiveness of HVIPs.[8] Individual studies included a retrospective study to evaluate impact on recidivism, a case management study, a longitudinal observational study, and two cost-benefit analysis studies. Overall, the reviewed articles captured findings of at least 14 different HVIPs. Table 2 includes all the relevant data that were extracted from each article for this review.

[a] Most programs – or studies of them, exclude injuries related to child abuse, intimate partner violence, sexual assault, or suicide attempts.

Table 1: Literature, Search Terms, and Inclusion Criteria

Databases Searched:	• PubMed • Google
Keywords:	• "Hospital-based violence intervention" + Emergency department • "Hospital-based violence intervention" + review
Inclusion Criteria	
Literature	• Peer-reviewed publications
Date of publication	• No limits
Language	• English
Types of Studies	• Syntheses of evidence (e.g., systematic review; meta-analysis) • Cost-benefit analyses • Long-term impact evaluations
Populations of interest	• Adults • Children • Youth
Exposure of interest	• Violent Injury and other violence-related outcomes
Intervention	• Hospital-based intervention (emergency department, trauma-centre)

Summary of the evidence

According to one review, there is currently limited evidence of effectiveness of HVIPs.[8,b] Systematic reviews of studies, including several randomized controlled trials (RCTs), have found positive outcomes in intentional violent injury recidivism[4,5,6,7,8] and none showed harm.[7] Two single-program studies used data from before and at least five years after an HVIP was introduced and both found an approximate 4% reduction in recidivism rates.[9,10] Systematic reviews have also found positive outcomes in other justice-system and violence-related outcomes, such as decreases in arrests and carrying a weapon.[4,6,8] In one systematic review, eight of the 14 included programs found significant results in at least one violence-related outcome area.[6] Tables 2 and 3 below provide a brief summary of individual studies included in the review articles.

Several studies measured intermediate outcomes that have the potential to reduce future violent behaviour, such as increased access and use of needed mental health services or educational or employment supports.[6,8] Finally, several cost-effectiveness studies found cost savings to the health care and criminal justice systems.[5,6,8,11,12,13]

All of the HVIP programs reviewed are based in the United States. The only known HVIP in Canada was implemented in Winnipeg and includes in-hospital and community care for youth for about one year after the time of injury. The Winnipeg program embodied the Indigenous Circle of Courage model that identifies belonging, mastery, independence, and generosity as the four universal human needs for positive development. This HVIP was assessed via a CIHR-funded randomized controlled trial (RCT) and cost-benefit analysis, and found a 45% decrease in repeat visits to ED due to violence, a 20% return on investment, and positive outcomes related to justice system involvement and school engagement.[14]

[b] The California Health Benefits Review Panel's "limited evidence" grading is used in cases where either the number of studies is small and/or studies have weak comparison groups or other flaws.

Table 2: Summary of Findings on Re-Injury
(Source: California Health Benefits Review Program, 2019)

Author	Study Design	N	Finding (Reinjury)	p Value	Limitations
Borowsky et al. (2004)	RCT	224	Intervention group lower fight-related injuries requiring medical care.	$p < 0.01$	Wide variability in services provided to subjects.
Cheng et al. (2008a)	RCT	166	Lower risk of injuries requiring medical treatment. Not significant.	Not significant	Low enrollment rate. High losses to follow-up.
Cheng et al. (2008b)	RCT	88	No difference in fight-related injuries in past 30 days.	Not significant	Lack of statistical power due to low sample size.
Zun et al. (2006)	RCT	188	Self-reported reinjury 8.1% in Intervention group and 20.3% in control. ED records reinjury rates 6.5% intervention group and 7.4% control.	$p < 0.05$ (self-reported injury)	Conflicting reinjury rates from ED and self-report data. Small sample size. High attrition.
Cooper et al. (2006)	RCT	100	Reinjury 5% in intervention group and 36% in control.*	$p < 0.01$	Did not report how outcomes were assessed. No statistical analysis results provided for this outcome (calculated by CHBRP).
Aboutanos et al. (2011)	RCT	75	Reinjury: 6% in intervention with case management and 6% in control.	Not significant	High attrition rates. Lack of a true control group.
Gomez et al. (2012)	Retrospective cohort	64	Reinjury 3.2% in intervention group and 8.7% historical 1-year rate.	N/A	Small sample size. Historical comparison group.
Smith et al. (2013)	Retrospective cohort	254	Reinjury 4.5% in intervention group and 16% historical 1-year rate.	N/A	Only active participants were included in the analysis. Historical comparison group.
Marcelle and Melzer-Lange (2001)	Retrospective cohort	218	Reinjury rate of 1% (no comparison group)	N/A	No comparison data provided.
Becker et al. (2004)	Retrospective cohort	112	No difference between intervention and comparison groups for reinjury.	N/A	Low frequency of tracked events.
Shibru et al. (2007)	Retrospective cohort	154	No difference between intervention and comparison groups for reinjury.	Not significant	Lack of statistical power due to low sample size
Bell et al. (2018)	Retrospective cohort	317	No difference between intervention and comparison groups for reinjury.	N/A	Statewide historical comparison group.

Table 3: Summary of Findings on Justice System and Violence Outcomes
(Source: California Health Benefits Review Program, 2019)

Author	Study Design	Category	Finding (Justice System and Violence)	p Value	Limitations
Cooper et al. (2006)	RCT	Justice	Less likely to be arrested for any crime.	p = 0.09	Focused on high-risk subjects. Self-report justice data.
		Justice	Less likely to be arrested for violent crimes.	p < 0.001	
		Justice	Less likely to be conviction of any crime.	p < 0.001	
		Justice	Less likely to be convicted for violent crime.	p < 0.001	
Cheng et al. (2008b)	RCT	Conflict and violence	Conflict avoidance self-efficacy.	p < 0.05	Lack of statistical power due to low sample size.
Cunningham et al. (2009)	RCT	Conflict and violence	Reduction in violent attitudes.	p = 0.01	Self-report.
		Conflict and violence	Increase in self-efficacy for fighting avoidance.	p = 0.04	
Zatzick et al. (2014)	RCT	Justice	Decreased likelihood of carrying a weapon (3, 5, and 12 months).	p < 0.05	Self-report. Low enrollment rate.
Shibru et al. (2007)	Retrospective cohort	Justice	Decrease in criminal justice system involvement.	p < 0.05	Lack of statistical power due to low sample size.

Features associated with positive findings

Case management initiated as an inpatient and continued beyond discharge was the most frequently used intervention, and was associated with significantly lower re-arrest or re-injury rates in some studies.[6,7] One review found that case management that incorporated access to various community resources demonstrated greater success than brief intervention alone.[7] This review found that, in addition to ensuring the availability of mental health services, vocational training and/or employment opportunities, the dose, quality, intensity, and duration of case management, high-intensity follow-up, and intervention early after injury appear to correlate to higher success.

Limitations of the evidence

All reviews have consistently noted that methodological limitations of most studies precluded their ability to demonstrate significant decreases in re-injury.[4,5,6,7] Two main issues have been small sample sizes and high losses to follow-up as recruitment and retention of high risk populations has been a challenge. Variation in program activities and outcome measures make it challenging to compare interventions, conduct meta-analyses, or attribute success to particular program components.[5,7]

Most investigators conclude that the HVIP model is a promising practice that requires further study. Evaluations or research studies must include: innovative ways to assess implementation and outcomes, including using qualitative approaches that capture the experiences of all stakeholders; sufficient and adequate staffing; strategies to recruit and retain vulnerable/marginalized clients; and should go beyond measuring violence or crime-related outcomes and include a range of proximal or intermediate outcomes that relate to program goals and activities.[5,15]

A U.S. National Network of Hospital-Based Violence Intervention Programs has been formed to support rigorous evaluations and program fidelity. In addition, a multi-institutional database for collecting program outcomes has been established, with over 6000 HVIP participants represented thus far.[3] This database could enable cross-site comparisons of various program outcomes.

Overall, HVIPs are seen as a viable way to interrupt the cycle of violence and address health inequities by connecting marginalized community members at high risk of re-injury, to the necessary resources and environment to support healthy outcomes.

Preliminary considerations in determining relevance and feasibility of HVIPs for Toronto

When implemented with fidelity to key elements, the HVIP model, presents a promising practice at the tertiary prevention end of the continuum of violence prevention. The following are a number of considerations and observations that could inform a full assessment of the relevance and feasibility of HVIPs for the Toronto context. [16,17]

Local data suggest a need for this type of intervention. In recent years, Toronto has seen an increase in shootings, and an increase in ED visits for assault-related injuries; for instance, the Sunnybrook Trauma Centre has reported an increase in admitted gunshot victims, from 63 in 2014 to 142 in 2018 (which includes victims of the Danforth shooting).[18] In 2017, about 50% of police-reported victims of violent crime were youth and young adults ages 15-34. A number of local studies suggest that violent crime may disproportionately affect groups who are living in economically vulnerable circumstances or neighbourhoods.[19,20,21,22,23]

Community advocates are reinforcing the need for this type of program and have called on the City to invest in a continuum of strategies to break the cycle of violence affecting marginalized communities. Likewise, the Board of Health and City Council have adopted recommendations and directed City divisions and agencies to explore strategies that work with victims and perpetrators to interrupt retaliatory violence, and ensure access to a range of culturally appropriate support services and programs for victims of violence.[24] There is also political interest at the provincial level. In June 2019, a Liberal MPP tabled a Private Member's Bill (Bill 129) calling for amendments to Ontario's *Health Insurance Act*.[25] Bill 129 proposes that insured health services would include prescribed hospital-based violence intervention programs and trauma-informed counselling for survivors and others affected by gun violence.

HVIPs are quite likely adaptable to the Toronto context as they have proven viable and feasible in diverse urban centres around the world, including in Canada and the UK.[26] In addition, there appears to be a readiness and expertise locally to develop a made-in-Toronto program. Senior management and physicians at trauma units at St. Michael's Hospital and Sunnybrook Health Sciences Centre are actively exploring partnerships for implementing the HVIP model at their institutions. They see HVIPs as valuable for potentially reducing health inequities. Toronto can leverage the expertise of the Chief of Emergency

Medicine at St. Michael's, Dr. Carolyn Snider, who led the Winnipeg program, in using a collaborative process with the community to plan, test, implement and assess a local program.

Established FOCUS (Furthering Our Community by Uniting Services) situation tables and community safety networks across the city could help with recruiting and/or training culturally competent case workers and connecting clients to community resources. There is also local academic interest in researching violence intervention strategies that could be leveraged to design a robust, adequately resourced research study or a sound evaluation. The combined expertise of TPH and SDFA in surveillance, data access, research and evaluation, could also support this process.

Overall, an HVIP model appears to be relevant and feasible in the Toronto context given local data pointing to increases in violent injuries, local hospital interest, and established community infrastructure that could be leveraged to support implementation.

Conclusion

Though the evidence is emerging and limited at this point, most reviews of HVIPs describe them as a promising practice with potential to positively add to violence prevention efforts and reduce health care costs. Positive outcomes have been found across a number of different types of studies, programs, and settings, and in a number of different outcome areas. HVIPs are valued for their capacity to demonstrate empathy to individuals in very vulnerable situations, support them to build positive social connections and realize their unmet needs.[3]

Based on preliminary consideration and observations, HVIPs appear to be relevant and feasible in the Toronto context. As most of the research is US-based, there is also an opportunity to contribute to the Canadian evidence base by designing a sound evaluation of a Toronto program.

As US experience has indicated, however, sufficient funding is required to support fidelity to the core essential elements of the HVIP model, ongoing quality improvement, sound evaluation, and sustainability. Adequate time is required to build solid connections with community service providers and build trusting relationships with groups affected by community violence to ensure buy-in and program legitimacy.

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