BACKGROUND PAPER

SEEING AND TREATING VIOLENCE AS A HEALTH ISSUE

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Abstract

Violence should be defined as primarily a health issue – and health approaches should be utilised to stop events and outbreaks and to reduce spread. This health framing is important because it recognises that violence is a threat to the health of populations, that exposure to violence causes serious health problems, and that violent behaviour is contagious and can be treated as a contagious process. Relatively standard and highly effective health approaches to changing behaviours and norms are increasingly being applied to the problem of violence and are showing strong evidence of impact among individuals and communities.

This paper makes the case for seeing violence primarily as a health issue by conveying the scientific understanding of violence and describing how the health sector can greatly increase its involvement in treating violence – to save lives and accomplish better health outcomes for individuals and communities. This framework is intended to encourage the development of a more activated, involved and complete health system that works alongside other sectors to help reduce violence, similar to the way our society has successfully addressed other health problems.

Keywords: contagious, behaviour, norms, health, prevention, system, trauma, transmission, community

Evolution of Violence as a Public Health Issue

Violence is both a health and a public health issue. It is a health issue because there is a specific health lens that helps in getting better understanding and outcomes. By seeing violence as a health issue, we can recognise that the people exhibiting violent behaviour as well as those affected by violence – through injury and exposure – essentially have a personal health problem. This is a health problem involving exposure, contagion, and trauma. Violence is a public health problem because it is also a serious threat to the health of populations and, because public health techniques are effectively utilised to reduce the prevalence and incidence of violence and make communities safer and healthier. Public health is a subset of health and is an application of health principles to the community. We will introduce some of the public health discussion first and then come back to health.

For decades, violence has been viewed as a public health issue (Dahlberg and Mercy, 2009; Davis and Wright, 1977) due to the fact that violence injures and kills many people (Cron, 1986). It is estimated that more than 1 million children are killed every year as a result of violence (Krug et al., 2002) and more than 1 billion children —half of all children in the world—are exposed to violence every year (CDC, 2015). Increasingly, violence has also been seen as a public health issue because of the destructive effects of exposure to violence on other types of health problems, including chronic diseases such as cancer and heart disease (Felitti et al., 1998; Gudmunson et al., 2013), infectious diseases such as HIV (Machtinger, 2012; Hillis, 2000; Baral, 2012; Jewkes, 2010), as well as serious mental health problems (Mbagaya, 2013; Dube, 2001; Benjet, 2010; Devries, 2011; Martinez and Richters, 1993; Gorman-Smith and Tolan, 1998; Hurt et al., 2001; DuRant et al., 1995; Singer et al., 1995; Rosenthal, 2000)

The vision of violence as a public health issue is an important shift that helped to focus approaches on social, behavioural and environmental factors (Mercy et al., 1993). The public health lens also helps to understand the problem of violence as a community problem and has led to community-level solutions (Mercy and Hammond, 1998) that have been instrumental in reversing the rates of violence in many countries throughout the world (Krug et al., 2002; Kieselback and Butchart, 2015).

Violence as a Contagious Health Issue

The health perspective on violence prevention proposes a more comprehensive and deeper understanding of the people involved in violence. The health perspective is based in a scientific understanding of violence utilising understandings from physiology, biology, neuroscience, psychology, and sociology. This scientific understanding of violence has demonstrated that violence is contagious. Like contagious diseases, violence has been shown to cluster (Sherman et al., 1989; Slutkin, 2013; Buhaug and Gleditsch, 2008; Gould, 1990) and spread geographically (Zeoli et al., 2012; Cohen and Tita, 1999). Violence also has been shown to transmit (cause more of itself by passing from one person to another) for many types of violence, including child abuse (Widom, 1989;

Egeland et al., 1988), community violence (Bingenheimer et al., 2005; Kelly, 2010; Spano et al., 2010), intimate partner violence (Ehrensaft et al., 2003; Black et al., 2010), and suicide (Gould et al., 2010; Gould, 2001). Violence also transmits *between* syndromes – for example, those exposed to war violence having an increased risk of perpetrating community violence (MacManus et al., 2013) and those exposed to community violence having an increased risk of perpetrating domestic violence (Mullins et al., 2004; Devries et al., 2011).

In recent years, science has made much progress in understanding *how* violent behaviour is transmitted - both in terms of physical mechanisms and the social psychology. At the individual level, violence is transmitted through social learning or modeling. Many behaviours have been shown to spread in this manner (Christakis and Fowler, 2009), including violence behaviour (Bandura et al., 1961). Modelling is the dominant method of developing behaviours because it is much safer and more efficient to copy those around you than it is to develop behaviours through direct experience (Slutkin, 2013; Bandura 1977). People not only copy their friends, but also their friends' friends, and their friends' friends' friends (Christakis and Fowler, 2009). This indicates that exposure to violence has a physical, neurological effect that increases the risk of subsequent violent behaviour. Neurological researchers theorise that mirror neurons may be involved in this unconscious learning process, as these regions have been shown to fire both during an action and during observation (Iacoboni, 2009; 2005).

Violent behaviour also transmits at the group level through social norms and scripts. For example, in violent communities violent behaviour can become the accepted or even expected response to small disputes, perceived slights, or insults. These expectations are enforced by the perception that failure to respond can be a sign of weakness with an associated risk to the individual of further victimisation (Anderson, 2000; Wilkinson, 2006). These types of norms that encourage violence also play a significant role in perpetuating other types of violence, including child abuse (Spinetta and Rugler, 1972), intimate partner violence (Ahmad et al., 2004; Yoshioka et al., 2001), bullying (Nesdale et al., 2008), law enforcement violence (Westley, 1953; 1970), and post-conflict violent communities (Ember and Ember, 1994).

Social norms have a strong effect not only because of the perceived consequences of disobeying them, but also because people are neurologically driven to seek social approval and avoid rejection. Social pain associated with exclusion is experienced much like physical pain and in fact the same areas of the brain are involved in processing both types of pain (Eisenberger, 2012; 2008; Kross, 2011; Eisenberger et al., 2003; Macdonald and Leary, 2005). Similarly, social approval has been linked to the dopamine receptors (Baumeister and Leary, 1995; Izuma et al., 2008). In other words, social norms transmit behaviour through an innate desire to avoid pain and obtain "pleasure," in this case anticipation of social acceptance, approval, or status as reward.

Violence has the added effect of being a traumatic experience, which can increase the risk of transmission of violent behaviour though the profound mental impact and physiological effects

(Slutkin, 2013). Exposure to violence can lead to several adaptive responses that increase the risk of violence including aggression, impulsivity, depression, stress, and exaggerated startle responses (Martinez and Richters, 1993; Gorman-Smith and Tolan, 1998; Hurt et al., 2001; DuRant et al., 1995; Singer et al., 1995; Rosenthal, 2000; Schuler and Nair, 2001; Mead et al., 2010), as well as changes in our neurochemistry including degrading monoamine neurotransmitters (MAOA), a flood of neuroendocrine responses, and changes to the brain structure (such as hippocampal volume and prefrontal cortex abnormalities) (Child Welfare Information Gateway, 2015; McCrory et al., 2010; Mead et al., 2010; Wilson et al., 2011; Hanson et al., 2010; Perry, 2001).

Not everyone who is exposed to violence becomes violent, just as not everyone exposed in other epidemics contracts the problem or disease following exposure. As with diseases, many risk factors help determine whether the violence contagion is more or less likely to result in violent behaviour at some time in the future. Age is a particularly important factor for violence, as it is for diseases such as influenza (Taubenberger and Morens, 2006) and tuberculosis (Comstock, 1982). Children and adolescents are more susceptible to picking up violent behaviours in part because their brains are more impressionable (Perry, 1995) and are more prone to making risky choices (Van Leijenhorst et al., 2010; Tymula et al., 2012). Studies have also shown that adolescents have an elevated neurological response to gains that leads to greater reward seeking (Galavan, 2010; Van Leijenhorst et al., 2010) and that their choices are more driven by occasional outcomes than adults (Van Duijvenvoorde et al., 2012). Finally, adolescents are less able to take others' perspectives into account and in general have diminished decision-making capabilities (Van Duijvenvoorde and Crone, 2013).

The dose – essentially the amount or intensity of the exposure to violence – can also affect acquisition of violent behaviour. Violence exposure has been shown to have a cumulative effect on trauma (Dubow et al., 2012) and those with chronic exposure have shown a more than 30 times greater risk of future violent behaviour than low exposure, with more moderate exposure having an elevated but lower risk (Spano et al., 2010). Context is also important; for example, the presence of peers has a clear effect on whether a person chooses to engage in risk taking behaviour (Chein et al., 2011).

The Importance of the Health Perspective

The health perspective is important because it is based on a scientific understanding that reveals to us that violence is a behaviour developed through exposure and is thereby transmissible, allowing us to see and understand people differently. Every response to violence should be based on this scientific understanding.

The health perspective then allows us to move away from the moralistic perspective that understands violence as caused by "bad" people and "evil." There is no science in moralistic explanations. Moralism as a perspective on violence is completely subjective. Often, perpetrators of violence believe that they are in the right or that their behaviour was appropriate (Fiske and Rai, 2014; Kelty

et al., 2012). A young person from a violent community may believe he is right or justified in avenging his friend's killing – he may even believe that such vengeance is expected. A man might believe he is right or justified in acting violently with his wife or child. A government might believe it is right or justified in bombing a community. For each of these cases, an opposing moralistic perspective exists. However, from a health perspective, the preferred outcome is objective and clear: to maintain and improve the physical, mental, psychological and emotional well being of each individual and of the community.

The health perspective is ethnic, cultural, racial, gender, class and sexual orientation neutral, though it accounts for different influences and manifestations. Thinking about good and bad people is replaced by good and bad outcomes and with people viewed under contextual, biological, environmental, and social influences. Harm is to be avoided at all costs. Care is the fundamental guiding principle of health and health systems, and prevention is a way of giving care in advance of things going too far.

With a new scientific understanding of violence as a contagious health problem, our approach to violence can fundamentally change to prevent violence rather than simply react to it. We can detect and successfully treat people before they become violent by understanding the effects of exposure to violence, the symptoms (and latency) of violent ideation, and the effectiveness of particular methods of behaviour change, care or treatment. Furthermore, understanding and trying to reduce additional risk factors and enhance protective factors can be used to help persons become less susceptible and increase resistance to the transmission and progression of violence.

The Health Approach to Reducing Violence

Health approaches for preventing violence are those that are based on an understanding of how violent behaviours are formed and of the effects of exposure to violence. Health approaches are preventative and nonjudgmental with a commitment to do no harm and approach people through the lens of care. Health approaches to violence can be classified according to four types, which can be implemented in combination.

The first strategy centres on stopping the transmission of violence by detecting situations in the community where the risk of future violence is high and preventing these situations from becoming lethal. This prevents violent events as well as reduces further exposure to violence and spread of the behaviour. Furthermore, interruption itself helps to stabilise communities and also helps to shift norms (Webster, 2012).

An example of this approach is the violence interrupters from the Cure Violence programme (Skogan, 2009; Webster et al., 2012; Ransford et al.; 2013, Slutkin et al., 2015) now being implemented in over 60 communities in the U.S. as well as in Latin America and the Caribbean, South Africa, and in early forms of adaptation in the Middle East and elsewhere. Violence

interrupters work both to find new conflicts in the community as well as stopping retaliations to previous events, including working with victims in hospitals (Purtle et al., 2013; Cunningham et al., 2009; Zun et al., 2006). In order to stop potentially violent events, it is usually necessary that highly trusted community-based health workers provide these services in a confidential way so as not to dissuade people from seeking care. Similar health based outreach methods exist to interrupt ongoing violence for child abuse, intimate partner violence, and elder abuse, often through detecting the abuse and referring to intervention (U.S. Preventive Services Task Force, 2013).

The second strategy focuses on identifying and treating those at highest risk for violent behaviour. A health approach can effectively detect cases of potentially violent individuals, in the same way that disease control specialists, case workers, and other health outreach workers detect those suspected of having tuberculosis, syphilis, gonorrhea, HIV/AIDS, or even Ebola - all of which also are not obvious, frequently hide from persons with authority, and are hard to reach without very credible workers who have the access, and trust (for example, Aggleton et al., 1994). This often involves active case finding – actively seeking out cases that need the most attention. Programmes that have done this type of outreach identify those at high risk and treat them to address their needs and reduce their risk for violent behaviour, including for community violence (Spergel et al., 1998; Skogan et al., 2009), suicide (Motto, 1979), and war violence (Espie et al., 2009).

Identification and treatment of those at risk for violence works because people can be changed and their risk for behaving violently can be diminished. Many effective treatment options exist that both treat existing trauma and help provide resistance and resilience to exposure. For some, a positive role model and mentor may be effective (Tolan et al., 2008), while others may need a treatment programme such as cognitive behavioural therapy or functional family therapy.[1] These types of treatment are particularly important for those at high risk, but it is also important to provide treatment for everyone traumatised by direct and indirect exposure to violence – and there are many effective treatments for people with differing levels of exposure.[2] While not everyone exposed will need treatment, it is important to seek out those who do need more extensive help.

The third type of health strategy addresses factors to reduce the *community's* susceptibility or increase its resistance to the violence contagion. These approaches typically address two types of factors: community norms and social determinants of health. Working to change the norms that encourage the use of violence both reduces susceptibility by discouraging and challenging negative norms, and increase resistance by amplifying positive norms. Addressing social determinant of health works to affect the susceptibility or resistance through addressing issues such as employment, built environment, and social cohesion and support. Most programmes addressing these social

1These methods may require that they are maintained by outreach services.
[2] (see NCTSN, 2015 for examples)

determinants do not specifically seek to reduce violence, but it is often one of the many intended effects. Examples include building a community's resilience through linking a network of adaptive capacities such as social capital and economic resources (Norris, 2008), or through urban upgrading to improve the general conditions and quality of life in certain communities - for example through the provision of clean piped water, electricity, basic health care and school facilities, or by providing parks and other public places for leisure activities (Kieselback and Butchart, 2015).

The fourth type of health strategy addresses factors that affect an *individual's* susceptibility or resistance to the violence contagion, and also includes approaches to address many social determinants of health. Another important method of doing this is by addressing mental health issues that can increase the risk of being traumatised, such as depression, anxiety, and alcohol and drug use. Individuals can also use various approaches to increase resilience, including constructing and maintaining social support networks as well as cognitive and behavioural interventions (Southwick and Charney, 2012; Luthar and Cicchetti, 2000; Luthar et al., 2000; Masten et al., 1990) or developing skills in mediation or mindfulness (Farb et al., 2007).
All of these approaches address violence as a health issue and a behaviour, and they implement health methods that reduce the likelihood of violent behaviour occurring. Multiple approaches should have a cumulative effect, and all approaches should be carefully monitored and adjusted as needed.

The Epidemic Control Approach to Reducing Violence

Epidemic control is a subspecialty of public health with specific considerations, concerns and methods. The epidemic control requirements for reducing violence begins with clearly recognising the existing science that violence is contagious (IOM, 2013; Slutkin, 2013; 2013b) and therefore that the methods used to stop epidemics, can be successful in stopping violence. The epidemic control method specifically combines many of the elements of a health model outlined above, including stopping transmission, treating the highest risk, and addressing norms. One prominent example of the epidemic control method of violence prevention is the Cure Violence Health Model, which adapts the World Health Organization's model for addressing other epidemics (Heymann, 2008). Cure Violence outlines its main components as:

1. **Detect and interrupt the transmission of violence -** by anticipating where violence may occur and intervening before it erupts.

2. **Change the behaviour of the highest potential transmitters -** by identifying those at highest risk for violence and working to change their behaviour.

3. **Change community norms -** by influencing social norms to discourage the use of violence.

A central characteristic of the Cure Violence model is the use of credible messengers as workers – individuals from the same communities who are trusted and have access to the people who are most at risk of perpetrating violence. Those hired can include people who have formerly been involved in violence, but have changed their behaviour. Because Cure Violence workers have access and trust, they are able to talk about violent behaviour credibly and persuade high-risk individuals to resist behaving violently. Intensive and very specific training is required, but hiring the right workers is essential to get the access, trust and credibility required for the job – as for all health workers attempting to access hard to reach populations of any type (McDonnell, 2011).

Changing behaviours and norms becomes profoundly easier when the change agents have credibility with the populations being served. The credibility allows access to individuals and communities that can lead to the types of conversation and participation needed to achieve positive outcomes. While it is certainly possible for people from many different backgrounds to be credible, as with other community health workers, people from the same community who have had similar experiences are most likely to be able to be credible.

The Cure Violence approach is being implemented in more than 40 communities across nine countries. The model has been externally evaluated several times, with each evaluation showing large, statistically significant reductions in gun violence. Studies by Northwestern University and Johns Hopkins University showed 41 to 73 percent reductions in shootings in neighbourhoods in Chicago (Skogan et al., 2009)[3] and as much as a 56 percent decrease in killings in Baltimore (Webster et al., 2012)[4], while an evaluation by the *Center for Court Innovation* showed that the area in New York City in which the programme operated went one year without a killing and had 20 percent fewer shootings compared to the trend in the neighbouring

[3] Overall reductions in shootings in the seven programme sites were between 41 percent and 73 percent. When compared to control communities to control for other factors such as law enforcement, statistically significant reductions that were specifically attributable to the CeaseFire Chicago programme were found to be between 16 percent and 28 percent in four communities by time series analysis. Hot spot analysis found reductions of shooting density between 15 percent and 40 percent in four partially overlapping communities. Six of the seven communities examined had reductions due to the programme as determined by either time series analysis or hot spot analysis. The seventh community had -100 percent drop in retaliation killings and large reductions in shootings, but the neighbouring comparison community had similar reductions in shootings.

[4] The Baltimore evaluation examined four communities, each with differing levels of implementation. All four Safe Streets sites had a statistically significant reduction in at least one measure associated with the implementation of the programme. The evaluation found "strong and consistent evidence" that Safe Streets was associated with reductions in shootings and killings in the South Baltimore programme site where killings were reduced by -56 percent and nonfatal shootings by -34 percent. There was also "strong evidence" of a programme effect in the initial East Baltimore programme site where there were no killings during the first 22 months of the programme. The remaining two East Baltimore programme sites had statistically significant reductions in nonfatal shootings, but not in killings. In one community, killings increased. In this community a gang war had started just prior to implementation. These two sites are also the same sites where there were fewer mediations, indicating that the mediation component was not implemented as strongly.

communities (Picard-Fritsche and Cernaglia, 2013). An evaluation of the programme from 2012-2013 in Chicago found a 31 percent reduction in killings in the two target districts (Henry et al., 2014). An evaluations of three communities in New York found that program areas had a reduction of 18% compared to a 69% increase in matched comparison areas (Butts et al. 2015). In addition, a recent evaluation of a Cure Violence adaptation in Richmond, California found that it coincided with a reduction in killings that the researchers suggest is due in part to the programme (Wolf et al., 2015).[5]

The international adaptations of the Cure Violence model have also demonstrated large reductions in violence, although formal evaluations are needed to determine causality. In three communities in San Pedro Sula, Honduras, the programme implementation has coincided with 88 percent reduction in shootings across 5 sites.[6] In the target community in Cape Town, South Africa, there has been a reduction of 52 percent in gang-related killings.[7] In Loiza, Puerto Rico, there was a 50 percent reduction in killings associated with first year of implementation of the programme.[8] In Ciudad Juarez, Mexico, after implementation of Cure Violence the rate of killing dropped by 24.3 percent.[9] Formal evaluations are forthcoming from programs in Trindad and Nova Scotia.

Beyond reductions in violence, researchers have found many other positive effects of the Cure Violence model. The Skogan evaluation detailed the extensive assistance given to clients of the Cure Violence program in Chicago, with employment, education, drug abuse, parenting, and other issues. For example, the study found that 86% received help finding jobs, 72% were successfully connected to job training programs, and among those receiving assistance 52% were later working full or part time. The Skogan study also found that the Cure Violence staff often acted as important adult mentors for their clients. The study reported, ""One striking finding of the interviews was how important [Cure Violence] loomed in their lives; after their parents, their outreach worker was typically rated the most important adult in their lives …. Many of these clients emphasized the importance of being able to get in touch with their outreach workers at critical moments in their lives – times when they are tempted to go back on drugs, get involved in illegal forms of employment, or when they felt that violence was imminent, either on their part or someone else's"

John Jay College's Research and Evaluations Center found important effects of the program in New York City, including a significant improvement in norms related to the use of violence and an

[5] Notably this adaptation uniquely added a component of paying clients for their adherence to the programme, a feature that may or may not have added to the overall effect (not specifically evaluated.)
[6] Data source: Honduras site programme data.
[7] Data source: Argus, Thursday October 8th 2015 (Cape Town newspaper article based on official Cape Town Police data)
[8] Data source: University of Puerto Rico, Official Police data.
[9] Data source: Mesa De Seguridad Y Justicia De Ciudad Juarez.

improvement in attitudes towards police. John Jay researches found that "[y]oung men living in neighborhoods with Cure Violence programs reported significant reductions in their willingness to use violence compared with men in similar areas without programs" (Delgado et al. 2015). These findings on an improvement in norms related to violence are consistent with findings in Baltimore (Webster et al. 2012). The John Jay researchers also released five reports on five different communities in New York City which found that after implementation of the Cure Violence program young men in each of these communities "report greater confidence in law enforcement to help with neighborhood violence" and all except one were "more willing to contact police in the event of violence" (Delgado et al. 2015a, Delgado et al. 2015b, Delgado et al. 2015c, Delgado et al. 2015d, Delgado et al. 2015e).

Additionally, many communities around the world have heard about or learned from the Cure Violence experience and in some instances have attempted to implement programmes influenced by the Cure Violence model – some that we are aware of and probably many that we are not aware of. The Cure Violence approach is very specific approach and requires guidance and training – and adherence to principles to make it work, just as for all professionally done health, law enforcement, or other interventions. There is an under appreciation in health, education, criminal justice, and many other fields about what is really required - in terms of principles, training, supervision, support, documentation, and feedback to implement a programme with fidelity. All governmental and community experiences are important learning experiences, but results from programmes that do not implement the fundamental principles, nor implement with fidelity should not be confused with the Cure Violence model.[10]

Imagining a Full Health Approach

The health sector can be much more fully utilised to reduce violence than we have seen utilised so far. What is needed from the health sector was identified 30 years ago by the United States Surgeon General C. Everett Koop's Workshop on Violence and Public Health: "education of the public on the causes and effects of violence, education of health professionals as to better care for victims and better approaches to violence prevention, improved reporting and data-gathering, some additional research, and increased cooperation and coordination-networking if you will among health and

[10] Confusion has been created in the literature because frequently community groups have claimed to use the Cure Violence model, but did not actually implement the model (Wilson et al., 2010; Fox et al., 2012; Boyle et al., 2010). The evaluations of these other experiences in some cases provide excellent documentation within the evaluation studies themselves about the key aspects that were inconsistent with the Cure Violence model, including in some cases the absence of some of the most fundamental requirements – most notably not attempting to or successfully reaching the very highest risk persons (those most likely to be doing the shooting), not hiring specific violence interrupters, and/or having those persons fully trained, interrupting conflicts, and following core principles.

health-related professions and institutions" (Cron, 1986). In essence, Dr. Koop saw the need for a health system to respond to violence as a health problem in a much more energised and comprehensive way.

Despite Dr Koop's call three decades ago, the health sector today remains severely underutilised. Below we outline a framework for a full health approach to violence. We will describe very briefly the roles for the institutions in the health sector, roles for different types of health professionals, and the ways in which sectors outside of the formal health sector can also utilise elements of the health perspective with the goal of reducing violence.

Ministries of Health and Health Departments

Since it has been decades that violence has been viewed as a public health issue (Dahlberg and Mercy, 2009; Davis and Wright, 1977), and since then multiple intervention have been more fully developed (WHO, 2015; Krug et al., 2002; Skogan et al., 2009; David-Ferdon and Simon, 2012; Weiss and Kelly, 2013; Purtle et al., 2013), it is time for ministries of health and health departments to play a much more active and prominent role in violence. As the agency of government responsible for issues related to the health of the populations, ministries of health and health departments assume these responsibilities by assessing and analysing data on violent events, locations, characteristics, and trends from hospitals, police, medical examiners, universities, the community, and other sources to provide improved information on violence for analysis, intervention and for educating the public. Educating the public is a critically important role for health leaders.

Ministries of health and health departments also need to be involved in identifying, disseminating, and evaluating evidence-based strategies to prevent violence, change behaviours, and reduce susceptibility and enhance resistance to violent behaviour. Depending on what the data shows a community most requires, this work may include a full epidemic approach to violence, or specific targeted elements of a health approach such as marketing efforts to change norms about violence and promote health behaviours that prevent violence. Since violence always has the potential to act in an epidemic fashion, appropriate health based strategies need to be put into place.

When there is any type of violence in a community – community violence, child abuse, intimate partner violence, elder abuse, sexual abuse, or suicide – the ministry of health or health department should be "out front." When the public wants to understand why "senseless" violence is occurring in a community, the ministries of health or health department should be offering answers that help people "make sense" of it - as a contagious issue related to exposure - to understand the scientific explanation for why violence occurs and to explain and likewise outline appropriate - not just emotional response to prevent future events.

Ministries of health and health departments should coordinate community based efforts as well as the relationship between community based efforts and hospitals to prevent events, including the

prevention of spread once events have occurred through interrupters and outreach workers based in community organizations, as well as monitor their performance and results (Ransford et al., 2013).

Hospitals, Trauma Centres, and Emergency Rooms

Hospitals are an important setting for health responses to violence because victims of violence often come to hospitals to seek treatment. Hospitals need to implement measures to properly detect and treat victims of violence.

First, hospitals must make an assessment of the types, severity, and amount of violence that the hospital treats to determine what type of approaches should be implemented. At a minimum, hospitals should include violence in their community health needs assessment and implementation plan. Hospitals should also implement a screening tool to determine if a patient has been a victim of violence, and then have a set of referral options for the patient, including resources for conflict mediation, behaviour change, domestic violence services, trauma treatment, and mental health care.

If a hospital treats a high volume of victims of community violence, it should implement a hospital-based programme to prevent relapses, prevent retaliation, treat mental trauma, and address behavioural effects; such programmes have been shown to have significant effects on reducing re-injury (Smith et al., 2013). If community outreach programmes are available, the hospital should be connected with these programmes to provide long-term treatment when needed.

Mental Health Centres

An important element of preventing violence is the treatment of those who are at risk for becoming violent and those who have been heavily exposed. As described above, exposure to violence is a significant risk factor. For this reason, efforts to prevent violence need to include treatment of the trauma associated with exposure. Mental health centres are an ideal venue for this type of service because of their experience in treating mental health issues generally. Mental health centres need to increase capacity so that they can treat exposure to violence and meet the need of the large amount of untreated people.

Health and Mental Health Centres in Schools and Prisons

Any institution with a medical facility should adopt strategies to address violent behaviour based on their need. In particular, schools and prisons need to implement health approaches to violence prevention based on the needs of the populations that they serve. Schools in all communities should be trained to detect violence exposure and refer exposed people to appropriate treatment, particularly in high violence communities but also in other communities because domestic violence is so prevalent.

Medical facilities in prison systems are a crucial part of a health system to address violence because very high percentages of persons who are incarcerated have been exposed to violence and suffer trauma from this exposure (James and Glaze, 2006). Furthermore, those in prison are victims of violence at very high rates (Wolff and Shi, 2009; Mendel, 2011). It is well known that trauma can also occur to a person while incarcerated. Our current system is releasing highly traumatised individuals back into the community without any treatment for their serious conditions, which plays a large role in exacerbating violence in communities (IOM, 2013). Equipping prisons to treat exposure to violence is a crucial element for stemming the cycle of violence.

Within other institutions, including daycare centres, corporations, government agencies, and universities, medical facilities or people serving medical roles should also be trained to respond to violence exposure. At a minimum this should include training in how to screen for exposure to violence and make appropriate referrals, but could also include more proactive methods such as trainings and group meetings.

Community-based Organisations Implementing Health Programmes

Many community health issues are addressed by community organisations or community health clinics. As with other medical systems, community health workers come into contact with people who have been exposed to violence; these health workers are crucial actors in identifying and referring people for treatment.

For communities with chronic and severe violence, community organisations are frequently the best entities to implement a community-based health approaches to prevent violence. Community organisations, because of their knowledge of and connection to the community, are ideal because health approaches rely on having access to those most likely to commit violence; embedded community organisation can often gain this access.

Primary Care - Paediatricians, Doctors, Nurses, and Other Health Professionals

Just like hospitals, health professionals are in a position to prevent violence because they come into contact with people who are victims of violence, exposed to violence, or are at risk of becoming violent. All types of health professionals should be included, from paediatricians to family practitioners to community health workers to nurses. Health professionals working in settings like veteran clinics or in chronically violent communities should be given special training so that they are able to respond sufficiently to individuals with higher levels of exposure to violence.

All health professionals should be trained in detection of violence exposure and trauma, and standard screening tools should be universally available. These efforts should focus on identification and ensuring appropriate referral and treatment for violence exposure and risk of behaving

violently. These types of screening tools have been shown to be effective in the primary care setting at reducing violence (Borowsky et al., 2004).

Working with Other Sectors in Applying Health Approaches

Health approaches do not only come from the health sector. Other sectors can take the principles of the health approach and apply them in different settings. For example, schools and educators can learn methods of screening students to determine if they have had exposure to violence and are at risk for becoming violent, and then make appropriate referrals for treatment. Law enforcement is currently and can benefit from even further training in peaceful mediation and de-escalation of conflict. Further, many law enforcement departments are also making real time information and referrals to health and related professionals to be used to detect conflicts and prevent violence as well as for treating trauma.

The entire justice system, including prisons and jails, probation and parole, prosecutors, defense attorneys, and attorney generals can take on a health perspective that recognises both violence as a behaviour and the impacts of exposure to violence. This perspective can result in an increased utilisation of treatment services for trauma and mental health care, behaviour change, and interruption of conflicts leading to less violence.

Many other agencies that come into contact with people traumatised by violence, such as child welfare agencies, are also important in detecting ongoing violence and identifying those exposed or at risk. Likewise, any agency or organisation that is involved in planning or maintaining the built environment, such as parks and public areas, should, and many do, consider a health perspective to reduce risk of violence. Each of these sectors and others have been working toward prevention and incorporating many health-based and related principles and approaches already and will hopefully be continuing this trend.

How Health Fits in a Bigger Picture

We are making the case for prioritising a health perspective as foundational to how we understand and address violence, but that does not mean that we believe that the health sector alone can solve the problem of violence, any more than the health sector can alone solve cholera or Ebola epidemics or in fact any problem. Health approaches add to, but do not replace existing efforts. Accountability for violent behaviours is still required if we as a society are ineffective at providing health based prevention to sufficient scale coverage and effectiveness.

There are also other roles that are needed to reduce and prevent violence that fall outside usual law enforcement responsibilities, but are often expected by the general public to be performed by law enforcement officers. Violence against another person is against the law, but that does not mean that those assigned to *enforce* these laws should also be expected to be held fully and totally responsible

for preventing violence, and expected to fill every gap in society's deficiencies. For example, even where deterrence can be shown to reduce violence (for example, Braga and Weisburd 2012), this should not be the primary focus or limit to society's efforts to do full scale prevention. Likewise, police should not be expected by society to be behavioural scientists, clinicians, social workers, doctors, mentors, or everything to everybody – or every solution to our social problems. In fact, police are being blamed commonly for many societal problems that they did not make and have very understandably limited ability to influence – based on what we now know about how behaviours are actually formed at home and by peers, maintained, and what the modern science tells us of how behaviours are effectively changed, which is way beyond what punishment is known or could be expected to accomplish.

Therefore, although police have a role of enormous importance, risk, and responsibility, it is unrealistic for us to expect police to provide full solutions to all of the aspects of violence. It is both unrealistic and scientifically ungrounded – and it is not fair to the police themselves or to the community. Nor is it realistic or aligned with the scientific understanding of the problem. Also, just because two or more professions may be considered connected, does not mean that the same people can or should perform all functions.

The health approach helps frame the issue and helps provide an understanding that informs the approaches used, but not all approaches should come from the health sector either. Likewise, other framings of violence can also supplement this health approach. For example, the human rights and child protection framing of violence adds extremely important elements to seeing the effects of violence more fully in certain situations, and keeps us vigilant about equity. Further, the women's safety and protection framings help to prioritise certain populations that may be more vulnerable or possibly affected by violence more severely, and thereby also help us guide our interventions geographically as well as in application.

Conclusions

We are proposing a new lens – one different from how much of the general public currently sees violence and how our current governmental and nongovernmental institutions respond to violent events or outbreaks of violence. We are proposing that all of us take in more of the health framing and use a health lens as much as possible. Violence is a very unhealthy and very risky behaviour - both to the individual as well as to his/her family and community. It is acquired through contagious brain mechanisms and social processes and can be treated using health methods. If we want to reduce violence in our communities locally and around the globe and in all of its forms, we must acknowledge that violence is both resultant and predictable. There is no "senseless" violence. Saying it is "evil" or done by "bad" people does not help in deriving solutions and frequently makes violence worse. Violence is a behaviour that is modeled, passed on and transmitted by norms and social expectations, and accelerated through mental trauma. Brain processes mediate all of this.

Numerous other factors affect violence, many of which are frequently and largely inaccurately cited as "primary" causes of violence - such as poverty, dysfunctional families, and poor schools, to name a few. These are incredibly important problems - they all need to be addressed - and they are factors that can make violence worse by increasing the likelihood of spread and increasing the susceptibility of individuals, as other factors may do for contagious diseases. These are critical risk factors we should all aim to address them too.

What is currently missing and is critically needed is a healthy understanding of violence that offers a deeper understanding of behaviour in individuals and communities. Crucially, the process through which violence spreads must itself be understood – particularly the importance of social approval and norms, both very powerful forces that are neurologically driven. The reversal of violence outbreaks requires working on these processes through the health and other sectors and involving credible health workers with access, trust and skills.

Seeing violence as a health problem does not mean rationalising violent behaviour or excusing an individual who behaves violently. The health approach fundamentally sees violence as negative to the outcomes of the persons affected, community as a whole, and the person exhibiting the behaviour. The fundamental shift of the health approach is in understanding violence as resulting from exposure. Violence is the problem itself, and people who are caught up in the cycle of violence – or have "caught" violence – can and should be treated. And individuals who have this health problem need care and support to heal as well as an effective and appropriate regimen as is provided to individuals with other health problems.

Violence can be successfully diagnosed, criteria can be developed and refined to predict it, and people can be successfully and humanely treated to become less violent. People do change. There are programmes that help people to stop behaving violently, and there is not an age after which it is too late (Ross et al., 2013). Sending persons exposed to violence home without a reliable and effective treatment plan for exposure and mental trauma is irresponsible and unhealthy.

One intention of this framework is to develop a more connected health system to reduce violence, in the same way that our society successfully addresses conditions such as AIDS, TB, diabetes, and asthma. These approaches not only work toward greatly improved health and safety outcomes but also use health methods that cause no additional harm or trauma to the individual or community. These approaches are performed in a way that supports and provides people and communities with healthier lives. Furthermore, as with all health interventions, these approaches respect confidentiality and put a very high value on trust.

This framework also emphasises the need to focus resources on what has previously been sometimes referred to as "late" or "tertiary" prevention efforts. In reality, the individuals actively committing the violence today are the centre of the spread of violence itself. Science has illuminated the role of exposure in the transmission of violent behaviour and therefore we must address ongoing violence,

which transmits the violent behaviour and limits the effectiveness of primary and secondary approaches. In other words, you can provide increased resistance to the violence through primary and secondary approaches, but it might not be enough if ongoing violence is not addressed and the dose of violence exposure is still high. Young people are being exposed to violence in the community, in their schools, and in their homes, and modeling those who are doing it *now*.

We have listed some of the elements of the health system and the roles they need to play to prevent violence. However, there are many others that are critical and are part of the system, including teachers, law enforcement, several parts of the youth and social sector, and the media. These other sectors have key roles in spreading the health understanding of violence and its causes, providing effective solutions, and to the extent they are able, screening and providing appropriate referral for treatment of people heavily exposed. In many instances, each of these sectors and others have been incorporating health-based principles and approaches already and our hope is that this discussion further encourages collaboration and even more utilisation and adaptations of health approaches by all sectors to help produce an even healthier and safer society.

We might follow the wisdom laid out by the Surgeon General's Workshop of 30 years ago: "The solution to the problem of violence requires a total community effort, but health care providers can play a special role . . . The health care system must help to make victims whole emotionally as well as physically, and help to prevent further violence. Providers must be alert to the special needs of those most at risk of becoming repeat victims." (Cron, 1986).

The issue of lethal violent behaviour is much broader, deeper, and more specific than the current law enforcement, gun control, and mental health debates. If these areas represent the limit of our response, that response will be ineffective, in particular because they fall short of conveying to the public how violence is formed, maintained and changed i.e., how violent behaviour is an unconsciously acquired unhealthy state perpetuating itself. Effective solution must be based on this more scientifically grounded understanding of the violent behaviour of an individual as an acquired and preventable event which society has the responsibility to prevent. That includes reducing the exposure, transmission and progression of violence in individuals' brains and in communities - using community based and health system based outreach methods used for epidemics and diseases that spread. In this case this includes using peers, outreach, modified expectations, new skills, and changing norms - all specialised skills of the health sector and their partners. Massive reductions in other serious behaviours and problems have been achieved with public health methods. Violence can be reduced to much lower levels in our communities - perhaps to even rare events when we take the time to understand, explain, and treat violence as a health issue by activating and organising the health lens, sector, system, and partners to better prevent it. We all look forward and work toward this realisation of safer and healthier communities.

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