Where Do We Go From Here? Interim Analysis to Forge Ahead in Violence Prevention

Rochelle A. Dicker, MD, Sebastian Jaeger, MS, Mary M. Knudson, MD, Robert C. Mackersie, MD, Diane J. Morabito, RN, MPH, Javier Antezana, and Michael Texada

Background: The severity and disparity of interpersonal violent injury is staggering. Fifty-three per 100,000 African Americans (AA) die of homicide yearly, 20 per 100,000 in Latinos, whereas the rate is 3 per 100,000 in Caucasians. With the ultimate goal of reducing injury recidivism, which now stands at 35% to 50%, we have designed and implemented a hospital-based, case-managed violence prevention program uniquely applicable to trauma centers. The Wraparound Project (WP) seizes the "teachable moment" after injury to implement culturally competent case management (CM) and shepherd clients through risk reduction resources with city and community partners. The purpose of this study was to perform a detailed intermediate evaluation of this multi-modal violence prevention program. We hypothesized that this evaluation would demonstrate feasibility and early programmatic efficacy. We looked to identify areas of programmatic weakness that, if corrected, could strengthen the project and enhance its effectiveness.

Methods: We performed intermediate evaluation on the 18-month-old program. We selected the Centers for Disease Control and Prevention-recommended instrument used for unintentional injury prevention programs and applied it to the WP. The four sequential stages in this methodology are formative, process, impact, and outcome. To test feasibility of WP, we used process evaluation. To evaluate intermediate goals of risk reduction and early efficacy, we used impact evaluation.

Results: Four hundred thirty-five people met screening criteria. The two case managers were able to make contact and screen 73% of gun shot victims, and 57% of stab wound victims. Of those not seen, 48% were in the hospital for ≤2 days. Fifty-four percent of those screened had identified needs and received CM services. Thirteen percent refused services. Of the high-risk clients receiving full services (N = 45), 60% were AA and 30% were Latino. Sixty percent of the AA had no contact with their fathers. CM "dose": In the first 3 weeks of enrollment, 40% of the time, case managers spent >6 h/wk with the client. Forty-one percent of the time, they spent 3 hours to 6 hours. Seventeen of 18 people who required >6 hours had two to three needs. Attrition rate is only 4%. The table demonstrates percent success thus far in providing risk reduction resources.

Conclusions: WP case managers served high-risk clients by developing trust, credibility, and a risk reduction plan. Cultural competency has been vital. Six of seven major needs were successfully addressed at least 50% of the time. The value of reporting these results has led WP to gain credibility with municipal stakeholders, who have now agreed to fund a third CM position. Intermediate evaluation provided a framework in our effort to achieve the ultimate goal of reducing recidivism through culturally competent CM and risk factor modification.

Key Words: Violence prevention, Health disparities, Hospital-based violence prevention, Public health model.

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From the Department of Surgery, University of California-San Francisco and Division of Acute Care Surgery, San Francisco General Hospital, San Francisco, California.
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Address for reprints: Rochelle A. Dicker, MD, Department of Surgery, 1001 Potrero Avenue, Ward 3A, San Francisco, CA 94110; email: dickerr@sfghsurg.ucsf.edu; radicker@hotmail.com.

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Interpersonal violent injury is pervasive in the United States, and trauma centers stand on the front lines of the epidemic. According to the Centers for Disease Control, homicide was responsible for 18,124 deaths in 2005. This represents nearly 600,000 potential life years lost, giving credence to the concern that interpersonal violence disproportionately affects our young people.[1] Homicide is the second leading cause of death in people 15 years to 24 years of age and third in those 25 years to 34 years of age. Disadvantaged minority populations are disproportionately represented. Homicide is the main cause of death in African Americans (AA) aged 10 years to 24 years old and second most among Hispanics. Fatalities from assault represent the tip of the iceberg; nonfatal injuries are believed to outnumber fatal injuries on the order of 100 to 1.[2] As a result of the tremendous societal effects of violent injury, violence prevention is considered a fundamental goal of "Healthy People 2010."

The rate of injury recidivism from interpersonal violence is 35% to 50% nationally.[3] With the ultimate purpose of reducing injury and criminal recidivism, we designed and implemented a hospital-based and community driven violence prevention program (VPP), the Wraparound Project (WP) for Comprehensive Rehabilitation. The conceptual model of Wraparound is based on three critical components: (1) The Public Health Model for injury prevention succeeds based on evidence that addressing root causes and risk factors of violence can prevent future injury and incarceration.[4] (2) Health communication in this country is marred by a lack of cultural competency.[5] Our case managers function to undue this nationally identified health care flaw by providing solid understanding, cultural competency, and the capacity to establish trust between client and the case manager. (3) We believe that when a major event like trauma occurs, it provides a golden window, a teachable moment in which someone is more likely to participate in changes to secure health and welfare for the future.[6] Many violently injured youth and young adults are not provided "reentry" opportunities in a like manner to the criminal justice system. Physical rehabil-

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itation at our trauma centers is provided in the aftermath of injury, however, providing services to reduce or eliminate risk factors associated with violent injury are not traditionally offered on hospital discharge. The WP serves as a vital point of entry, provides mentorship, and shepherds clients to essential risk-reduction resources with our city and community partners. Finally, Wraparound provides long-term follow-up and crisis intervention. As stated in the Committee on Trauma's Resources for the Optimal Care of the Injured Patient 2006, "Institutions caring for injured patients can and should establish and aggressively pursue a leadership role in injury prevention; they are in the best position to do so."

The field of violence prevention and the programs dedicated to this cause have suffered from the absence of a template to measure feasibility, progress, shortfalls, and both short- and long-term results. Programmatic evaluation is helpful from inception to completion to create a systematic way to critique a program and make necessary changes during its evolution. Early and intermediate data are fundamental in maintaining a feasible and sustainable program that appropriately serves the target population and meets the expectations of all stakeholders.[7,8] Graduated evaluation can also serve as a foundation by which a successful program can be interpreted and recreated at another trauma center. Finally, early and intermediate evaluation aids in efforts to secure funding and create a platform when addressing policy makers.

The evolution of Wraparound can be broken into three phases. Phase 1 consisted of the early drafting and formatting of the program and initiation of the pilot project, which was funded with starter scholarship monies and fees generated through professional income. A formative evaluation was part of phase 1. Phase 2 included the launch of the full program using funds provided through city government. Adjustments to programmatic activities based on the formative evaluation from phase 1 were also part of this phase. An intermediate evaluation, including both a process phase and an impact phase were essential elements of phase 2 (see Methods). Phase 3 (ongoing) includes efforts to expand the program, and to finesse the elements necessary for exportation nationally. The final evaluation during phase 3 will be essential in our efforts to secure stable funding for our program and similar hospital-based VPP through regional and national advocacy efforts. This article will focus on the results of the intermediate evaluation conducted during phase 2 of the WP. To the best of our knowledge, this is the first study to perform a detailed intermediate evaluation of a VPP. We hope that it will serve as a template for other, like programs focusing on the epidemic of interpersonal violence.

METHODS

Before implementation of the WP, we initiated a pilot program. As a result, our violence prevention efforts became very well regarded in the community. Due to this notoriety, we could not conduct a randomized study with eligible victims of interpersonal violence because we did not have equipoise in the community the program serves. Instead, we offer the WP to all eligible individuals treated at our level I trauma center and implemented an evaluation process designed to critique the feasibility, benchmarks, and long-term outcomes of the program, as described below.

Eligibility criteria include individuals injured from interpersonal and youth violence between the ages of 12 years and 30 years. Individuals assessed to be victims of child abuse or domestic violence were excluded from this study and referred to appropriate providers. Two case managers from Wraparound received referrals based simply on eligibility criteria from Emergency Department and Ward Social Workers, Trauma Nurse Practitioners, Resident, and Attending Physicians and Ward Nurses. These providers contacted case managers by cellular phone. In addition, case managers received a daily trauma log by which they recruited eligible subjects by going directly to their bedsides to introduce the program. Based on the case managers' initial assessments of risk for reinjury, individuals were placed in either a "high-risk" category and therefore offered full Wraparound services, or "low risk" and offered basic education on resources such as the Victim of Crime Office of the District Attorney. We recorded the latter group as our "one-time advocacy" group. Evaluation of the WP was approved by the University of California Institutional Review Board.

The structure of our evaluation process follows the guidelines of two key publications[7,9]: *Demonstrating Your Program's Worth*, March 2000, Centers for Disease Control and Prevention and "Framework for Program Evaluation in Public Health," *MMWR*; 17 September, 1999/Volume 48/No. RR-11. Although the former is geared toward evaluating programs for unintentional injury prevention, the basic tenants of program analysis were implemented for VPP given the similarities in public health principles. The evaluation strategy breaks the process into four parts, allowing programs to scrutinize activities at various junctures along the evolution of the program, instead of waiting to find successes and failures during a final outcome analysis. To date, there does not exist a validated measure for evaluation specific for violence prevention. The process included:

a. Formative evaluation: Utility is an early evaluation measure that we began to assess during phase 1 of the Wraparound Pilot Project. Utility refers to serving the needs of a particular community identified in surveillance data. It is through formative evaluation of our current program that we identified the specific need for culturally sensitive case managers for the Latino or a population in San Francisco, and for the AA community. The specific Feasibility Instrument that we have adapted is from work done through the US Department of Health and Human Services in Substance Abuse Prevention.
b. Process evaluation: Indicators are critical as short-term elements that are associated with programmatic interventions and overall feasibility of the program. The following indicators were assessed beginning at 6 months from initiation of the program: Initial identification rate of eligible patients, participation rate, early attrition rate, capacity to deliver based on case manager's availability, accountability, and delivery of services by our city and community partners.
c. Impact evaluation: Intermediate indicators in violence prevention such as employment status and changes in social

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circle are direct indicators of ongoing presence or absence of risk factors associated with violent injury. The following indicators were evaluated at 6 months after each client-specific enrollment and were culled from the follow-up screening session or exit interview of participants. The measures included assessment of the following:

- Education status
- School fighting
- Employment status
- Attrition rate from program
- Social circle
- Attrition from mental health services
- Substance abuse
- Fulfillment of other needs (driver license, relocation, tattoo removal, etc.)

d. Outcome evaluation: This component will look at the degree to which our intervention meets the ultimate goal: reduction in reinjury based on reversal of risk factors. Associated activities, such as incarceration history since program enrollment, will also be recorded. The original questionnaire used to establish a needs assessment for each client will be the basis of the outcome evaluation. This will allow for direct analysis of risk factor modification in comparison with the intake interview. Outcome evaluation will be the next step in analysis of the WP, anticipated to be implemented when the program has been running for 3 years to 4 years.

The two intermediate evaluations, process and impact, were conducted during this study: to test intermediate feasibility of the WP, we used process evaluation. To evaluate intermediate goals of risk reduction and early programmatic efficacy, we used impact evaluation. To aid in assessment of risk, we utilized the Centers for Disease Control and Prevention-validated Youth Risk Behavior Surveillance System, targeting questions particularly relevant to risk for violent injury.[10] This survey tracks health-risk behaviours, which contribute to the leading causes of morbidity and mortality in youth and young adults. The behaviors are thought to be interrelated and potentially preventable. The survey monitors six categories of health risks including risks that contribute to intentional injury. In our Wraparound survey, we

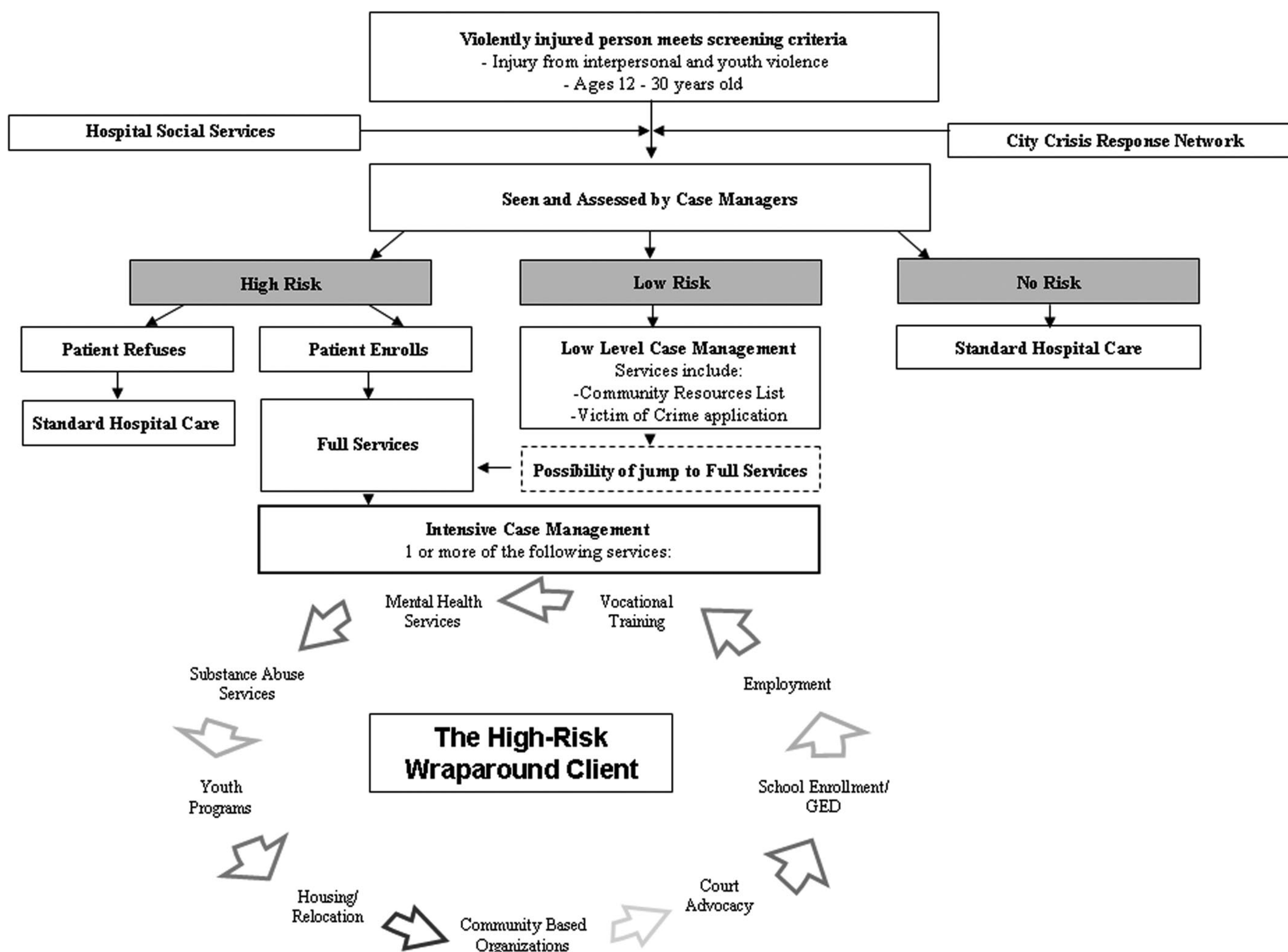

Figure 1. Wraparound program algorithm.

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focused on violent injury-related behaviors when compiling our needs assessments.

The structure of the WP is shown in Figure 1. Intensive case management (CM) begins at the bedside. Once the client is deemed "high risk" and the patient agrees to be in the program, enrollment for "full services" ensues. The case managers then follow clients beyond hospital discharge for 6 months to 1 year depending on the needs and progress of the client. The partnership between the case manager and the client is vital. The time case managers spend with clients, is a valuable, and of course limited resource. We refer to this as case manager "dose." We measured time spent during the most intense portion of program enrollment per client: the first 3 weeks from initial contact. It includes personal and phone contact, as well as advocacy.

In addition, it is very common for the case manager to incorporate the support of family and friends on the client's behalf. CM included crisis management, home visits, phone contacts, escorts to risk reduction resources, and recommendations for family therapy if necessary. Based on the needs assessment, the mentorship provided is coupled with other risk reduction resources as outlined in this figure.

RESULTS

In conducting process evaluation, we found the following results: 435 people met eligibility criteria at San Francisco General Hospital, the only City and County Level I Trauma Center, in the first 12 months of the program. The two case managers were able to make contact and assess 73% of the gun shot victims and 57% of the stabbing victims. Fifty-four percent of the individuals assessed had needs identified and received one of two forms of CM services: for lower-risk individuals, assistance with victim of crime services within the city and some basic CM was provided. Risk assessment was based on the criteria listed in the methods section and a more subtle assessment by the case managers: presence of certain tattoos, the mention of names of their friends, where they spend their time and the result of frank discussions. If deemed high-risk for injury recidivism, individuals received full programmatic services. Forty-five people were assessed as high risk. Of those eligible but not assessed by the case managers, 48% were in the hospital for ≤2 days. Typically, by the time, the case managers were able to come to the bedside to see the patient, he or she was already discharged. This was particularly true for the weekend admissions. Figure 2 profiles the outcomes of individuals who were able to be assessed by the case managers.

The demographics of the 45 individuals who received full CM services are seen in Table 1. Of note, nearly 60% of the violently injured victims in this group are AA. According to the San Francisco Violent Injury Surveillance System,[11] 60% of overall victims of violence in our city are also AA, although this ethnic group makes up only 6% of the city's population.

Lack of education and unemployment are two characteristics closely associated with violent injury risk. Of our high-risk

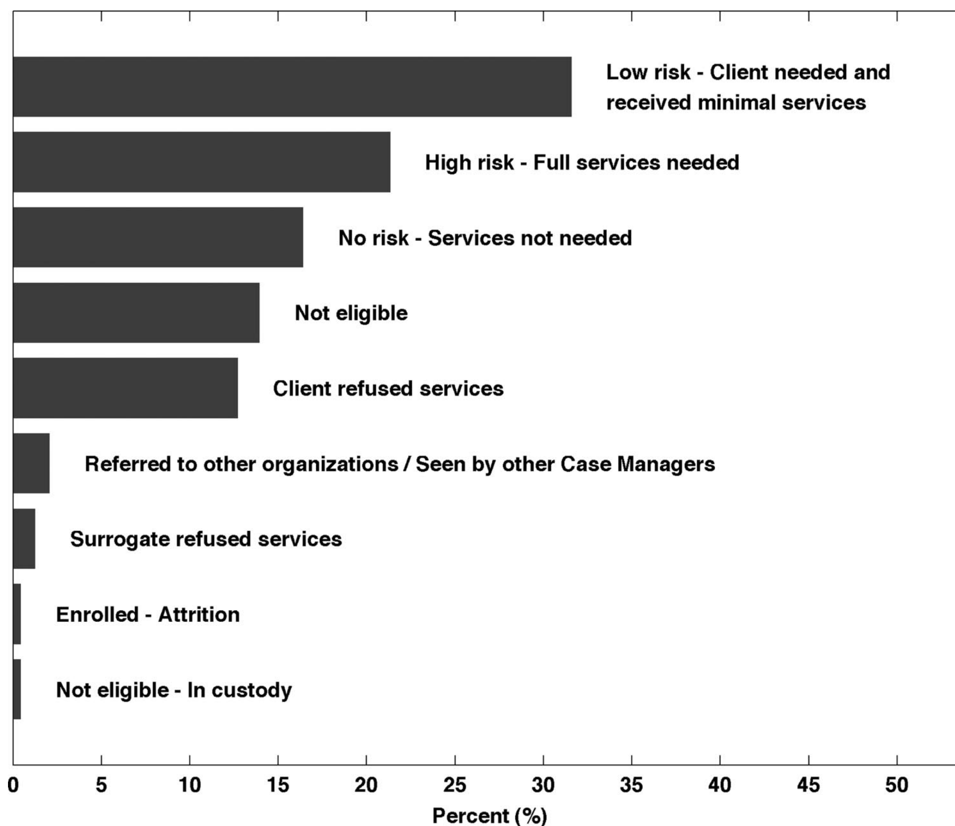

Figure 2. Subjects assessed by case managers.

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TABLE 1. Demographics Data for Enrolled Clients

Age (yr)	19 ± 3.86
Gender	
Female	6 (14)
Male	38 (86)
Race/ethnicity	
African American	26 (59)
Latino	13 (29)
Pacific Islander	2 (4)
White	3 (7)
Length of stay	
ICU days	3 ± 9.51
Hospital days	10 ± 15.33

Values are N ± SD or N (%).
ICU, intensive care unit.

clients, 90% were unemployed at the time of injury. Figure 3 demonstrates the lack of education in our population.

In an effort to understand time expenditure per client, we measured CM "dose," as described above. We found that 40% of the time, case managers spent >6 h/wk with an individual client. Forty-one percent of the time, they spent 3 h to 6 h/wk, and 19% of the time, they spent <3 h/wk. Seventeen of 18 people who required >6 hours had two to three service needs. A greater number of identified needs did not correlate with greater CM time.

For impact evaluation, we assessed how well Wraparound was able to address risk factors specifically associated with violent injury. Table 2 illustrates our early success rate at placing our highest-risk clients in risk-reduction programs and jobs. Fifty-five percent of our clients were on probation when they entered the WP. Our success in Court Advocacy was measured by our capacity to work with Probation Officers, Judges, and Public Defenders who entrusted Wraparound case managers with supervisory roles. Success in obtaining Driver Licenses was limited. This can be attributed to clients' failure to address prior moving violations and illiteracy. Successfully placing clients in General Education Development programs or in schools where they could finish formal secondary education was in large part due to case managers working with School Counsellors and having schools willing to take our clients in an alternative setting. Specific sites such as Goodwill Industries and a local trucking company were vital in helping with placement of our clients in solid jobs. Finding safe and affordable housing in San Francisco has been very labor intensive and has taken tremendous time by the case managers. Finally, through a Memorandum of Understanding with a local mental health outpatient program, The Trauma Recovery Center, we have been able to provide clients with treatment for substance abuse and post-traumatic stress disorder. The biggest hurdle is the cultural stigma associated with seeking mental health care. In addition to the services listed, we also have sent several clients to a city-funded tattoo removal service. This is a critical step for many

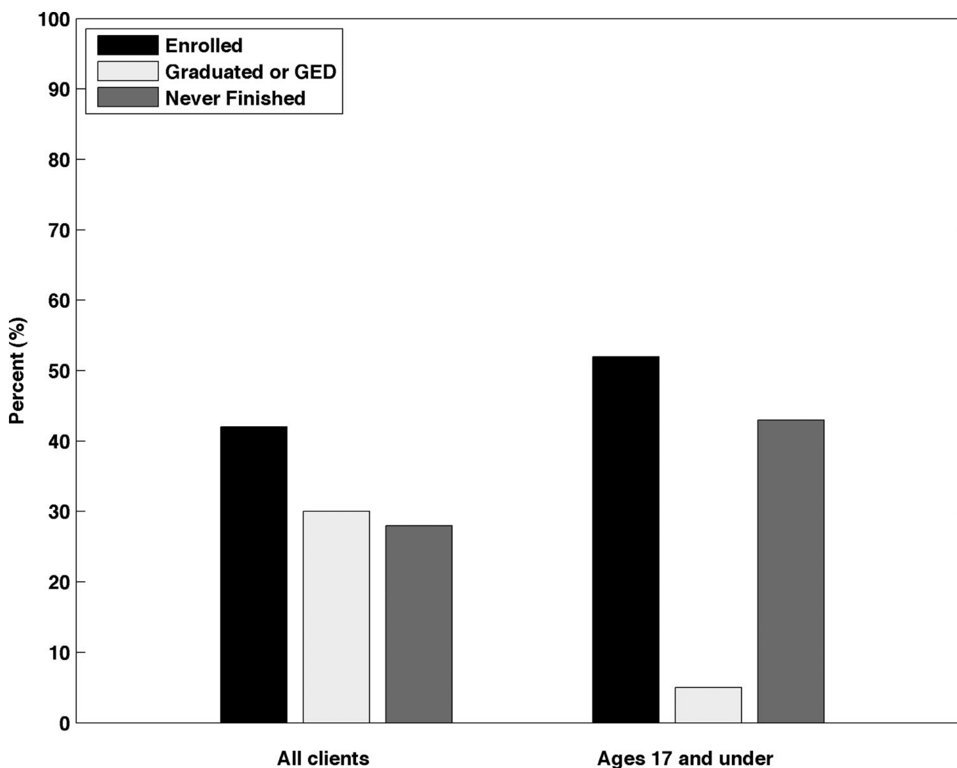

Figure 3. Education level in population of high-risk subjects.

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TABLE 2. Interim Analysis: Risk Reduction

Identified Need	Percent Need Met*
Court advocacy	88
Driver license	14
Education	68
Employment	61
Housing	50
Mental health/drug treatment	65
Vocational training	67

* Clients in program ≥3 months.

clients to increase chances of finding employment. The 6-month attrition rate for the entire program is 4%.

DISCUSSION

In a previous study, investigators looked at 753 consecutive deaths at a Level I Trauma Center. The vast majority of injuries they reviewed were found to be “therapeutically non-preventable.” Based on these findings, the authors concluded that attention to injury prevention provides the greatest opportunity for additional improvements in the field of Trauma Care.[12]

Trauma centers often typify the “revolving door” phenomenon; for many young individuals admitted, violent injury is not a one-time event. However, unlike our approach to other pathologies more routinely thought of as “disease states,” standard of care does not routinely address the root causes and risk factors that lead to violent injury or injury recidivism despite the fact that the contributors have been identified. Although there is precedent for the successful institution of violence prevention efforts, comprehensive evaluation regarding the feasibility and early efficacy of VPPs is not reported.[3,13] We have created a hospital-based, community-driven VPP and used public health evaluation techniques previously used in unintentional injury to scrutinize our program from its inception.

The results of our process evaluation, or analysis of programmatic feasibility, were very positive: we were able to successfully screen and enroll a large proportion of our target population, spend significant time with high-risk clients, and engage stakeholders. Stakeholders included community and city partners vital in providing risk reduction resources. In addition stakeholders included hospital administration and personnel. Staff embraced the program and have come to expect its presence.

During this feasibility component, we found that we lacked adequate CM personnel to assess many violently injured individuals with short hospital stays. This data were presented to the Mayor’s Office and the Board of Supervisors and led to additional funding to salary an additional case manager.

For impact evaluation, we looked at the success of our program in addressing the known risks that contribute to violent injury. WP case managers served high-risk clients by developing trust, credibility and a risk reduction plan. This approach resulted in six to seven major needs being successfully addressed at least 50% in a population that is greatly in need of basic education, training, and other services. The most difficult to address have been obtaining driver licenses and assisting in finding affordable, safe housing in some situations. Illiteracy played a significant role in inability to obtain a driver license, and we are working with those clients to address this.

Overall attrition in the program is extremely low and many clients are demonstrating hope for their futures. In part, we feel that the case managers’ role as mentor, confidant, and representative of community outreach is responsible. One of the most compelling reasons to tap into the community for essential partnership in the struggle against violence is captured in the concept of collective efficacy. There is good data supporting the notion that collective efficacy, i.e., social cohesion among neighbors combined with their willingness to intervene on behalf of the common good, is associated with reduction in violence. The empowerment reflected in the actions of the case managers is oftentimes directly transferred to the clients. Our institution has, through our case managers, promoted a vital seamlessness and partnership between our institution and the communities plagued with epidemic of violence.[14] Any attempt at violence prevention should target at-risk individuals by reaching into the greater community in which they reside to appropriately address the cadre of contributing environmental factors. Most of the VPPs that have shown greatest success have recognized the importance of incorporating the community into strategies of risk reduction.[15,16]

Dr. C. William Schwab and his colleagues published their data regarding the utilization of trauma centers as lead agencies, in partnership with communities, to develop firearm injury prevention programs. In this investigation, trauma centers played a lead role in implementing firearm injury surveillance systems, production of injury profiles, and influenced community leaders and policy makers to address firearm injury. The link that a trauma center develops with its surrounding communities and its resources should be seamless if risk and protective factors are to be understood and addressed.[17]

For the violently injured individual at great risk for recidivism, interventions targeting risk factors immediately after injury and continuing on discharge would amount to a much more comprehensive approach, postinjury, than is currently the standard of care and practice at acute care trauma centers. The “golden window” that has been identified after other life-threatening events such as myocardial infarction, provides a unique opportunity to influence behavioral changes to reduce future risk. Acute care trauma centers today can seize this same window of opportunity for individuals injured from violence. Seizing this “golden window” in concert with the instant credibility afforded to our culturally competent case managers allows Wraparound to successfully enroll, retain, and develop protective factors in young victims of violence.

The importance of cultural relevance is recognized in the field of Public Health. “Health Communication” is defined as “the art and technique of informing, influencing, and motivating individual, institutional, and public audiences about important health issues.” Dr. Stephen Thomas of the

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Center for Minority Health at the University of Pittsburg points out that there "is credible evidence suggesting that cultural norms within Western societies contribute to lifestyles and behaviors associated with risk factors for chronic diseases." He goes on to say that "group identity" acts as a powerful filter through which information is received.[18] The application of these principles to violent injury, which can be regarded a societal chronic disease, is the backbone of our VPP, the WP.[5,19] Based on cultural competency, we were able to engage a traditionally resistant population of individuals and maintain their acceptance and trust.

A shortcoming of our study is the lack of randomization. As mentioned earlier, we felt that we did not have equipoise from the community to proceed with randomization. Disparate health care in underserved communities is a tremendous concern. Wraparound is there to address it, not to be perceived to contribute to it. A shortcoming of our program is failure to capture 15% of eligible people deemed high risk by our case managers. In many ways, these individuals may be considered the highest risk individuals of all. Occasionally, refusal of services comes from Guardians. We continue to work on overcoming this shortfall.

To the best of our knowledge, process and impact evaluations have not previously been applied to a VPP. This intermediate evaluation provides a framework in our effort to achieve the ultimate goal of reducing recidivism. This evaluation has aided in identifying strengths and weaknesses in the program in an objective manner. In addition, it provides critical data to our stakeholders: policy makers, funders, hospital staff, and our affected communities. This type of evaluation could aid in replicating a VPP at another trauma facility. Analysis and critique from programmatic inception can provide an early feedback system to coordinators building programs from the ground up.

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