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Violent re-injury risk assessment instrument for hospital-based violence intervention programs

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Abstract

Background—Violent injury is the second most common cause of death among 15–24 year-olds in the US. Up to 58% of violently injured youth return to the hospital with a second violent injury. Hospital-based violence intervention programs (HVIP) have been shown to reduce injury recidivism through intensive case management. However, no validated guidelines for risk assessment strategies in the HVIP setting have been reported. We aimed to use qualitative methods to investigate the key components of risk assessments employed by HVIP case managers and to propose a risk assessment model based on this qualitative analysis.

Materials and Methods—An established academic hospital-affiliated HVIP served as the nexus for this research. Thematic saturation was reached with 11 semi-structured interviews and 2 focus groups conducted with HVIP case managers and key informants identified through snowball-sampling. Interactions were analyzed by a four-member team using Nvivo 10, employing the constant comparison method. Risk factors identified were used to create a set of models presented in 2 follow-up HVIP case managers and leadership focus groups.

Results—Eighteen key themes within seven domains (environment, identity, mental health, behavior, conflict, indicators of lower risk, case management) and 141 potential risk factors for use in the risk assessment framework were identified. The most salient factors were incorporated into eight models that were presented to the HVIP case managers. A 29-item algorithmic structured professional judgment model was chosen.

Conclusions—We identified four tiers of risk factors for violent re-injury that were incorporated into a proposed risk assessment instrument, VRRAI.

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Keywords

Trauma; violent injury; hospital-based violence intervention program; risk assessment

Introduction

Intentional violent injury is a leading cause of death among people 15–24 years of age in the United States.[1] Many of these patients suffer a subsequent violent injury, with recidivism rates as high as 58%.[3–6] Hospital-based violence intervention programs (HVIP) have been created to reduce injury recidivism among patients at risk of re-injury. However, to our knowledge no formal methods of assessing patient's risk of re-injury have been developed.

HVIPs provide intensive case management to victims at risk of being violently re-injured.[7–10] These programs take advantage of "teachable moments," which often occur in clients' lives immediately after a violent trauma, and during which they are more willing to accept interventions to reduce recidivism.[11] Through case management and violence mediation strategies, these programs have been successful in preventing both re-injury and incarceration.[12] In one HVIP evaluation, the intervention group had a significantly lower injury recidivism rate than the control group (5% versus 26%).[7] Other HVIPs in Baltimore, Chicago, and Richmond have found that their intervention groups had significant reductions in misdemeanor offenses, feelings of aggression, and substance abuse.[8–10] The National Network of HVIPs (NNHVIP) has spurred collaboration for sharing best practices and enhancing research efforts. This has been immensely useful to new and emerging programs, as a greater understanding of the key points of success for established programs is crucial to their ongoing funding and success.[13,14]

An important gap in knowledge exists surrounding the process of client risk evaluation in HVIPs. Currently, there is no validated approach to predicting a client's risk for being re-injured and no known studies on risk assessment strategies employed by successful HVIPs.[15,16] At least two limitations arise in the absence of verified risk assessment protocols. First, the accuracy and reliability of longitudinally comparing HVIP interventions is severely limited as no baseline of risk "severity" can be established, limiting the ability to adjust for case mix when comparing interventions, populations, and program effectiveness.[17–19] Second, emergent HVIPs with less experience are confronted with the obstacle of assessing clients without validated guidelines, and therefore lack a barometer to guide their practice. Currently, most HVIPs rely on case manager intuition for assessing client risk. Despite this, in drawing upon their personal experience and sociocultural knowledge, case managers often perform very well in their assessments. In one HVIP, clients assessed as high risk who were offered services had higher rates of injury recidivism than those assessed as having lower risk, proving the ability of HVIP case managers to accurately discern client risk level.[20] Therefore, a qualitative research approach to explicate this unique knowledge is a viable research strategy for the creation of a risk assessment instrument for HVIP clients.

The aims of this study are 1) to investigate the key components of the implicit risk assessments that HVIP case managers use in their client evaluations, and 2) to use an

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iterative process to synthesize a risk assessment instrument based on these components, to be used by trained case managers in the HVIP setting.

Materials and Methods

Study Design and Sample

The UCSF-sponsored Wraparound Project (WP) was founded in 2005 and was one of the first HVIPs in the US. They have shown that an HVIP can reduce re-injury rates two to three-fold and have demonstrated HVIP effectiveness. [13,17,21,22] Qualitative focus groups and individual interviews were carried out with key informants for two HVIPs, who were identified through snowball-sampling until no new thematic information arose during interviews (theoretic saturation).[23] Informants had diverse backgrounds and included HVIP directors (2), HVIP case managers (6), a trauma nurse practitioner, social workers (2), psychotherapists (3), violence intervention specialists (2), community leaders (2). One HVIP director and two case managers from the CHOICE Program based at Natividad Medical Center in Salinas, CA were included. All protocols and focus group and interviews guides were approved by the UCSF Committee on Human Research for use in this study.

Data Collection

From May 2016 to August 2016, a researcher trained in qualitative research methods (EK) conducted four focus groups with case managers, and 11 semi-structured interviews with key informants. All interactions were audiotaped and professionally transcribed.

Data Analysis

A four-member multidisciplinary team including one Wraparound Project case manager (E.K., A.H., T.H., and J.D.) performed data analysis by using the standard constant comparison method.[24–26] On completion of coding and reaching thematic saturation, the coded data was organized into a conceptual taxonomy. Themes were proposed and agreed upon by group consensus.[26] Nvivo 10 was used for data analysis (QSR International, Melbourne, Australia).

Synthesis of Risk Assessment Instrument

A thorough literature search of violence-related risk assessment models and their development methodology was conducted and used to inform our approach, given the lack of a standardized pathway for creating this kind of risk assessment instrument.[27] The selection of a model building approach was primarily informed by the fields of forensics and psychology, in which models for predicting intimate partner violence (IPV) or suicide risk are developed by identifying potential predictor variables through consultation with experts and/or clients and patients, and regressing a subset of those variables with available data.[28–30] Other tools have relied solely on researcher expertise for creation of the variable pool.[31] Some tools for predicting IPV, such as the Danger Assessment, rely on women's thoughts about risk of violence for assessment.[32] The model described in this study was formulated with input from the expert informants described above, and one member of the case manager leadership (TH) who participated in all aspects of the data analysis and creation of the risk assessment tool.

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Essential risk-assessment concepts identified through our qualitative data analysis were used as predictive factors in the models; eight different risk assessment models were created de novo and presented to key stakeholders. One model was selected unanimously and iteratively refined through two focus group sessions to optimize the mechanics of its assessment strategy as well as the language used in the instrument.

Results

Key informants comprised of 1 HVIP program director/trauma surgeon, 2 social workers, 3 psychotherapists, 2 directors of community-based youth outreach programs, and 3 community-based outreach workers participated in one-on-one interviews, while seven key informants (1 HVIP director and 5 HVIP case managers) participated in a series of four focus group sessions. The average lengths of the interviews and the focus group session were 48 minutes and 106 minutes, respectively.

Qualitative Analysis

At thematic saturation, 141 codes (risk factors) were identified as potential key components of HVIP case managers' risk assessment. Qualitative analysis of the code taxonomy allowed the synthesis of seventeen themes organized into seven domains (Table 1). The seven domains are: environment, identity, mental health, behavior, conflict, indicators of lower risk and case management (Appendix 1).

Violent Re-injury Risk Assessment Instrument (VRRAI)

An algorithmic structured professional judgment model was unanimously selected by case managers for the creation of VRRAI (Figure 1). Other presented models included a questionnaire, simple point scales, graded scales, scales informed by actuarial data[5,33–36], and a simple algorithm. The selected instrument was amongst the more complex models, and was amongst the highest in terms of number of variables included. VRRAI is composed of four components and contains a total of twenty-nine items regarding what informants and case managers considered the most pertinent risk factors for predicting violent re-injury in this client population (Table 2). The four components of the instrument are evaluated sequentially, with the outcome of each component dictating the next step in the algorithm. The components and an explanation of each follow: Category A (Elevated-Risk Indicators), Category B (Behavioral Factors), Category C (Severe Conditional Factors), and Category D (Moderate Conditional Factors). A guide to evaluating the instrument can be found in Table 3.

- Category A - Elevated-Risk Indicators: the six risk factors included in this component are intended to represent the most sensitive indicators available. In other words, if one or more of these factors are present, it is very likely that the client in question is an elevated-risk client.
- Category B – Behavioral Factors: the six risk factors included in this component pertain to mental health or behavioral factors which, if present, may significantly potentiate other risk factors. These can be thought of as risk "multipliers." Thus, the presence of one Category B factor does not alone qualify a client as having

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elevated-risk. Instead, it is the synergy between Category B factors and other factors that may lead to an assessment of elevated-risk.

- Category C – Severe Conditional Factors: the eight risk factors included in this component represent factors which may be less sensitive than Category A factors, but when present in conjunction with many other risk factors may necessitate an assessment of elevated-risk.
- Category D – Moderate Conditional Factors: the nine risk factors included in this component represent factors which may be less sensitive than Category C factors but when present in conjunction with many other risk factors may necessitate an assessment of elevated-risk.

Discussion

This study sought to determine the critical components of HVIP case manager's violence risk assessment, and to create a violence risk assessment model based on the identified risk factors. We identified 141 potential risk factors, which were coalesced into eighteen themes in seven domains. This information was used to synthesize eight risk assessment models, and one was selected unanimously. The selected model takes the form of an algorithmic structured professional judgment model and consists of four components with a total of twenty-nine questions. Once validated, VRRAI may be utilized by HVIP case managers to assess clients' risk of reinjury.

Traditionally, prediction models in IPV, suicide risk, and violent re-injury have been classified into three categories: unstructured clinical judgment, actuarial risk assessment, and structured professional judgment (SPJ).[16] Although several studies have used actuarial approaches to quantify the risk factors associated with injury recidivism[5,33–36], SPJ remains the favored approach, and is the form that the VRRAI takes.[16] SPJ has been defined as "a decision made without fixed and explicit rules but based at least in part in consideration of a standardized information base."[37] SPJ tools allow clinicians to integrate their own judgment into a minimal structure where a list of relevant risk factors are provided.[16] VRRAI follows this format; risk factors are presented and a structure for determining a client's risk status is provided, however, clinical judgment is required to answer each question in the tool. This is at once a benefit and a limitation: evaluators must have adequate knowledge, experience, and training to use the tool, but it allows escape from the rigidity of actuarial tools. For these reasons the SPJ approach is favored by clinicians in varying fields and by the focus group participants.to the particular model used in VRRAI.

The factors presented in VRRAI are corroborated by existing literature surrounding the risk factors of recurrent violent trauma. Richardson et al. found that the four top factors predicting trauma recidivism for black males in an urban setting are a) previous incarceration, b) weapons use in the past year, c) disrespect as a factor leading to conflict, and d) being intoxicated during the incident, with respective odds ratios (OR) of 6.23, 2.75, 2.48, and 1.72.[5] They also found that trauma recidivists were significantly ($P < 0.05$) more likely to experience housing instability. All but (d) intoxication during the incident, are included in our model. Substance use disorder history is a factor in VRRAI, which as a

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behavioral pattern may be more predictive than noting the presence of substance use during a single incident. A case-control study conducted by Cooper et al. found that victims of violent trauma were significantly more likely to be currently selling drugs (OR = 22.1), have been incarcerated (9.8), ride with a gun in the car (6.2), observed violence in neighborhood (6.1), have an immediate family member murdered (5.9), been in a fight in the past year (5.6), be unemployed (4.9), and never have completed high school (3.7).[38] All of these factors are represented in VRRAI explicitly, except "observed violence in the neighborhood." Our data suggests that "exposure to community violence" is implicitly contained in the VRRAI risk factor "lives in high-risk neighborhood." In a study comparing first time violent trauma victims and recidivists, Buss et al. found that having been threatened with a knife or gun in the past, witnessing violence, living in poverty, and having a history of mental health disorders were significant ($P < 0.01$) discriminators upon regression.[39] Socioeconomic status (SES) is not an explicit factor in VRRAI, though many other attributes present in the model can be considered as markers for low SES. Goins et al. found that 75% of violent trauma recidivists were unemployed.[4] A final study examining trauma recidivists of all mechanisms reported that clients with high risk substance-related behaviors, recent history of fighting with weapons, or drug-related arrests were 3.5, 2.8, and 2.4 times more likely to be re-injured, respectively.[33] In summary, case manager assessment of client risk of violent re-injury is a complex process with many factors to be considered. The model we have presented contains items that address these factors.

Importantly, research by Elijah Anderson, PhD and John Rich, MD, MPH gives theoretical insight to the interrelation of the variables described in these studies and presented in our model, and how they encourage recurrent violent trauma, specifically around the risk of "disrespect."[40–42] Following intentional violent trauma—which is a severe form of disrespect— the victim is pressured to retaliate. These factors disrupt the victim's sense of safety and encourages weapon carrying, which increases risk of re-injury.[43] Furthermore, traumatic stress can bring on hypervigilance and hypovigilance, causing the victim to perceive situations as more threatening than usual or to be less aware of their personal safety.[44,45] Finally, self-medication with alcohol, marijuana, and other drugs can potentiate the emotional distress and make functioning at work or school more difficult, further limiting their opportunities. This may in turn force the client into the illicit economy, further increasing their risk of violent re-injury.[38]

The connections between incarceration and housing instability and its effect on violent injury have become clarified through recent scholarship. Bruce Western and others have described in detail the War on Drugs' legacy in disproportionate incarceration of young black males and gross restriction of their economic opportunities.[46–48] History of incarceration makes public housing far more inaccessible, leading to housing instability.[49,50] Residentially mobile youth are at higher risk of victimization, possibly because of being viewed as having fewer resources to ward off personal confrontations and the nature of their changing peer social networks.[40,51] Transient homelessness increases crimes of desperation and puts clients in close proximity of many ex-convicts and elevated risk individuals.[52] Physical and social proximity to higher risk individuals—especially those involved in gun violence—has been shown to increase rates of co-offending (being arrested for the same offense), amplifying risky behaviors, and being more predictive of victimization than

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demographic information alone.[6,53–55] For these reasons, two essential threads to be assessed are level of participation in gangs and in illegal activities, and incarceration history. In consideration of this fact, these factors' placement in Category A (elevated-risk indicators) is justified.

Other strengths of VRRAI include its conceptual framework, potential for high sensitivity, and ease of use. The four categories included in the model (elevated risk indicators, behavioral factors, severe conditional factors, and moderate conditional factors) provide a rational conceptual framework which mirrors case manager's mode of thinking about client risk. That is, the first category evaluates whether or not there are any variables that would clearly signify elevated risk. If there are, the assessment is complete. If not, the full evaluation must be completed. The second category evaluates mental health and behavioral characteristics which can be understood as risk "multipliers," which help an assessor to understand the risk variables which follow in category C and D. Taken together, the model presents the most salient factors that should be considered in a violent re-injury risk assessment. It has the potential for having high sensitivity because there are several pathways to making the determination of elevated risk. This is in contrast to actuarial models that rely on summing scores and delivering the probability of an outcome. This model can account for the client who may outwardly seem to be lower risk, but in consideration of all the factors present in the model and the volatility "multiplier" of his or her behavior or mental health condition, actually falls into the elevated risk group. At the same time, with only twenty-nine items, considering each of the factors should not be overly cumbersome for the assessor.

Limitations to this model and this study include the need for experiential knowledge and client-assessor rapport, inherent limitations of qualitative research, and the lack of established guidelines on risk assessment for this population to date. In terms of model design, as previously discussed, SPJ tools inherently require assessors to have adequate knowledge, experience, and training. This includes both clinical knowledge and knowledge of the community and culture to which the client belongs. Being aware of the different social structures and groups present in the community can at times be indispensable for making the assessment appropriately. Fortunately, almost all case managers working in the HVIP setting have been raised in and live in the same communities as their clients. Another weakness of this model is that it requires a certain degree of rapport to be established between the client and the assessor which can take days or weeks. This is true for SPJ tools in general and for the unstructured clinical judgment that is currently practiced by HVIP case managers. Study limitations include the lack of validated guidelines for creating clinical risk assessment tools for predicting fundamentally social phenomena. Second, this instrument was produced in consultation with two HVIP groups in Northern California: it is possible that the results may not be generalizable for use in other communities. To address this, emphasis was placed on using language in the instrument which case managers felt would be intelligible to their colleagues working in other parts of the country. Given the frequent and extensive collaboration provided by NNHVIP, we feel that the informants participating in this study have an adequate understanding of how their colleagues in other regions conceptualize risk assessment. Third, the threshold number of Category C and D variables which must be present to make an assessment of elevated-risk were set arbitrarily. Validation studies are

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needed to determine what the appropriate threshold is for these categories. Finally, qualitative methods are always fundamentally influenced by researcher bias.[56]

This model may provide numerous benefits for HVIPs and the public health effort to reduce intentional violent injury recidivism. First, it can be used for client risk stratification and triage of case management resources, which is especially difficult for emerging programs with less experience. Given the high rates of recidivism in this patient population, HVIPs tend toward enrollment practices which favor sensitivity over specificity. Improving their ability to offer services to the most appropriate clients while using a model with a potentially high negative predictive value will enhance the efficiency and efficacy of these programs. Second, by helping new programs enroll the most appropriate clients, the instrument may be useful in training new case managers. Third, it could enhance evaluation data by providing some control for case mix when assessing processes and outcomes for the elevated-risk clients being enrolled in HVIPs. This will allow for more rigorous inter- and intra-institutional comparison of HVIP interventions, while generating more hypotheses for future advancement of the field. Validation studies of VRRAI should use multi-center prospective data to confirm risk factor thresholds using receiver operating characteristic curves; to evaluate the sensitivity, specificity, and inter-rater reliability (Fleiss' kappa) as compared to ad hoc case manager assessments; and to measure external validity.

Conclusions

This study identified a pool of variables contributing to risk of violent re-injury. The twenty-nine most salient factors were organized into an algorithmic risk assessment instrument with a four category structure, VRRAI. Future research must be conducted to assess the validity of this instrument.

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Appendix 1

Detailed explanation of domains and themes identified through qualitative analysis of interviews and focus groups.

Domain 1 - Environment

Themes identified in relation to the client's environment included where the client was raised, where they are currently living, the social network that the client maintains, the stability of the client's housing, and the client's access to and knowledge of resources, services, and opportunities. Informants described how "immersion" in certain locales and communities provide examples of high-risk behavior for youth to mimic, many opportunities for involvement in those behaviors, and fewer examples of lower risk behavior: "there [are] a

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lot of land mines out there… drugs, gangs, alcohol, addiction… a lot of it stems from poverty." Informants described that the omnipresence of these environmental risks factors allows youth the opportunity to involve themselves in those activities, because they "want to be like [their] community… you're starting to mirror what's in your community." One informant described how people could not leave the community unless they "end up going to jail or [they] leave in a pine box." The social milieu occupied by the client is an important consideration because it is often informative about their worldviews and can be predictive of their likelihood of being reengaged in violence. Several informants described how the clients are often accustomed to "being let down by adults," causing them to "turn to their youth friends for support." This can lead to a less stable support system that is not grounded in the foresight of older, more experienced adults. Housing instability was also highlighted as a marker of mental health or substance use disorders. Finally, access to resources, services and opportunities was described as a strong predictor of clients' involvement in the illicit activities and its accompanying risks. Educational attainment was also emphasized as an important consideration as clients with low educational attainment may be forced to "look for another alternative, which can land [them] in jail, which can lead to doing robberies." All informants reported that being involved in youth or community programs—or even more importantly, having a job—can mitigate risk substantially. As one informant reported, "there was a saying: 'Don't nothin' stop a bullet like a job.'"

Domain 2 - Identity

The theme of identity was defined as and individuals' view of self in society, gang affiliation, legal history and status, and demographics. Specifically, case managers emphasized that clients who view the system as having failed them or their community often find identity within the gang or "street" lifestyle. Determining their identity ("Who do I want to become?") is of paramount importance to understanding their trajectory. One informant described how victims of violence often have a sense of hopelessness, and that they "don't actually see themselves living very long" and are "just surviving, not thriving." Viewing law enforcement as inherently hostile was also a prominent societal view—one informant said: "hell naw I ain't gon' talk to police cause they get you killed." Affiliating with gangs or "crews" shape client identity and place them at higher risk for many reasons. Several informants said that "wannabes" are at highest risk because "they are willing to do whatever" to be "in" with the gang. For others who are heavily involved with a gang, it can be risky to leave the organization. Informants also described that the nature of what it means to be in a gang is changing, as many gangs are much less structured in recent years, making their rules and code of conduct harder to predict. All informants agreed that a history of legal issues could be a mark of heavy involvement in gang or "street" lifestyle, and/or a lack of transitioning resources. Demographically, a client's ethnic identity or immigration status may be informative of the community dynamics that the client is involved in when contextualized by case manager's understanding of local enclaves. This is most salient for young undocumented immigrants who do not speak English and lack support systems, as they are more likely to be recruited into the illicit economy and are seen as easy targets for exploitation and victimization: "even if they're shot or stabbed, they're not going to tell

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anybody," because interacting with government puts them at risk of deportation, "so it's a lot harder for them for sure. They're scared."

Domain 3 - Mental Health

Mental health for clients arose as a risk factor, including emotional/mental response to current trauma, history of clinical mental health disorders, history or current use of substances, and degree of denial of mental health disorders. Responses to violent trauma are varied, but certain key behaviors such as hyper/hypovigilance, dissociative behavior, and increased drug use can increase client risk following the injury. One mental health trained informant said that the clients "are more likely to interpret neutral stimuli as threatening and they can react in kind," or they may be "so avoidant that they're not paying attention to threat cues in their environment… it can go both ways." Another described how a dissociative affect can cause clients to "feel like they're in a daze" and that "life is like a dream," ultimately decreasing their situational awareness. Clients with mental health diagnoses may also be at higher risk of re-injury as emotional or mental instability can significantly potentiate already risky behaviors or situations, and can precede a rapid disintegration of coping ability. In all cases, substance use must be assessed, as substance abuse is often exhibited by clients and can distort perceptions of danger, modulate behavior, and cause withdrawal from social support networks. It can also "bring them into contact with people who are selling substances, into unsafe places." Almost all informants discussed how important denial of mental health as a result of cultural stigma is for determining risk; clients who are unwilling to acknowledge or seek help for mental health conditions are at higher risk for re-injury.

Domain 4 - behavior

Behavioral considerations as a risk factor include client disposition, coping strategies in response to trauma and other stressors, and involvement in illegal activity. Informants identified several important behavioral components that might best be described as his or her behavioral disposition. Qualities of a client's disposition, which informants associated with elevated-risk included having low social awareness, high impulsivity, high aggression, and being recalcitrant to outreach. If clients are unable to "read situations"—in other words—navigate dangerous interactions, they are more likely to be re-injured. If the client often responds aggressively to confrontations, they are at elevated risk of re-injury—especially when their aggression is "coupled with hypervigilance and paranoia." Informants trained in mental health spoke about "stimulus value" a term used to describe how threatening a client's behavior or appearance may be to others; clients who do not recognize their own stimulus value can unwittingly cause others who are fearful of the client to perpetrate violence against them. One factor that almost every informant spoke about in great detail was that when someone refuses services, it is an important indication that they need services. Informants described that when offered services, many elevated-risk clients respond by saying "I'm good right now, I don't need nothin'" and that this should be considered a sign that the client is heavily involved in activities that place them at higher risk. This recalcitrance as a marker of risk was heavily emphasized by all, especially in clients with "shut-down" demeanors: "Don't eat, don't cry, don't talk, that's a dangerous motherfucker

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right there. And you can't read 'em or figure 'em out." Several mental-health trained informants sought to understand this behavior in terms of attachment style, their "capacity to let people help, to think that a person could help them, to allow the trust that this person, this place, and these people could be helpful to them." Determining a client's attachment style may therefore be useful in contextualizing their behavioral dispositions. Related to disposition, many informants discussed the client's coping strategies in response to trauma and stressors, and how those not engaging or otherwise lacking support networks, and those who cannot envision non-violent conflict resolution as having elevated risk. Another factor within behavior that was universally discussed was client's involvement in illegal activities, as greater involvement places clients in closer proximity with elevated risk individuals, and often necessitates the carrying of firearms, with this subsequently increasing the risk of dangerous confrontations.

Domain 5 - Conflict

The nature and history of conflict within a client's life, and their connection to friends or family with histories of violence perpetration or victimization, emerged as a key marker of increased risk. One informant pointed to a recent client of theirs who was admitted for a gunshot wound, a few weeks after his father was "assassinated." Another described a conflict where a "car got ambushed and four guys got killed," and subsequently a brother of one of the victims "started dealing with the trauma," and started "feeling like he wanted to vindicate his brother," and was eventually "baited into things" by his adversaries who had been posting disrespectful content on social media platforms. Informants explained that in most cases, conflicts have been ongoing for many years and that their ability to mitigate risk through working with a single client is limited due to the diffuse and multi-partied conflicts they are often embroiled in: "we may be able to bring different groups together but not everybody. So [they] may say, 'I don't' have a problem with you [an adversary], so when I see you in the street I'll give you a pass, my people aren't gonna do nothing to your people and yours aren't gonna do nothing to mine. That may not work if you bring the whole crew in because everybody has their own individual issues with each other."

Domain 6 - Indicators of Lower Risk and Case Management

The findings described above list themes that, when present, often indicate elevated risk of re-injury. In contraposition, the absence of these factors suggests that a client is at lower risk of re-injury, as discussed by informants. In addition, there were two themes that emerged which are not available through contrapositional logic: clients' willingness to participate in outreach programs and maintain employment emerged as two of the most reliable indications of a lower risk client. Informants described a loose pathway towards clients' divesting from the illicit economy and street lifestyle wherein their worldview shifts, they become more open to outreach programs, then accept and finally maintain employment in traditional jobs. One informant described a client who they believed was in the beginning phase of this path when they said, "I sell drugs here and there but that's not how I want to continue making a living, I know it's unsafe." Another informant said, "if you give an alternative, they actually try it out, it actually works for them, then yeah, you'll see it because they really weren't in it for all the reasons they were doing it for. They really

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wanted to just provide for the family, take care of their moms, take care of their kids." Finally, informants described the risk-assessment process as fluid, often requiring multiple interviews, and crosschecking with community contacts to complete.

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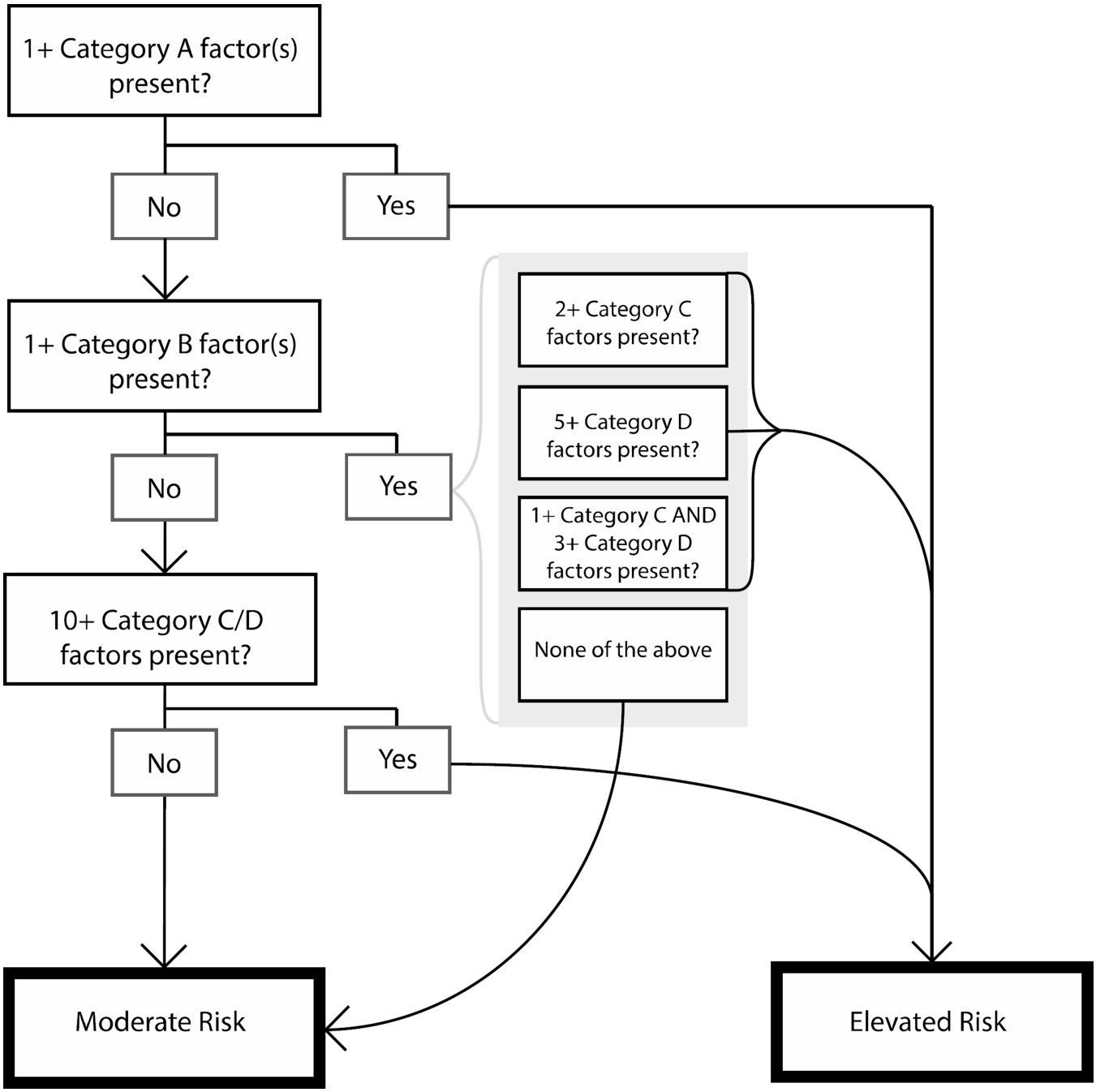

Figure 1.
Violent Re-injury Risk Assessment Instrument (VRRAI) algorithm. Assessors should use this algorithm in conjunction with the risk factors listed in Table 2, using the evaluation guide found in Table 3.

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Table 1

Domains, themes, and illustrative quotations

Domain	Theme and illustrative quotation
Environment	**Immersion in neighborhood/community** – Immersion in certain locales and communities provide examples of high-risk behavior for youth to mimic, and many opportunities for involvement in those behaviors. *"It's a stumbling block just trying to walk that straight life. And living in a harsh environment and walk that straight line, its hard for the young ones, unless you really leave this environment. But to live in the environment where you just got shot and try to make money, and walk straight, it takes a lot of team effort."*
	Social network – Clients lacking structured, supportive families more often turn to friends or gangs for support, opening pathways for high-risk behavior imprinting. *"You have to see what the family dynamics are like. Is the mom working, is she on drugs? Is the dad in the life? Do either of them have a job? Are there siblings? What is the hierarchy in the house? Is there really like a parent-child relationship? Or is it more like brother and sister? Cause these days a lot of the parents are young, they hanging out with their kids. They go to a party, and the mom will be here and the daughter will be over there, dancing with the same people. But then, when something goes down, they don't have a support system Or moms on drugs, I'm out here hustling dope; I'm taking care of my brothers and sisters I'm really like the man of the house."*
	Housing instability - Housing instability puts clients in close proximity to high- risk individuals, may signal significant mental health and/or substance abuse issues, and reduce their functionality in activities of daily living, and compromise their ability to cope with stressors. *"They go back to wherever they can sleep. They don't know if they're a target to get robbed or get beaten up, assaulted, stabbed."*
	Access to resources, services, and opportunities - Clients lacking access to and knowledge of resources and legal opportunities are forced to participate in illicit economy and endure associated risks. *"If you're not being productive, if your time is not being utilized and your time is not being productive, and you come from an environment where there's a lot of poverty, drugs, and violence, you're more likely to be involved in that lifestyle because you have to survive."*
Identity	**Demographics** – Undocumented immigrants are extremely vulnerable to violent injury, especially if they are minors or have limited support networks locally. *"[Undocumented immigrants] are definitely high risk because they come alone they come unprotected, they come not knowing anybody. So they're either going to be victims of the violence because they look vulnerable, because they look like they can be robbed for something, because they look like they can somewhat just say they're over here. And because they're newcomer, they look like a Sureño. They're going to be identified as that and then this is going to be brought upon that because of just their look, their clothes, their whatever. So if they get connected to any gang, they're either going to get harassed by them or they're going to join them because if they're doing heavy recruitment, they [0:28:36] [Indiscernible]. I want to say even right now they're doing more recruitment to get younger people So if they look like they're either going to mess with you, then that's typically what would happen. They'll get harassed. And so then they either are going to fall in line and get victimized or they're going to say, "No. I want to be part of this and I'll do whatever it takes."*
	View of self in society – Clients who view the system as having failed them or their community and reject outreach find identity in gang/"street" lifestyle are at highest risk. *"They highlight in life that it's mirrored by music, the media, movies and that Sometimes they glorify that they're still alive or they've been shot, stabbed, or assaulted. Once we have a conversation about the reasons why, they will start seeing, "You're looking for an identity. Do you know your history? Do you know how powerful you are, your people are, your community are? Do you know the reflection of what you have done that's going to mirror your life from now on?"*
	Gang-affiliation – Though nearly all clients with gang affiliations are at higher risk of re-injury, the reasons may differ; aspiring gang members are more willing to take extreme risks whereas established members find it more difficult to exit the gang. *"The [gang] wannabees are the most dangerous to me in my head. They're the most dangerous because they're willing to do whatever."*
	Legal history and status – Clients with histories of serial legal troubles is indicative of heavy involvement in gang/"street" lifestyle and lack of access to transitioning resources.

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Domain	Theme and illustrative quotation
	"If a person been to jail that many times, that means he hasn't had the resources or somebody to get to get him by and helped him transition on how to stay out of jail or how to go ahead and be productive and learning something else to do or learning a skill besides whatever it is that landed him in jail."
Mental Health	**Emotional/mental response to trauma** – Victims of violence often display aspects of hypervigilance, hypovigilance, dissociative behavior, and increased drug use which can further compromise their safety following the injury. *"So if they're in a situation where people are getting hurt or there is threat of somebody getting hurt, somebody is threatening directly with a weapon and maybe has done this more than once and they are not -- that's not a flag for them that-- engaging those persons or being in an area where they are being in a place where they are likely to account this person. It's not raising a flag for them, then that would be a concern to me."*
	Clinical disorders – Clients frequently have histories and/or develop clinical mental health disorders which can increase their risk of re-injury; case managers must enroll the assistance of appropriate mental health professionals. *"The more, sort of what we would consider hard core mental health issues like post traumatic stress disorder, depression, substance abuse, we play more of an ancillary role, we have the capacity to identify that maybe there's an issue and we look to our partners to get the more formal mental health care."*
	Substance use – Substance abuse issues are often exhibited in clients with elevated risk. These problems are increased following the injury and can distort their perception of danger, bring them in proximity of higher risk individuals, and cause withdrawal from social support networks. *"Have they used substances because that that's a factor that little factor of judgment and to what degree have they used that in the past and where are they with that now? And do they have recovery support? They're in recovery. Do they have -- because a new crisis, any trauma can cause people to regress to old coping? Even if they are in recovery, how were they managing their recovery with this new crisis? Have they relapsed or been tempted to relapse and if so, how they manage that?"*
	Denial of mental health – Cultural stigma of mental health disorders and reluctance to discuss personal and family issues can cause clients to reject outreach efforts. *"I'm thinking about stigma and cultural pieces that get in the way, and I would say most of all it's the intersection of these different variables that makes engagement challenging."*
Behavior	**Behavioral disposition** – Low social awareness, high aggression, high impulsivity, and recalcitrant to outreach are indicators of elevated risk clients. *"Are they demonstrating threatening behavior that appears threatening to others in their efforts to be invulnerable, or their effort to be. And that brings on more extreme behavior by perpetrators. They shoot people like that, or they come up behind them and hit them on the head. They don't want to even risk being hurt by them."*
	Coping strategies in response to trauma and stressors – Clients who are not engaging (or lack) support networks and who cannot envision non-violent conflict resolution are at elevated risk of re-injury. *"Is there any history of assault, of assault, of behavior as well as -- and then getting a picture because we do get some trauma history getting a picture of whether this is someone who has been impacted, whether this trauma that they are facing right now, how is their coping now impacted by their history and so is someone where they have a lifelong vulnerability, lifelong trauma exposure and that's more important in terms of understanding someone's coping that is resilient to their vulnerability."*
	Involvement in illegal activities – Involvement in illegal activities puts clients in close proximity with higher risk individuals and often requires the carrying of firearms which increases the risk of confrontation. *"If I'm shot, I'm gonna make sure I keep a gun on me, I'm not gonna let you come up here and shoot me, I'm gonna try to get you back, or shoot you before you shoot me. So there is a potential for either injured, murdered, or becoming a perpetrator. The perpetrator can become the victim in the middle of being the perpetrator… I'm in an environment where I can potentially be shot any time, so I'm gonna keep a gun on me at all times."*
Indicators of lower risk	**Indicators of lower risk** – Willingness to participate in outreach programs (education, vocational training) and maintain employment are indicators of a lower risk client. *"But if you give an alternative, they actually try it out, it actually works for them then yeah, you'll see it because they really weren't in it for all the reasons they were doing it for. They really wanted to just provide for the family, take care of their moms, take care of whoever, their kids."*
Conflict	**Conflict** – Clients engaged in criminality and those with friends or family who have histories of violence perpetration/ victimization are at elevated risk of re- injury.

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Domain	Theme and illustrative quotation
	"Some of this has been going on for a long time, the situation might be bigger and longer, and been going on longer than we've been involved. So we may be able to bring different groups together but not everybody. So you may have some individuals but all. So you may say, "I don't have a problem with you, so when I see you in the street I'll give you a pass, my people aren't gonna do nothing to your people and yours aren't gonna do nothing to mine." That may not work if you bring the whole crew in because everybody has their own individual issues with each other. The neighborhood may stand together, but they all got individual problems with individuals from different sets."
Case Management	**Difficulty in assessment process** – Building accurate assessments requires development of rapport, multiple interviews, and community connections to verify client narratives. *"It's going to take from that 1 day to 6 months maybe down the line, or 3 months or whatever. It's a gradual step. In order for someone to trust you, you have to be forthcoming, you have to be transparent, and you have to offer what you said you were. They may not talk to you today. They may be released and not talk to you for a month but, when you see them in the community for example, maybe that's when it hits them or whatever time it hits them."*

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Table 2

Violent Re-injury Risk Assessment Instrument (VRRAI) factors arranged in evaluation form.

Category A: elevated-risk indicators			
A.1	Imminent threat of violence (real or perceived, unresolved conflict)	Yes/no	
A.2	Heavily connected with gangs, gang/criminal lifestyle (carrying weapons, involved in aggravated robbery(s), associates with elevated- risk individuals, views injury as “badge of honor”)	Yes/no	
A.3	History of 2+ GSW, SW, other assaults	Yes/no	
A.4	Incarceration/probation/parole history	Yes/no	
A.5	Heavy family/social network history of violence	Yes/no	
A.6	Disengaged/unreceptive (does not want services)	Yes/no	
Category B: behavioral factors			
B.1	Severe mental health diagnosis (PTSD, psychosis/schizophrenia, etc.)	Yes/no	
B.2	Substance abuse (alcohol, marijuana, prescription drugs, hard drugs, etc.)	Yes/no	
B.3	Dissociative behavior (unconcerned/unaware of personal safety)	Yes/no	
B.4	High aggression/impulsivity	Yes/no	
B.5	Low recognition of dangerous situations	Yes/no	
B.6	Denial of involvement in present injury	Yes/no	
Category C: severe conditional factors			
C.1	Disrespect as factor leading to injury (“code of the street”)	0/1	
C.2	Recent illegal activity (selling drugs/theft/robbery/prostitution)	0/1	
C.3	Weapons use in past year	0/1	
C.4	Unstable housing history (past year)	0/1	
C.5	Lives in high-risk neighborhood	0/1	
C.6	Undocumented minor with poor local support network	0/1	
C.7	Substance use at injury	0/1	
C.8	Not involved in recommended programs and/or school or work	0/1	
		Category C Total __/8	
Category D: moderate conditional factors			
D.1	Pursuing/glorifying/wanting to be in “street”/gang lifestyle	0/1	
D.2	Unmotivated to change life trajectory after injury	0/1	
D.3	Has been in a fight in past year	0/1	
D.4	Victim fears future violence	0/1	
D.5	Has access to guns	0/1	
D.6	Unemployed	0/1	
D.7	Low educational attainment	0/1	
D.8	Undocumented immigration status	0/1	
D.9	Unstable family/lacks positive role model	0/1	
		Category D Total __/9	

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Table 3

VRRAI Evaluation Guide

#1	1+ “Category A” factor(s) present?	**Yes** = **Elevated Risk** **No** = Check #2
#2	1+ “Category B” factor present?	**Yes** = Check #3 **No** = Check #4
#3	• + “Category B” AND 2+ “Category C” factors present? −*OR*− • + “Category B” AND 5+ “Category D” factors present? −*OR*− • + “Category B” AND 1+ “Category C” AND 3+ “Category D”factors present?	**Yes** = **Elevated Risk** **No** = Check #4
#4	10+ “Category C or D” factors present?	**Yes** = **Elevated Risk** **No** = **Moderate Risk**