Cure Violence: Treating Violence As a Contagious Disease

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The Cure Violence Health Model is a health approach for reducing violence. This model is based on established methods that have been shown to control other epidemic diseases. It is derived from a synthesis of the fields of epidemiology, infectious diseases, behavioral science, social psychology, and neuroscience.

The methods used in the Cure Violence Health Model came out of my prior experiences in health and epidemic control with tuberculosis, cholera, and HIV/AIDS (Slutkin et al., 2006), mostly, but not exclusively, in developing countries—in concert with conversations and discussions with researchers and practitioners in violence prevention the United States—and in particular those persons most intimately involved and affected from the community and the street. Persons most affected from the community and the street became the core of the intervention, as is usual in health and disease control efforts.

Cure Violence is therefore a merging of several scientific disciplines and the street. It was not initially planned that way. Initially, strategy was designed in the usual way the World Health Organization (WHO) devises strategies for many infectious and noninfectious problems, but with time it became clear that violence has an intrinsic contagious nature, and as a result a new theory emerged—that of seeing and treating violence as a contagious process. It also became clear that difficulties emerging from other approaches may have been a result of following old theories, for example with an emphasis on moralism. Likewise, prior successes may have been from knowingly or unknowingly using contagion control methods, or in some cases just from the natural history of epidemic processes—i.e., that epidemics do reduce or die out on their own under certain, sometimes predictable, conditions.

I am a physician trained in infectious diseases. I spent 15 years working on preventing epidemic diseases, mostly in Africa, and did not intend to work on preventing violence. What I expected was to continue working on preventing the spread of more "usual" infectious epidemics. When attempting to take a break, my career diverged when I came to see that violent behavior was also an epidemic process and then with others gradually tried out new methods based on epidemic control. I have learned along with many others in cities across the United States and in other countries that this new approach can be effectively adapted if principles and practices are followed as for other similar diseases, and that the theory of violence as a contagious disease is becoming even more validated by the practice itself and the results of independent evaluations.

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Working with Epidemic Diseases

During my training in infectious diseases at San Francisco General Hospital (SFGH), I was asked to run the tuberculosis control program for San Francisco. This was my first real experience in epidemic control and this is where I first learned the methods of controlling things that *spread*, which is largely done by identifying the most infectious persons and putting them on therapy as well as identifying and treating contacts. We used outreach workers with trust from the same communities to accomplish this. After my training, I signed on to work in Somalia. When I told my mentor at SFGH that I was making this move, he told me that it was the biggest mistake I'd ever make. I landed in the middle of a dire refugee situation: a million refugees in 40 camps, where infectious diseases were common and I was one of only six doctors. I was brought on to work on preventing the spread of tuberculosis, but when the epidemic of cholera struck my responsibilities immediately expanded to helping inhibit the spread of cholera as well.

Because of our limited resources, we recruited and trained refugees to become specialized health workers. This was the same method we used in San Francisco for tuberculosis control and offered the best method for gaining access and trust with the local population. This was a new category of worker—an indigenous worker that was trained at the location of the outbreak to help doctors stop the spread of disease. We relied on these indigenous workers because we had no other options, but we also saw how the trust and credibility they had with a fearful refugee population made them extraordinarily effective at changing behaviors and norms to prevent the spread of the diseases beyond what any other workers had been.

Following 3 years of work in Somalia, I began working for the WHO on the newly exploding pandemic of HIV in Africa—my assignment being the epicenter of central and east Africa—Uganda, as well as Rwanda, Burundi, Zaire (now Democratic Republic of the Congo), Tanzania, Malawi, and several other countries. To rapidly combat the spread of HIV, we used many of the same methods the Somali team and I had previously employed in Somalia—most notably carefully selecting and training indigenous workers to change behaviors and norms, in this case on sexual behavior. After several years, and a relatively successful program of behavior change in Uganda, I was called on by WHO to use what we had learned in the field to run a unit at WHO where we were responsible for designing interventions to guide countries to prevent the spread of disease. In this capacity, the Intervention Unit of WHO formalized the methods of changing behaviors and norms using indigenous workers, methods that are used today in many countries.

After 10 years overseas, I was feeling physically exhausted, chronically jet lagged, and emotionally isolated and wanted to come home. I had seen a lot of death, and in particular epidemic death. Epidemic death has a different feel to it—it is full of not only fear, but panic. I had repeatedly heard hundreds and thousands of women wailing and crying in the desert. In the face of so much death, for my own health and well-being, I felt the need to come home and take a break and maybe start over.

Coming back to the United States, I was not aware of any epidemic problems that I could be involved in addressing. In fact, I was not aware of very many problems at all by comparison—there is running water in every home and many other luxuries are commonplace. After all my experiences, I really didn't know at all what I would do next.

My Introduction to Violence and the Responses to Violence

I returned to my hometown of Chicago, where my parents lived, and it was not long before friends began to tell me about how children were shooting other children. I asked my friends what was being done about this, and what I heard boiled down to essentially two approaches.

The first approach involved different kinds of punishment—what generally falls into the field of suppression. In the health field, which in many ways is based on the understanding of behavior and behavior change, punishment is not considered as a tool, and we find it to be highly overrated in the public mind.

Additionally, the punishment approach reminded me of what happened in historic epidemics when people did not have a scientific understanding of the causes of diseases. Epidemics such as plague, typhus, leprosy, and smallpox in past centuries were thought to be caused by bad people, "bad humors," or bad air. In some instances, this misunderstanding of the causes led to blaming, exclusion, or punishment of victims. These responses not only caused additional pain and suffering, they caused more spread when persons affected or carriers do not seek care, or go into hiding.

The other prevailing approach to the problem of violence that I heard came out of what I call the "everything" solution. This approach calls for us to fix schools, families, poverty, racism, drugs, and everything else that is wrong in chronically violent communities. There is no question that all of these factors can and do exist in the context of community violence, but in our work in disease control we found that sometimes you don't need to wait for the solution to everything in order to stop the spread of diseases. In Somalia, we had no ability to solve the refugee crisis with only six doctors, but we found a way to stop the diseases.

Regardless of my experience with these types of approaches, it was clear to me that the field of violence reduction was stuck. This has happened with many problems in our society. For example, this was true with diarrhea and malaria for decades until the strategies for these were rethought.

I did not know what had to be done with violence, but it did appear that the perspective on the problem as a health problem, and an understanding that violence as a type of behavior could lead to a new approach, or at least fill a gap. We thought there was a likely possibility that the methods of behavior change and norm change that we had used for epidemic diseases might be productive in addressing violence as well.

Violence as a Disease

When we first started exploring this issue, as for many others, we looked at the data. What we saw in the maps of violence in most US cities showed characteristic clustering—just like the maps that I had seen in other epidemics such as cholera (see Fig. 1). The graphs also showed that violence rose and fell in wave upon wave configurations. In my work with epidemics, I was used to seeing exactly these types of graphs as well—because all larger epidemics are combinations in time and space of many small epidemics, rising and falling as the disease transmits and spreads (see Figs. 2 and 3), leading to new foci or epicenters.

As we were beginning to make these connections, I began to look into what really predicted a case of violence. I found that the greatest predictor of violence is a preceding case of violence. This characteristic of violence reflects other epidemics as well. If someone has a case of flu or upper respiratory infection (URI), it is known to have been preceded by another case of flu or URI. I was beginning to see that violence was behaving like an epidemic disease.

In a way, we all are intuitively aware of this connection from reports that discuss the "spread of violence" in fights, gang wars, civil wars, riots, as well as for genocides. With gang wars, one shooting often causes one or many retaliations, with each retaliation in turn causing many more, and so on—so that over time a single shooting could lead to a great number of deaths.

Similar Characteristics, Similar Approach

Counterintuitively, the finding that violence behaves like an epidemic disease was very good news to me and our team—because there is a way to reverse epidemics. My colleagues at WHO and

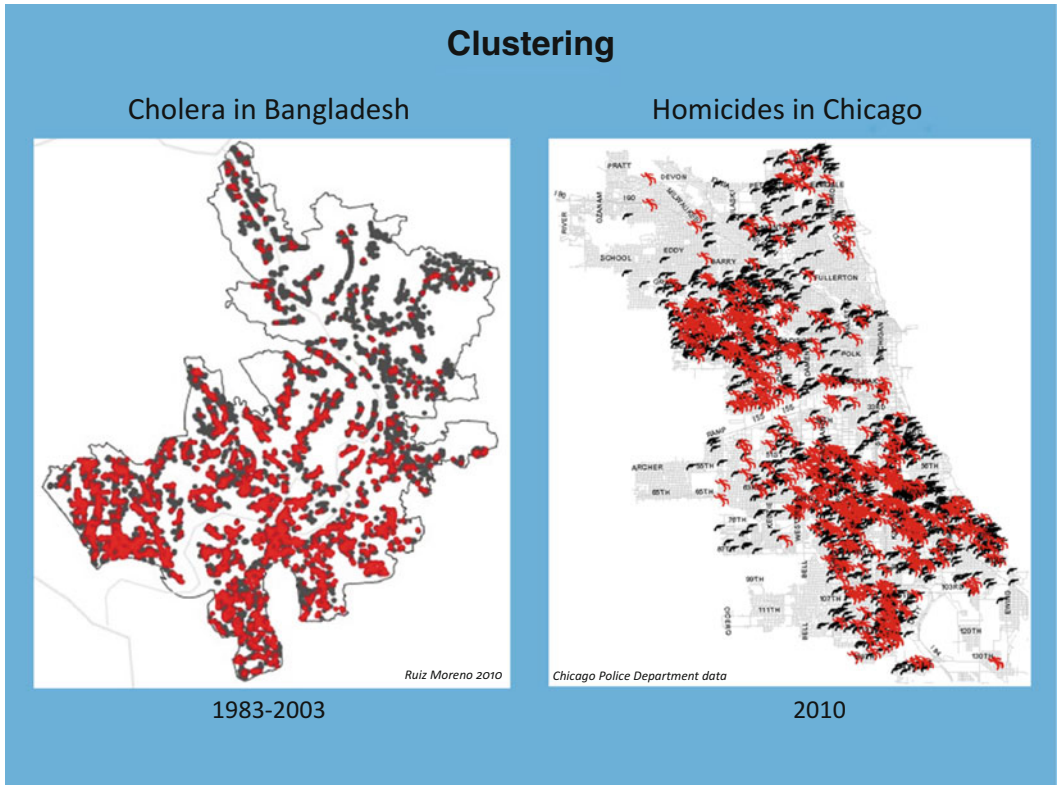

Fig. 1 Maps showing similarities in clustering between infectious diseases and violence: The timeframe for these two events are vastly different, with the cholera cases taking place over 20 years and the homicide cases over a single year. The speed of the clustering is not relevant here. Contagious processes have differing incubation and latency periods and take place in places with different population characteristics that affect the rate at which they cluster. These charts are intended to demonstrate the similarity in clustering patterns typical of contagious processes

I had used this method many times in many countries. The method for reversing epidemics has essentially three main elements:[1]

1. Interrupt transmission
2. Prevent future spread
3. Change group norms

To interrupt transmission, you need to detect "first," or active cases and stop the transmission to others. With tuberculosis, for example, you find those persons that have active or currently infectious tuberculosis; and then you prevent them from spreading the disease to other people. [For violence, a "first" or active case can be someone who is very angry because he feels he has been disrespected or someone who is angry about an unpaid debt, and who is contemplating violence. In these cases, if you can neutralize the tensions that lead to violence or change the thinking such that violence will not be used, transmission is interrupted.]

To prevent future spread, you need to find those who have already been exposed to the disease and treat them before they can spread the disease further. With AIDS work, it could be sex workers or clients who already may have HIV/AIDS or are at least at high risk who need to be reached (Slutkin et al., 2006). Once you find people who are able to reach and have the trust of these high-risk people, you need to help them change their behaviors so that persons are less likely to contract the disease—e.g., by using condoms or by reducing the number of sexual

[1] Other elements are also important including environmental control.

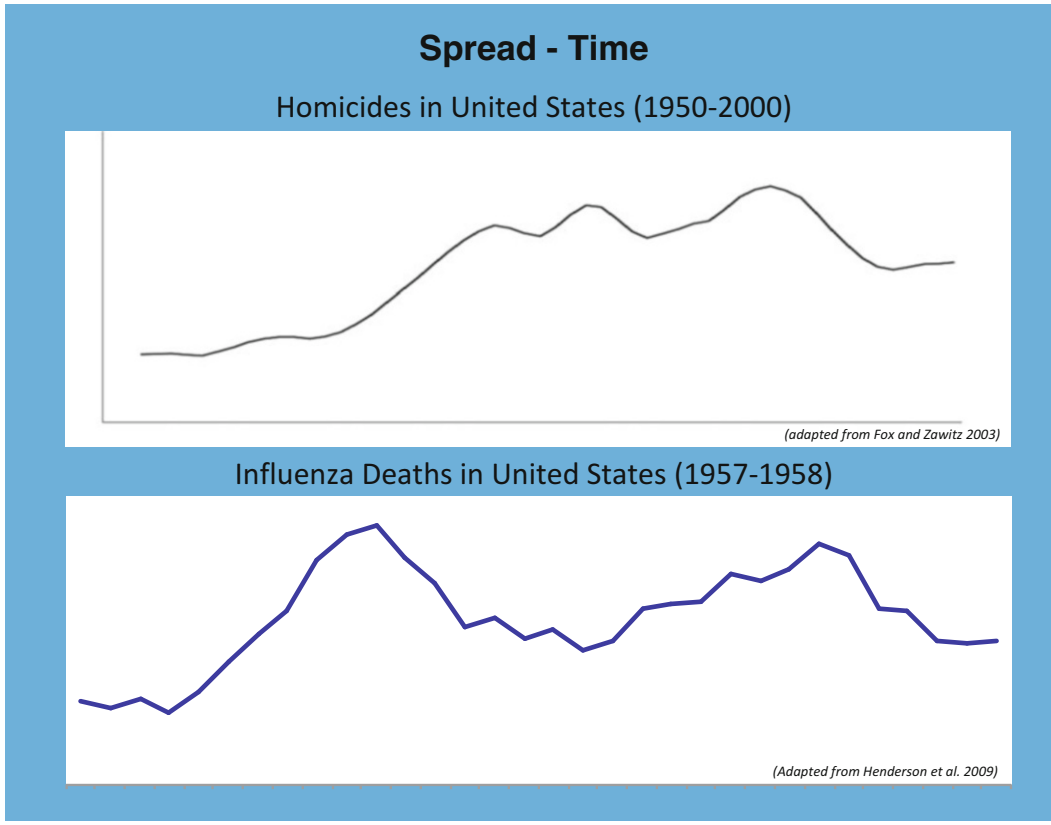

Fig. 2 Sample epidemic curves of violence and infectious disease

partners. For violence, we find those persons that are most exposed to violence, who are involved or "hanging out" in networks with other violent people, and we work intensively with them—again using the most credible and trusted but trained workers to change their behavior to become less violent.

Finally, to change norms we need to challenge unhealthy or harmful norms and replace them with positive and healthy norms. With epidemics we do this by spreading information through public education, specific events, and other activities. The spread of information and skills makes possible group immunity, where a population becomes resistant to a disease because its (new) norms support behaviors that protect them from infection. We thought a very similar approach could be used to treat violence.

Beginning with a small staff, we spent the next 5 years working on how to adapt this epidemic control strategy to the epidemic of violence. This process involved simultaneously talking to people in the community about what was thought feasible, looking at the scientific literature in violence prevention and related behavioral fields, and actively working with a mixed technical and community steering committee to prioritize interventions using the methods we had learned and helped to develop at WHO. Our goal was primarily about developing a clear objective to focus the research and planning. In this case, it was about ensuring that the focus would remain strictly on addressing violence in the form of shootings and killings, rather than becoming distracted by or specifically concerned with gangs, drugs, or poverty—although these other issues also have the potential to be affected by an intervention for reducing shootings and killings.

With this focus in mind, we developed a logic model and a specific plan. Our first plan was a

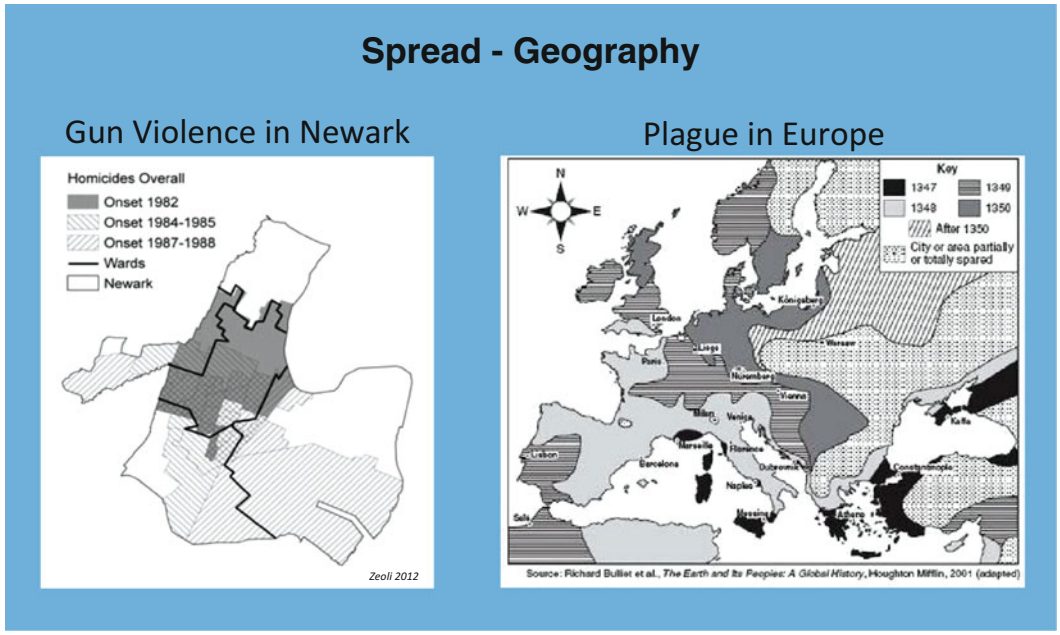

Fig. 3 Epidemic spread of gun violence and infectious disease: Onset is defined in the study as the years in which clusters emerged in the pattern of homicides, as determined using mapping software

collective effort that involved the community, law enforcement, and researchers. The Office of Juvenile Justice and Delinquency Prevention and the Centers for Disease Control and Prevention supported this strategy development work from 1995 to 1999, as well as for years later.

Starting to Treat Violence as a Disease

In 2000, we began to operationalize this plan to address violence in the Chicago neighborhood of West Garfield Park, which at the time was the most violent community in the United States. The initial pilot was made possible largely by the support of the Robert Wood Johnson Foundation, the Chicago Community Trust, the MacArthur Foundation, and an Illinois State Senator named Lisa Madigan, who now serves as the Attorney General for Illinois. West Garfield Park was specifically chosen because of its high level of violence as well as the presence of a good community partner organization, Bethel New Life, who was already operating in the neighborhood.

For the pilot program, we hired a new category of worker: people who were from the community and who then became trained in the methods of disease control. While other programs had employed outreach workers for decades to address gangs, drugs, and crime, they had never before been trained in epidemic control or operated as community health workers. In addition, their focus was sharply defined as stopping shootings and killings. These outreach workers were specifically hired for their access and credibility among the highest risk population—coming out of the same community and with real experience in the same gangs. These indigenous workers were just like the workers we had used in Somalia and Uganda, but their training was designed for a different type of problem.

Through these new workers, our staff put in place an outreach system that worked to change behaviors and stop conflicts among those at highest risk for violence. This evolved into a system which also included a street-level public education component using yard signs, leaflets, and photocopied fliers—the same tactics we had employed in many developing countries. Workers

made a point of encouraging multiple messengers from the community to convey messages that were designed to change norms around the use of violence. To push this norm change, whenever a shooting occurred we organized shooting responses, where clergy and residents gathered to speak against the violence in a very public way. Responding to each and every shooting was a new idea and many people initially objected to it. For many in the community and the general public, the death of a gang member was not a tragedy—the attitude was essentially, "he asked for it" or "let them kill each other"—not realizing or prioritizing the effect on the community overall or not fully appreciating how there are carriers, and how this group is affecting the norm. Previous to this being part of the system to change norms, outpourings, demonstrations, and rallies from the community—in Chicago as well as most other cities—were usually limited to when there was considered to be a young child or others considered an "innocent victim." We came in with responses to all shootings to firmly establish the idea that every death and shooting is awful and against the newly proscribed norm, and began to spread this idea among the peer group as well as the community itself.

As the work began, my colleagues and I were surprised by a couple of developments. First, we had intended the shooting responses to create a role for the community to become active in establishing new norms, but we found that individuals at high risk for violent behavior would often come out for the responses as well. This allowed our outreach workers and the community members a chance to interact with them and talk to them about the violence in the community. Essentially, the norm change had opportunities to happen on the spot. Second, the outreach workers became quite popular in the community. People looked up to them. This gave our workers even more ability to influence and change the behavior of those at high risk for violent behavior to persuade them against using violence as well as the credibility to mobilize the rest of the community.

The first year of implementation resulted in a 67% drop in shootings in the West Garfield neighborhood, while comparison areas saw a much lower reduction of 20% (Ransford et al. 2010). That year included long periods without shootings, up to 90 days at a time—previously unheard of in that community as we were told by community residents. The community also started to look different. For the first time in as long as they could remember, families began coming out onto their front lawns and sidewalks in the afternoons and evenings. People were now enjoying parks that had gone unused for years.

The funders then asked us to "do it again"—in other words, repeat the result. With the help of Senator Dick Durbin from Illinois, we obtained funds from the United States Department of Justice to expand this pilot to four more communities over the next three years. Collectively these communities showed a 42% drop in shootings in their first years of implementation, while comparison areas had a 15% reduction, neighboring areas had a 14% reduction, and the city of Chicago had a 12% reduction (Ransford et al. 2010).

Developing a Model

At this early point, the model was focused on changing individual behavior and community level norms. To accomplish these goals, outreach workers were called on to perform two functions with their high-risk clients: (1) focus on the problem of violence by working to change violent behaviors and stop violent events, and (2) help their clients with any other problems in their lives.

This multi-pronged approach was common in my experience with epidemic diseases. While specialized health workers focus on the problem of greatest concern (in this case, stopping and reducing shootings), during interactions with clients workers are often called on to help with a variety of other daily and life issues and crises. With tuberculosis, outreach workers helped to make sure clients took their medicine but also addressed problems clients were having with alcohol or finding work or homes. With HIV, outreach workers helped teach people how to use

condoms, but also assisted with daycare and financial needs. With violence, our outreach workers were helping to change the behavior of those at highest risk for violent behavior, but also assisting with multiple other areas of their clients' lives. One of the things that they often helped with was mediating conflicts to prevent them from escalating into shootings. This mediation and behavior change was part of the outreach workers' role, but a tension soon developed between these and with other client needs. This was brought to our attention by two of our first outreach workers named Evans "Chip" Robinson and Antonio "Lil Tony" Pickett (referred to as Batman and Robin in the community).

The tension occurred because outreach workers were being called on to do much more expansive and time-consuming behavior change, largely daytime and continuous interactive work, as well as life-saving conflict mediation, which is mostly nighttime and frequently urgent work. Because the workers could not always work at night or were busy with other client activities, some conflicts did not get mediated, which resulted in shootings. It became clear that a new specialized worker was needed to focus on interrupting conflict. In 2004, we separated out these job descriptions and developed a new type of worker called "violence interrupter" to focus like a laser on detecting and interrupting potentially lethal events that were simmering in the community.

In 2004, because of the statistical results in the first five communities, the state of Illinois funded a tripling of the whole program in Chicago—from 5 to 15 communities and from 20 to 80 workers, with a large concentration in the West Garfield area and in Logan Square, and started a particularly strong program in Maywood, a heavily affected nearby suburb to Chicago that had 22 killings in the previous year. That year, there was an immediate 47% drop killings in Cure Violence Chicago sites, with the city as a whole experiencing an unprecedented 25% reduction in killings. West Garfield and Logan Square had particularly large drops, which suggested a possible dose-dependent relationship. Maywood, Illinois also had a 50% drop in killings (Ransford, Kane, & Slutkin, 2013).

Scientific Validation and Growing the Movement

The impressive results caught the attention of the National Institute of Justice, which funded a multi-year, multi-method, external evaluation of the Chicago program led by Northwestern University. This evaluation showed that shootings dropped by 41–73% overall in program communities with 100% reductions in retaliation homicides in five of eight communities.[2]

These were compelling results that the lead evaluator, Wesley Skogan, called "as strong as you could hope for." The findings led to a cover story in *The New York Times Sunday Magazine* focusing on the new theory and the results, *The Economist* (World in 2009) referring to this work as the "approach that will come to prominence," a subsequent official endorsement by the U.S. Conference of Mayors, and years later to the approach being featured in an award-winning documentary called *The Interrupters*.

This positive evaluation also increased interest among other cities with chronic violence problems in replicating the Cure Violence approach. The first replication of this approach, outside of Illinois where there was already widespread replication, began in Baltimore in 2007. A subsequent evaluation of the Baltimore replication funded by the Centers for Disease Control and performed by the Johns Hopkins University School of Public Health reported that homicides were reduced by up to 56% and shootings by up to 44% (Webster, Whitehill, Vernick, & Parker, 2012). A replication in New York City which began in

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

2009 was evaluated by the Center for Court Innovation and found to have resulted in a rate of gun violence that was 20% lower than comparison neighborhoods after implementation of the program (Picard-Fritsche & Cernaglia 2012). Today, the Cure Violence program has more than 50 sites in more than 25 cities in the United States as well as programs in 8 countries outside the United States. Several additional evaluations are currently being completed, including evaluations of Cure Violence replications and adaptations in Cape Town, South Africa; Loiza, Puerto Rico; and a program adapted to a youth prison in England. The Chicago program has also had an additional independent evaluation showing statistically significant reductions that showed a 38% greater decrease in homicides, 1% greater decrease in total violent crimes, and a 15% greater decrease in shootings (Henry, Knoblauch, & Sigurvinsdottir, 2014).

More About Understanding the Health Approach

It's still new for many people to see violence as a health problem. Some are not yet aware of the science of violence as contagious, or understandably feel most comfortable with the view of people as "bad" as a dominant lens. Our theoretical framework still requires accountability for violent behaviors, but attempts to approach the problem from what is known about behavior from brain and social science.

Also, many people are not yet aware of the theoretical and practical experience of public health in hiring persons from similar backgrounds as a proven and necessary health and public health technology and resist the hiring of people who have formerly been involved in violent activity. Relapses of personnel occur as they do for all diseases and the press or others can amplify these effects. However, relapses in other fields that use peer-based workers have also occurred—with one study showing a 48% relapse rate for drug counselors with previous drug issues (Rhodes et al. 1974) and another study showing a 37.5% relapse rate for alcohol counselors with previous alcohol issues (Kinney 1983). Even law enforcement agencies experience occasional criminal activity by their staff.

By comparison, the Cure Violence workers relapse rate is incredibly small—estimated to be approximately 1.5% of workers. This low rate is likely a result of the sophisticated relapse prevention system put in place in Cure Violence sites. This system includes the use of hiring panels to screen applicants, community checks on applicants and staff, periodic drug and alcohol screening, and weekly discussions and support of relapse prevention with workers. Cure Violence is also developing increasingly sophisticated counseling and self-care training for staff to offer additional resources to prevent relapse.

We realize that it takes time for new policies or practices to take hold; however, the practice of viewing and treating violence as a health problem is growing. Not only is the Cure Violence approach spreading in the United States and around the world, but many other programs that take a health approach to violence are also arising. Health Departments are now getting much more involved in running programs to address violence—with health departments in Baltimore, Kansas City, and New York City leading the way. Law enforcement agencies in many areas are also embracing this approach—either by working with health departments or other departments using health approaches such as youth agencies, or in some cases by adopting health approaches in their own work. Trauma centers and hospitals, an innovation added to the Cure Violence Health Model in the last 10 years, are getting involved by implementing programs to address the effects of exposure to violence and for preventing retaliations. And there has been a very fast acceptance of the approach in the international community, where health is increasingly seen as a logical and effective approach in a more complete strategy to effectively reduce violence in communities.

Continued Learning, Continued Development

At Cure Violence, we work with others to actively research and learn how to make the model and the full health approach more effective. To this

end, we have a process of continual development, redesign, and feedback. We started our work by strategizing, then implemented something, learned some lessons, made some changes, learned more, and so on. We continue to learn—from the workers on the street, from the literature on the science of behavior, as well as from other health approaches. Then, we combine the knowledge gained from the street with the science to make adjustments to the model to make it more effective. The first major change was the addition of the violence interrupter position in 2004, but many other changes have followed, including the hospital component, and substantial revisions to the training, and data usage.

The independent evaluators, who spent years studying the implementation of the program to figure out what made the model work, accelerated this learning process greatly for us and for everyone. Skogan's team's evaluation confirmed the effectiveness of both the outreach workers and interrupters and helped us to crystallize this aspect of the model. He found that the outreach workers were acting as role models to their clients and providing significant assistance in connecting the clients with the social services that they needed. The clients reported that the outreach workers were the most important people in their lives aside from their parents. His team found that the interrupters were surprisingly effective in preventing retaliation—actually eliminating retaliation homicides in five of eight communities. Skogan called the innovation of violence interrupters "an original and important development in the violence prevention arena." We learned a lot of unexpected and very useful findings about the approach from this evaluation.

Daniel Webster, the lead evaluator for the Baltimore study, concluded that the work of interrupting conflicts seemed to be very important to achieving results. Looking at four communities, he found that differing results correlated with differing numbers of mediations—communities with three times the number of mediations per month had much stronger results.

Webster's team also found that there was evidence of norm change in persons who were not associated with the program. A survey of young adult males in one program community and two control communities found that after program implementation youth in the program site were much less likely to approve of the use of a gun to settle disputes and four times more likely to support little or no use of violence than their cohorts from the control communities. Because the survey measured attitudes towards use of violence in individuals not directly involved in the program, his findings suggest that the norm change work of the program was spreading beyond the program participants, as it is intended to do.

We are also examining data on our own to make improvements, such as determining the optimum number of workers and types of workers for different communities. The original 67% drop shootings in the first program site was accomplished with 8–10 workers per community site. The subsequent smaller reductions were accomplished with 4–5 workers.

Finally, the rapid expansion into other countries has resulted in much additional experience in both adapting the model and helping us to understand even more about what makes the model work in different circumstances. While political context, culture, and levels of violence may differ in many of the areas we work, it goes back to the same practice we used years ago in Somalia, Uganda, and so many other places: employing highly trusted indigenous workers with the right training and support to change behaviors.

The first country where the model was adapted internationally was Iraq, in 2008. On the surface, the context of southern Iraq could not have been more different from the west side of Chicago, east side of Baltimore, or central New Orleans. However, as we started working with a local Iraqi organization to adapt and implement the model it became apparent that many of the conflicts leading to violence, which may have been labeled as "sectarian" or "tribal," actually began as small interpersonal disputes. As in Chicago, Baltimore, or New York when workers who belonged to the same (in this case) religious and tribal groups focused on preventing the spread of violence among their own peers, the model was able to mediate hundreds of conflicts that otherwise would have led to more deaths.

Since the work in southern Iraq, the Cure Violence Health Model has been successfully implemented in a range of contexts around the globe, including Puerto Rico, Honduras, South Africa, and England. The use of epidemic control methods to (1) map out likely causes of violence, (2) recruit and train indigenous workers with access and credibility with those likely to be involved in violence, and (3) develop behavior and community norm change messages has been universal in application—even if the end result looks widely different on the ground. In each context where our community and implementing partners work, most people are relieved to move beyond the old view of punishing "bad people" and instead to work towards interrupting conflicts, and changing behaviors and norms.

Disease: More Than a Metaphor—Epidemiology and Neuroscience

Years ago, it became clear to me that violence behaves like a contagious disease in virtually all of its critical characteristics, as a result of multiple lines of research from the health, epidemiologic and other disciplines mentioned above, and now summarized in a report from the Institute of Medicine (IOM, 2013; Slutkin, 2013). What has become additionally clear from applications described here and elsewhere, is that violence can be successfully treated like an epidemic disease as well. In other words, the theory is being validated by the treatment. Further, as scientists learn more about how behaviors are formed, we have found that violence has all of the specific population and individual characteristics, meets the specific criteria of a contagious and epidemic disease, and meets the dictionary definitions of both contagious and disease (Slutkin, 2013).

Further, we have learned a great deal from recent studies on the mechanisms of behavioral acquisition, maintenance, and change from recent developments in neuroscience and behavioral science, many of which are highlighted in the IOM report as well. And we can now make a more cohesive picture of how this fits together including at other levels of analysis. Of greatest relevance perhaps is research over the past 20 years that has repeatedly demonstrated in greater detail that exposure to violence—not just as a victim, but also as an observer—makes people more likely to commit violence. And that this effect happens across violence types.

The synthesis of these studies from different fields, and the expanded understanding that they offered, had a tremendous effect on our thinking. For example, a recent longitudinal study of youth in a public housing project in Mobile, Alabama, found that those chronically exposed to violence were 30 times more likely to engage in violence (Spano, Rivera, & Bolland, 2010). Another longitudinal study of youth in Chicago showed that exposure to violence approximately doubles the probability that the subject will perpetrate serious violence (Bingenheimer, Brennan, & Earls, 2005). These and other studies demonstrate that there is dose dependency between exposure and likelihood of expression of violence—a critical characteristic of infectious processes. This type of dose–response relationship has also been demonstrated in other types of violence, including for child abuse (Ball, 2009; Egeland, 1993, Ertem, Levanthal, & Dobbs, 2000; Widom, 1989), war violence (Archer and Gartner, 1976; MacManus et al., 2013), intimate partner violence (Baldry, 2003; Black, Sussman, & Unger, 2010; Duman & Margolin, 2007; Ehrensaft et al., 2003), elder abuse (Yan & Tang, 2003), and suicide (Gould, Greenberg, Velting, & Shaffer, 2010). What defines infectious disease epidemiology and separates it from other epidemiology is when the outcome variable is a risk factor for itself (Giesecke, 1994).

We are also beginning to learn about *how* this exposure to violence plays out in the brain and how the brain picks up behaviors. For example, we knew that people tend to pick up behaviors from people they are around; now, we have learned that the brain unconsciously learns through observation (Bandura, 1977), possibly using mirror neurons or similar circuits—even when the observer does not "intend" to pick up behaviors as far as can be determined (Iacoboni et al., 2005). We knew that people are compelled to perform certain actions in response to social

influence or pressure (Gilovich, Keltner, & Nisbett, 2011); now, we can turn to findings that show that human beings experience social rejection in neurologically similar fashion to physical pain (Eisenberger, 2012; Eisenberger and Lieberman, 2005). Finally, we now know that repeated exposure has been shown to hardwire dissociative and hyperarousal responses to violence into the brain (Perry, 2001).

Understanding this is good news to practitioners and policy makers from all fields—because we can now understand violence scientifically rather than relying on moralistic judgments to guide both policy and practice including intervention design. Moralistic approaches and emotions have a very poor record historically in solving major problems. The scientific approach moves us away from using emotions as the tool box of problem solving; instead, we can apply what we now know—which *is* more than we did before—from the sciences of behavior, epidemiology, infectious diseases, and neuroscience. This can not only ground us in a new theory of violence as a contagious process and epidemic disease, but also in the solutions that follow. This lens and approach has the advantage of understanding behavioral acquisition in a contagious framework and in understanding behavioral and normative change at individual, group, and community levels.

Next Steps

The theory of violence as an epidemic and contagious brain process was not something that we intentionally sought. The original Cure Violence team and I viewed this as a problem of science and of behavior that called for behavior change approaches—relevant, essential, but incomplete. Through research and practice it does now appear that violence behaves like a contagious disease: it operates like a disease in how it spreads and transmits and it lends itself to health-based epidemic control solutions. It is now even more relevant and very feasible to consider violence a health problem—in other words brain based, brain acquired, trauma facilitated, and contagious. The people who are both engaged in it and affected by it have a health issue.

At Cure Violence, we are not arguing that the health approach is the only and entire solution to violence—just that the health sector can make a much more significant contribution to the solution—and that this sector is currently being underutilized. Successful societal efforts require more than one angle or approach. For HIV prevention, we utilize behavior change, norm change, as well as antiviral treatment. With diarrheal disease control, we use water and sanitation improvements, as well as oral rehydration. To reduce motor vehicle fatalities, we use enforced speed limits, as well as innovations such as changing behaviors around seat belt usage and reducing drunk driving, designing divided highways, and better designed cars.

For reducing violence, the role of law enforcement is already fully accepted. But the effort to address violence must be about more than enforcing laws. We can now take into account a lot of new science that provides not only a new theoretical framework based on a new understanding, but can help us to create new methods of prevention and epidemic control. The health system is very experienced at changing behaviors—consider exercise behavior, eating behavior, smoking behavior, and sexual behavior. Violence is simply another behavior that the health sector can be more actively involved in helping to change.

We *all* need safer, more livable, and healthier neighborhoods and cities. Nothing is more essential to all of us. We all see an enormous problem in violence—but this problem is not insurmountable. We can challenge ourselves to understand violence more clearly, utilizing science, health, and epidemiology as well as all the usual fields of research already established. We must keep an open mind about what we have learned scientifically about how the brain works and what this brain research says that gives us new understandings to stop violence in new ways. Just as the discovery of microorganisms by Anton van Leeuwenhoek in the late seventeenth century opened the door to unlocking the causes of epidemic disease—and effective ways to prevent them—the new science of how behaviors are formed and the view of violence as an epidemic

disease process are revealing a new path and set of possibilities for all of us—and for new hope for our future and for generations to come for the possibility of life without violence.

References

Archer, D., & Gartner, R. (1976). Violent acts and violent times: A comparative approach to postwar homicide rates. *American Sociological Review, 41*, 937–963.

Baldry, A. C. (2003). Animal abuse and exposure to interparental violence in Italian youth. *Journal of Interpersonal Violence, 18*, 258–281.

Ball, J. D. (2009). Intergenerational transmission of abuse of incarcerated fathers: A study of measurement of abuse. *Journal of Family Issues, 30*, 371–390.

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bingenheimer, J., Brennan, R., & Earls, F. (2005). Firearm violence exposure and serious violent behavior. *Science, 308*, 1323–1326.

Black, D. S., Sussman, S., & Unger, J. B. (2010). A further look at the intergenerational transmission of violence: Witnessing interparental violence in emerging adulthood. *Journal of Interpersonal Violence, 25*, 1022–1042.

Bulliet, R., Kyle Crossley, P., Headrick, D. R., Hirsch, S. W., Johnson, L. L., & Northrup, D. (2001). *The earth and its peoples*. New York, NY: Houghton Mifflin Company.

Chicago Police Department's CLEAR (Citizen Law Enforcement Analysis and Reporting) System. (2010). Retrieved from https://data.cityofchicago.org/Public-Safety/Crimes-2001-to-present/ijzp-q8t2

Duman, S., & Margolin, G. (2007). Parents' aggressive influences and children's aggressive problem solutions with peers. *Journal of Clinical Child and Adolescent Psychology, 36*(1), 42–55.

Egeland, B. (1993). A history of abuse is a major risk factor for abusing the next generation. In R. J. Gelles & D. R. Loseke (Eds.), *Current controversies on family violence* (pp. 197–208). Newbury Park, CA: Sage.

Ehrensaft, M. K., Cohen, P., Brown, J., Smailes, E., Chen, H., & Johnson, J. G. (2003). Intergenerational transmission of partner violence: A 20-year prospective study. *Journal of Consulting and Clinical Psychology, 71*, 741–753.

Eisenberger, N. I. (2012). The neural bases of social pain: Evidence for shared representations with physical pain. *Psychosomatic Medicine, 74*, 126–135.

Eisenberger, N. I., & Lieberman, M. D. (2005). Broken hearts and broken bones: the neurocognitive overlap between social pain and physical pain. In K. D. Williams, J. P. Forgas, & W. von Hippel (Eds.), *The social outcast: Ostracism, social exclusion, rejection, and bullying* (pp. 109–127). New York, NY: Cambridge University Press.

Ertem, I. O., Levanthal, J., & Dobbs, S. (2000). Intergenerational continuity of child physical abuse: How good is the evidence? *The Lancet, 356*, 814–819.

Fox, J. A., & Zawitz, M. W. (2003). *Homicide trends in the United States: 2000 update*. Bureau of Justice Assistance. Retrieved from http://www.bjs.gov/index.cfm?ty=pbdetail&iid=968

Giesecke, J. (1994). *Modern infectious disease epidemiology*. Boca Raton, FL: CRC Press.

Gilovich, T., Keltner, D., & Nisbett, R. E. (2011). *Social psychology* (2nd ed.). New York, NY: W.W. Norton.

Gould, M. S., Greenberg, T., Velting, D. M., & Shaffer, D. (2010). Youth suicide risk and preventive interventions: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry, 42*, 386–405.

Henderson, D. A., Courtney, B., Inglesby, T. V., Toner, E., & Nuzzo, J. B. (2009). Public health and medical responses to the 1957–58 influenze pandemic. *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science, 7*(3), 265–273.

Henry, D. B., Knoblauch, S., & Sigurvinsdottir, R. (2014). *The effect of intensive ceasefire intervention on crime in four Chicago police beats: Quantitative assessment*. Chicago, IL: Robert R. McCormick Foundation.

Iacoboni, M., Molnar-Szakacs, I., Gallese, V., Buccino, G., Mazziotta, J. C., & Rizzolatti, G. (2005). Grasping the intentions of others with one's own mirror neuron system. *PLoS Biology, 3*(3), e79.

Institute of Medicine. (2013). *Contagion of violence*. Forum on Global Violence Prevention. IOM and National Research Council of the National Academies.

Kinney, J. (1983). Relapse among alcoholics who are alcoholism counselors. *Journal of Studies on Alcohol, 44*(4), 744–748.

MacManus, D., Dean, K., Jones, M., Rona, R., Greenburg, N., Hull, L., …, Nicola, F. (2013). Violent offending by UK military personnel deployed to Iraq and Afghanistan: a data linkage cohort study. *The Lancet, 381*, 907–917.

Perry, B. D. (2001). The neurodevelopmental impact of violence in childhood. In D. Schetky & E. P. Benedek (Eds.), *Textbook of child and adolescent forensic psychiatry* (pp. 221–238). Washington, DC: American Psychiatric Press.

Picard-Fritsche, S., & Cerniglia, L. (2012). *Testing a public health approach to gun violence*. New York, NY: Center for Court Innovation.

Ransford, C. L., Kane, C., Metzger, T., Quintana, E., & Slutkin, G. (2010). An Examination of the Role of CeaseFire, the Chicago Police, Project Safe Neighborhoods, and Displacement in the Reduction in Homicide in Chicago in 2004. In Youth Gangs and Community Intervention. Ed. Chaskin, R. J. Columbia University Press: New York.

Ransford, C. L., Kane, C. M., & Slutkin, G. (2013). Cure violence: A disease control approach to reduce violence and change behavior. In E. Waltermaurer & T. Akers (Eds.), *Epidemiological criminology*. London, UK: Routledge.

Rhodes, C. & White, C., & Kohler, M. F. (1974). The role of the so-called paraprofessional in the six years of IDAP. In E. Senay, V. Shorty, & H. Alksne (Eds.). *Developments in the field of drug abuse* (pp. 1051–1066). Cambridge, MA: Schenkman.

Ruiz-Moreno, D., Pascual, M., Emch, M., & Yunus, M. (2010). Spatial clustering in the spatio-temporal dynamics of endemic cholera. *BMC Infectious Diseases, 10*(51), 10–51.

Skogan, W., Harnett, S. M., Bump, N., & DuBois, J. (2009). *Evaluation of ceasefire-Chicago*. Chicago, IL: Northwestern University Institute for Policy Research.

Slutkin, G. (2013). *Violence is a contagious disease*. The Contagion of Violence. Institute of Medicine. Retrieved from www.cureviolence.org/wp-content/uploads/2014/01/iom.pdf

Slutkin, G., Okware, S., Naamara, W., Sutherland, D., Flanagan, D., Carael, M., …, Tarantola, D. (2006). How Uganda reversed its HIV epidemic'. *AIDS and Behavior, 10*, 351–360.

Spano, R., Rivera, C., & Bolland, J. (2010). Are chronic exposure to violence and chronic violent behavior closely related developmental processes during adolescence? *Criminal Justice and Behavior, 37*, 1160–1179.

Webster, D. W., Whitehill, J. M., Vernick, J. S., & Parker, E. M. (2012). *Evaluation of Baltimore's safe streets program: Effects on attitudes, participants' experiences, and gun violence*. Baltimore, MD: Johns Hopkins Center for the Prevention of Youth Violence.

Widom, C. S. (1989). Does violence beget violence? A critical examination of the literature. *Psychological Bulletin, 106*(1), 3–28.

Yan, E., & Tang, C. S. (2003). Proclivity to elder abuse: A community study on Hong Kong Chinese. *Journal of Interpersonal Violence, 18*, 999–1017.

Zeoli, A. M., Pizarro, J. M., Grady, S. C., & Melde, C. (2012). Homicide as infectious disease: Using public health methods to investigate the diffusion of homicide. *Justice Quarterly, 31*(3), 609–632.