

# Hospital-Based Violence Intervention Programs Work

Carnell Cooper, MD, Dawn M. Eslinger, MS, and Paul D. Stolley, MD

**Background:** Hospital-based violence prevention programs have emerged at trauma centers nationwide; however, none has been thoroughly evaluated for effectiveness. Our Violence Intervention Program (VIP) conducted a prospective randomized control study to evaluate the effectiveness of intervention for repeat victims of violence.

**Method:** Patients admitted between 1999 and 2001 for treatment of injuries inflicted by a violent act were identified. Repeat victims of violence on parole/probation were invited to join the study. Participants were given a history-gathering questionnaire and randomized into two groups. Cases (intervention [n = 56]) re-

ceived intensive psychosocial follow-up services, family or group therapy, and assisted with substance abuse treatment. Controls (nonintervention [n = 44]) received standard medical treatment and follow-through in accordance with standard parole or probation procedures.

**Results:** There was no significant difference in the number of arrests in the two groups. The control group was three times more likely to be arrested for a violent crime, two times more likely to be convicted of any crime, and four times more likely to be convicted of a violent crime. The projected time of incarceration is significantly longer for the control group. Repeat violent criminal activity was sig-

nificantly more evident in the control group.

**Conclusion:** Significant differences exist between the VIP intervention and nonintervention groups in terms of the quantity and severity of criminal activity.

**Key Words:** Violence, Recidivism, Violent crime, Prevention, Violence Recidivism, Hospital based, Violence intervention, Crime prevention, Hospital based violence intervention program, Violence prevention, Adult violence, Youth violence, Repeat victims of violence, Perpetrators of violence, Repeat violence, Penetrating trauma, Penetrating trauma prevention program, Trauma Center, Level I trauma center.

*J Trauma.* 2006;61:534–540.

Violence is a public health problem of major significance. In the United States, homicide is the 13th leading cause of death among all groups and is the leading cause of death among African-Americans aged 15 to 34.<sup>1</sup> The rate of recidivism to the nation's trauma centers is unclear. Estimates range from as high as 45%<sup>2</sup> to as low as 10%.<sup>3</sup> Trauma centers are well equipped to deal with the blood loss, tissue destruction, and death that accompany violent injuries, but they are not equipped to deal with the social ills that put patients at risk for being repeat victims of violence.<sup>4–6</sup> It is within this environment, after a life-threatening injury, that individuals may be most open to behavioral change. We hypothesized that a culturally sensitive, comprehensive, and multifaceted intervention program offered at this opportune time can interrupt the cycle of violence. With this goal in mind, in 1998, we established the Violence Intervention Program (VIP) at the R Adams Cowley Shock Trauma Center at

the University of Maryland School of Medicine in an effort to decrease the rate of recidivism.

In response to the problem of trauma recidivism, a number of violence prevention programs with goals similar to those of the VIP have developed in the United States.<sup>7</sup> However, few of these programs are hospital-based and even fewer have been evaluated for effectiveness. This study represents the first randomized, prospective evaluation of a hospital-based violence prevention program.

## PATIENTS AND METHODS

Patients who were admitted to the R Adams Cowley Shock Trauma Center in Baltimore between January 1, 1999, and October 1, 2001, for injury secondary to violent assault and who had been hospitalized previously for violent injury were considered for the study. Entry criteria were age 18, at least one previous admission to a hospital for treatment for a violent injury, and involvement in the criminal justice system in the form of parole and/or probation. Patients who met the criteria were informed of the potential opportunity to participate in a culturally sensitive violence intervention program.\* After obtaining consent, each patient completed a baseline demographics questionnaire. This previously pilot-tested questionnaire,<sup>4</sup> consisted of 112 questions and required approximately 40 minutes to administer. It was designed to

Submitted for publication December 12, 2005.

Accepted for publication June 9, 2006.

Copyright © 2006 by Lippincott Williams & Wilkins, Inc.

From the R. Adams Cowley Shock Trauma Center, University of Maryland Medical Center, Baltimore, Maryland (C.C., D.M.E.); and the Department of Epidemiology and Preventive Medicine, University of Maryland at Baltimore School of Medicine, Baltimore, Maryland (D.M.E., P.D.S.).

Presented at the 64th Annual Meeting of the American Association for the Surgery of Trauma, September 22–24, 2005, Atlanta, Georgia.

Address for reprints: Carnell Cooper, MD, R Adams Cowley Shock Trauma Center, 22 South Greene Street, Baltimore, MD 21201; email: ccooper@umm.edu.

DOI: 10.1097/01.ta.0000236576.81860.8c

\*The Institutional Review Board approved the VIP protocol and a confidentiality certificate issued by the Maryland Department of Health and Human Services was obtained. The confidentiality certificate authorizes the team to protect the privacy of individuals involved in this study from any legal authority.

**Table 1** Follow-Up Duration, by Group

Years of Follow Up	Intervention Group (n = 56)	Control Group (n = 44)
<1 yr	13 (23%)	16 (36%)
1-2 yr	23 (41%)	13 (30%)
2+ years	20 (36%)	15 (34%)

collect detailed information on patient demographic characteristics, employment history, family background, place of residence and neighborhood characteristics, substance abuse, history of child abuse, past violence-related experience, incarcerations, relationship of victim to perpetrator, and other relevant data. Each participant underwent a blind randomization to either the case (intervention) group or the control (nonintervention) group. This process occurred while the participant was still a patient in the hospital.

The patients randomized to the intervention group then met with a social worker or case worker and a parole and probation officer assigned to the program. The social worker and the patient reviewed the results of the questionnaire and jointly devised a service plan. Components of the service plan included substance abuse rehabilitation, employment training, employment services, educational services, conflict resolution, and family development. After the patient was discharged, the social worker or case worker and parole and probation officer met with the patient (now client) at scheduled intervals. Home visits were also performed by members of the VIP team. Weekly group encounter sessions were also conducted. The team (consisting of two social workers; two case workers; a program manager; a parole and probation agent; and representatives from psychiatry, epidemiology and preventive medicine, as well as trauma and critical care) met on a weekly basis and reviewed active cases.

The control group received no organized support from the VIP team and continued with the parole and probation agent who was previously handling their case. All patients were treated by the same physician group. Both groups were followed through July 1, 2002 (Table 1).

## RESULTS

There were 100 patients entered into the study; 56 in the intervention group and 44 in the nonintervention group. There were no differences in the general demographics of the two groups (Table 2).

Evaluation of criminal activity before initiation of the study suggests that the intervention group may have had a slightly more violent history than the nonintervention group (Table 3).

The differences between the intervention and nonintervention groups were identified by calculating risk ratios (RR) and a 95% confidence interval (CI). The Statistical Analysis Software (SAS) system was employed for all statistical calculations.

**Table 2** Baseline Characteristics of the VIP Participants, by Study Group

Characteristic	Number (%) with the Characteristic	
	Intervention/ Case Group (n = 56)	Nonintervention/ Control Group (n = 44)
Sex		
Male	53 (95%)	43 (98%)
Female	3 (5%)	1 (2%)
Race		
White	7 (13%)	5 (11%)
Black	49 (87%)	38 (86%)
Other	0	1 (2%)
Age group		
<30	29 (52%)	26 (59%)
30-44	24 (43%)	16 (36%)
45+	3 (6%)	2 (5%)
Marital Status		
Single	45 (80%)	36 (82%)
Married	3 (6%)	2 (5%)
Divorced	5 (9%)	1 (2%)
Other/unknown	3 (6%)	5 (11%)
Insurance (based on questionnaire)		
Private	5 (10%)	1 (3%)
Medicaid	8 (16%)	10 (27%)
Medicare	2 (4%)	1 (3%)
None	35 (70%)	25 (68%)
Unknown	6	7
Education		
Never went to high school	3 (6%)	4 (10%)
Some high school	29 (55%)	27 (64%)
High school graduate	14 (26%)	8 (19%)
Some college or technical school	7 (13%)	2 (5%)
Unknown	3	4
On medical assistance		
No	45 (82%)	30 (70%)
Yes	10 (18%)	13 (30%)
Unknown	1	1
Disabled		
No	45 (82%)	33 (77%)
Yes	10 (18%)	10 (23%)
Unknown	1	1

Evaluation of criminal activity after interaction with the VIP revealed no significant difference in the number of arrests (1.2 [1.0, 1.6]  $p = 0.095$ ) (Table 4). However, the nonintervention group was three times more likely to be arrested for a violent crime (3.2 [1.7, 5.9]  $p = <.001$ ), two times more likely to be convicted of any crime (2.3 [1.5, 3.6]  $p = <.001$ ), and four times more likely to be convicted of a violent crime (4.4 [2.1, 9.2]  $p = <.001$ ) (Table 4). A comparison of the cost of incarceration of the intervention group and nonintervention group, before and after initiation of the VIP, reveals significant savings in the intervention group (Table 3). The projected time of incarceration is significantly longer for the nonintervention group; 68 years compared with 18 years in the intervention group (Table 3).

**Table 3** Comparison of Data Before and After Initiation of Violence Intervention Program

	Before Program		After Program	
	Intervention/ Case Group (n = 56)	Non-intervention/ Control Group (n = 44)	Intervention/ Case Group (n = 56)	Non-intervention Control Group (n = 44)
Jail time served	1,723 mo (144 yr)	1,083 mo (90 yr)	213 mo (18 yr)	816 mo (68 yr)
Cost of incarceration*	\$3,600,000	\$2,250,000	\$450,000	\$1,700,000
Hospitalizations	56 (100%)	44 (100%)	3 (5%)	16 (36%)
Cost of hospitalization	\$46,000 each	\$46,000 each	\$138,000	\$736,000
Employment	22 (39%)	20 (45%)	46 (82%)	9 (20%)

\* The annual cost of incarcerating one person is estimated at \$25,000.

A comparison of jail time served revealed that, although the groups were randomly selected, before the VIP, the intervention group (144 years combined) had a more extensive history with more violent crimes than did the non-intervention group (90 years combined) (Table 3). After this study period, the nonintervention group was sentenced to spend 50 more years in jail than the intervention group (Table 3). A projected estimate of the costs of incarceration before and after the VIP reveals a significant savings in the intervention group. Based on the convictions for known crimes, it will cost approximately \$500,000 to incarcerate repeat offenders from the intervention group; but nearly \$2 million to incarcerate repeat offenders from the nonintervention group (Table 3).

The VIP also had a positive effect on hospital recidivism. The intervention group had a hospital recidivism rate of 5%, while the nonintervention group's rate was 36%. The nonintervention group was six times more likely than the intervention group to be hospitalized as a result of a violent injury. The average cost of hospitalization for management of a violence-induced injury during the study period was \$46,000 per person. The total cost of hospitalization for the three recidivists from the intervention group was \$138,000, compared with \$736,000 for the 16 recidivists from the nonintervention group (Table 3).

The VIP also had a positive influence on the rate of employment. The self-reported history of employment before the study was comparable for the two groups: at the time of injury, 39% for the intervention group and 45% of the non-intervention group were working at the time of hospital admission or baseline. During the follow-up period, employment was confirmed by the parole and probation officer

and/or social worker: 82% of the intervention group versus only 20% of the nonintervention group were employed after establishment of the VIP (Table 3). Two participants died during the study as a result of violent acts. Both were in the nonintervention group.

## DISCUSSION

Numerous school- and hospital-based violence intervention programs focus on domestic and workplace violence.<sup>8-12</sup> Violence intervention programs have been slow to organize at trauma centers because of a lack of data proving their efficacy and cost effectiveness and therefore obtaining funding has been difficult.

Similar to reports from trauma facilities around the country,<sup>2</sup> we observed that a significant number of victims of violence were recidivists. In many cases, the repeat injury was fatal. It became clear that simply repairing the injuries and sending these patients back to their communities was not enough. We asked what, if anything, could improve the situation.

Clearly, most trauma centers are not prepared to cope with the many social issues that put patients at risk for being repeat victims of violence. We theorized that a near-death experience caused by a violent injury may serve as a powerful stimulus to behavioral change. We hypothesized that a hospital-based violence intervention program could provide the avenue to that change and therefore decrease the rate of recidivism. We felt it was not necessary for the trauma center to provide all the services needed, e.g. job training and drug rehabilitation, but that the trauma center could facilitate the connection between the client and the services needed.

**Table 4** Events That Occurred After Interaction With Violence Intervention Program (during follow-up by study group)

	Proportion (%) With Outcome in Nonintervention/ Control Group	Proportion (%) With Outcome in Intervention/ Case Group	Risk Ratio (95% CI)	p Value
Ever arrested	35/44 (80%)	36/56 (64%)	1.2 (1.0, 1.6)	0.095
Ever arrested for violent crime	25/45 (57%)	10/56 (18%)	3.2 (1.7, 5.9)	<0.001
Convicted	31/44 (70%)	17/56 (30%)	2.3 (1.5, 3.6)	<0.001
Convicted for violent crime	24/44 (55%)	7/56 (13%)	4.4 (2.1, 9.2)	<0.001

To test our theory, we studied the risk factors for being a repeat victim of violence.<sup>4</sup> In a case-control investigation previously reported the following factors were indicated: unemployment, current drug use, past or present drug dealing, being an African-American male, annual income less than \$10,000, less than a high school education, and history of incarceration. We then developed relationships with state, city, and community service organizations that could help us address those risk factors. We chose to work with recidivists, rather than first-time victims of violence, with the intention of investigating the VIPs efficacy with the more difficult group.

The high arrest rate in both groups exemplifies the magnitude of the problem. In Baltimore, 52% of African-American males in their 20s are either incarcerated or on parole or probation.<sup>13</sup>

Despite those odds, the intervention group was significantly less likely to be arrested for or convicted of a violent crime; significantly less likely to be readmitted to the hospital because of a violent act, and significantly more likely to be employed. Other positive outcomes included reuniting with family, paying child support, and completing substance abuse treatment.

## CONCLUSION

A hospital-based violence intervention program is an effective means of reducing violence-related trauma recidivism. Our VIP is successful because the team enters the patient's life at a time when he or she is most likely apt to change, in an environment where it is safe to make a change (unlike jail). We provide the services and support needed to facilitate such a change. Shock trauma's VIP is a model that can be easily replicated in trauma centers around the country.

## ACKNOWLEDGMENTS

We thank Laurence S. Magder, PhD, in the Department of Epidemiology and Preventive Medicine at the University of Maryland School of Medicine, for statistical review; Linda J. Kesselring, MS, ELS, in the Division of Emergency Medicine at the University of Maryland School of Medicine, for copyediting the manuscript; Thomas M. Scalea, MD, FACS Physician-in-Chief, and John H. Spearman, M.B.A. Vice President, both at the R. Adams Cowley Shock Trauma Center for their continued support; and Cuthbert Simpkins, II, MD, Chief, Division of Trauma & Critical Care Louisiana State University Health Sciences Center for the vision to initially examine this issue in Baltimore in the early 1990s.

## REFERENCES

1. National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. Leading causes of death reports. Available at: <http://webapp.cdc.gov/sasweb/ncipc/leadcaus.html>. Accessed August 29, 2005.
2. Goins WA, Thompson J, Simpkins C. Recurrent intentional injury. *J Natl Med Assoc.* 1992;4:431-435.
3. Centers for Disease Control. Repeat injuries in an inner-city population: Philadelphia, 1987-1988. *MMWR Morb Mortal Wkly Rep.* 1990;9:1-3.
4. Cooper C, Eslinger D, Nash D, et al. Repeat victims of violence: report of a large concurrent case-control study. *Arch Surg.* 2000; 35:837-843.

5. Buss TF, Abdu R. Repeat victims of violence in an urban trauma center. *Violence Vict.* 1995;10:183-194.
6. Rich JA, Grey CM. Pathways to recurrent trauma among young black men; traumatic stress, substance use and the "code of the street". *Am J Public Health.* 2005;95:816-124.
7. Cohen JH. Measuring the quality of hospital-based domestic violence prevention programs. *Acad Emerg Med.* 2002;9:1173-1183.
8. Fairbourne CL. Violence in the workplace: violence prevention strategies in the operating room. *Semin Periop Nurs.* 2000;9:22-26.
9. Mytton JA, Di Guiseppi C, Gough DA, et al. School-based violence prevention programs: systematic review of secondary prevention trials. *Arch Pediatr Adolesc Med.* 2002;156:752-762.
10. Markowitz JR, Steer S, Garland M. Hospital-based intervention for intimate partner violence victims: a forensic nursing model. *J Emerg Nurs.* 2005;31:166-170.
11. Cunningham PB, Henggeler SW. Implementation of an empirically based drug and violence prevention and intervention program in public school settings. *J Clin Child Psychol.* 2001;30:221-232.
12. Becker MG, Hall JS, Ursic CM, et al. Caught in the crossfire: the effects of a peer-based intervention program for violently injured youth. *J Adolescent Health.* 2004;34:177-183.
13. Davis R. *A Study: 1 in 5 Young Black City Men In Jail. The Baltimore Sun*, March 15, 2005.

## DISCUSSION

**Dr. Edward E. Cornwell, III** (Baltimore, Maryland): Baltimore is the 13th largest city in the country, and yet the largest city that did not enjoy a substantial decrease in the homicide rate, and number of trauma center admissions for penetrating injuries seen throughout the 1990s in America's other urban centers. Only 17% of 2nd graders in Baltimore City's broken public school system read at grade level, and only 7% of 8th graders are proficient at their age appropriate level. The high school drop out rate for African-American male students in Baltimore City Public Schools is 76%; and over 60% of African-American men in their 30s who do not possess a high school diploma have been involved with the criminal justice system in the last 15 years. Amidst the depressing morass of these dismal statistics, Dr. Cooper and his colleagues have undertaken the Herculean task of designing a multi-disciplinary violence intervention program, and evaluating its effectiveness with academic rigor. The findings of this well presented study, that the group randomized to a whole host of psychosocial support services, experienced benefit in terms of improved employment status, decreased incarceration rates, and decreasing trauma recidivism over a short term follow up period, is indeed an eye opener that will earn much scrutiny from administrators and policy makers who are charged with the task of determining resources applied to a patient population that is routinely considered to be recalcitrant.

I have a few questions I'd like to ask. (1) How many patients had to be evaluated to randomize the 100 patients that form the basis of this study? In a poster presented at this meeting 2 years ago and an article to be published in *Journal of Trauma*, my colleagues and I found a dismally low incidence of "Readiness to Change" among trauma

patients ages 15 to 24 with positive toxicology screens for substances of abuse. Ours was an adolescent and young adult group of 90 patients, only 14% of whom demonstrated willingness to access counseling and support services that were made available to them. Your group had over 40% of patients who were 30 or older, but with a substantially higher incarceration rate, and yet with these indicators of more hard core disenfranchisement, your groups seem to be more enthusiastic to avail themselves of support services. Would you attribute this to the greater array of professionals involved, or might it be because of a more mature patient population? (2) Although you are a trauma surgeon and the study population became known to you because of their injuries, share with us your thoughts as to the true role of violent assault on the effectiveness of the intervention program. In other words, might you be able to present the same results of a study where a group of ex-convicts were randomized to an intervention program of psychosocial support without the hospitalization for traumatic injury? After all, at the one extreme your fatally injured patients had no opportunity for the intervention program. At the other extreme, the minimally injured patients may not meet triage criteria for admission to Shock Trauma, and you would never see them. There's yet another group of people who never became patients who may have very similar psychosocial dysfunction in their environment, but were fortunate enough to avoid injury from episodes of attempted assault. I'd be interested to know therefore, if the psychiatrist on your team thought that the admission for the violent act is a crucial factor in the effectiveness of the program, or is it perhaps a chance occurrence that brings a patient to your attention? (3) You report similar arrest rates between the intervention and the nonintervention group, but yet a lower incidence of conviction in the intervention group. Were members of the intervention team involved in testimony or otherwise providing support during the criminal justice process?

In summary, while my own bias and focus is in the prehospital setting, Dr. Cooper's group has garnered an impressive array of resources to try to address one of our greatest social ills, and in the process have justified a reconsideration of the role, the timing, and the setting for an interventional program in addressing trauma recidivism.

**Dr. Carnell Cooper** (Baltimore, Maryland): We evaluated approximately 4,500 patients during the study period. However, we were limited to working with those who lived in Baltimore City, which considerably narrowed the pool of eligible patients. I believe that our study population, despite the hardcore disenfranchisement, was enthusiastic to be involved in the program for several reasons; the timeliness of the approach, the clinical team including social workers and outreach staff, parole and probation involvement and the age of the patients. The patient was approached at the bedside as soon as possible. Many of the patients had the feeling of vulnerability because they sur-

vived a 'life threatening injury' for the second or third time and they realized that the odds of survival were decreasing. The clinical team was extremely aggressive; spending hours with the patients on the hospital floor to complete the questionnaire and getting to know the patient beyond the questionnaire. The team established a trust relationship before the patient was discharged and continued to follow-up regularly post discharge. Enrollment criteria in the study included active parole and probation (P/P) status allowing us to have a P/P agent as part of our team. Initially, the P/P agent provided 'the hammer.' If the patient wanted to successfully complete P/P, they needed to see the agent. The agent would then encourage the patient to remain active in the program. We were presently surprised when all of the patients remained in the program after their P/P was completed. Numerous patients from this study remain in contact with the clinical team.

Secondly, the age of the patient does seem to impact the receptiveness of the intervention. The older patient is getting tired of being out there on the streets and has considered a different way of living whereas the younger patients seem to still have the 'I am invincible' attitude.

Scott et al.<sup>1</sup> published data regarding program efficacy to reduce violent crime recidivism in an adolescent population. The study group revealed a significantly lower recidivism rate and time investment than the control group.

It is reasonable to suggest that the same study results may occur if the same study group was offered psychosocial support without hospitalization, however I do feel that our success is based on a 'golden opportunity' theory. We intervened in an environment where patients were perhaps, for the first time interested or wanted to change. The key premise of the program is that the near-death experience caused by violent injury may serve as a powerful precipitant to substantial change on the subjects' parts. Therefore, the program is initially hospital-based and rooted in the community. The trauma setting reaches perpetrators when they are victims, vulnerable yet protected. It is in this "golden hour" after surviving life-threatening injury that a deep trust can be established and a door is opened with opportunity for change.

Team members were actively involved with the patients, including offering testimony at court. The clinical team (myself included) would often attend court hearing with the patients as well as visit the patients in jail if they were re-arrested.

**Dr. C. William Schwab** (Philadelphia, Pennsylvania): After you enrolled the intervention group, how did you assure continuous participation?

Second, I might have missed it, but were the intervention and the nonintervention groups afforded standard testing to detect mental illnesses and were there differences between the two groups? In other words, preinjury, did either have a higher incidence of depression or other diagnosable mental illness?

Third, now, that you've had a large number of these people go through the program, working with the same case management team, what are the most important parts of the intervention(s) that either the participants or their case manager or social workers thinks makes a difference? Please advise us on these key observations.

**Dr. Carnell Cooper:** After the intervention group was enrolled, we assured continuous participation through aggressive follow-up and communication. Before the patient leaves the hospital we obtain as many potential phone numbers and addresses as possible because this population is extremely transient, yet they typically have at least one relative that they contact regularly. We also met the patients' relatives and friends when they visited the hospital trying to establish relationships with extended family.

If the patient 'lost' contact with the team, we would write letters, make phone calls and even do home visits to re-connect. Initially the parole and probation (P/P) agent also provided follow-up and customary support, however, when the P/P expired, the patients remained in contact with the team. Patients with brain damage and psychological disabilities were not considered for either group. The hospital has standard tests that they perform on every patient admitted. If we questioned the patients' mental status then I would speak to the psychiatric team. A psychiatric nurse and addictions nurse specialist were included in the team case review meetings. We did administer minimal post-traumatic stress testing on some patients and referred them for treatment.

I think the most important aspect of what we did was the individual counseling. The caseworkers and the social workers would see the patients on an individual basis at least once every two weeks, and would hold a group-counseling meeting weekly. The clinical team would 'meet' the patient at their current level of functioning and try to move them forward providing very basic support to address issues regarding: education – does the patient need a GED or Diploma, if they have a diploma, how to assist them to sign up for a college class or technical school; employment – where to look for employment, how to fill out an application, how to dress for an interview. These are very mundane details that many of us take for granted because we had a positive role model who taught us that you need an alarm clock or watch to get somewhere on time and you can't wear a t-shirt with profanities on it to a job interview. If they didn't have appropriate clothing for a job interview, we would provide a dress shirt and pants (when funding allowed.) The team would walk the patient through each step as needed until a successful outcome was obtained. For some clients, success equaled opening a bank account, obtaining a legitimate driver's license and car insurance, or working under the table doing construction versus dealing drugs.

**Dr. Scott R. Petersen** (Phoenix, Arizona): A few years ago, we looked at youth victimization and youth violence in

Phoenix. We had our eyes opened by the fact that whether a patient turned out to be a victim or a perpetrator was sometimes just a matter of circumstance, much like you've shown in the older population.

I would like to ask one question. Did you look at the arrest records of the patients in your study before and after the interventions? I may have missed that.

**Dr. Carnell Cooper:** The criminal arrest and conviction records were reviewed for each patient and recorded as violent (felony) versus non-violent (misdemeanor) crimes and the sentencing that accompanied those convictions.

When we initiated this research, we were specifically looking at hospital recidivism for a violent injury and were not thinking along the line that many victims of violence are also perpetrators of violence; but it just depends on the timing. This was pointed out to us by the Lieutenant Governors Office of Crime control and Prevention when pursuing funding. We were somewhat surprised by the number of past perpetrators of violent crime who we saw as victims of violent injury in our initial data. This data also showed that 80% of the victims of violence interviewed had a history of parole and probation. With the extensive criminal histories of both groups, but especially the case group we were actually somewhat surprised by the results we were able to achieve.

**Dr. Carol R. Schermer** (Chapel Hill, North Carolina): My question is do you have a measure of the intensity of the intervention? It sounds like you were saying it was very intense, and some people who did better than others may have actually received sort of a dose response. Do you think that that occurred in any way, or did everybody in the intervention group pretty much get the same thing?

The second part of that is it sounds like you think the effective ingredient is really the counseling. For a hospital to mobilize all of the resources to do this, what would be kind of the minimum that they could do that would be efficacious?

**Dr. Carnell Cooper:** A dose response is an absolute possibility. Although it was intended for each patient to receive 'equal' intervention; we were naïve to the amount of individualized treatment required. It simply takes more time and intense treatment to assist a patient with substance abuse issues compounded with extensive medical treatment of their injury. In Baltimore, as in most urban cities, immediate openings of a treatment bed are an atypical situation. Rather, the clinical team had to spend a tremendous amount of time with a patient to keep him engaged while waiting on a bed.

It is timely that you should ask about a measurement of the intensity of the intervention. We recently submitted two grant applications addressing this issue. Now that we know that this intervention can work, we need to understand why. We have only recently developed a measurement of intensity for this intervention based on the time spent with the patient and exactly for what: drug treatment,

GED, employment, disability, housing, etc. If this is funded we will gladly publish the results.

The absolute minimum staff necessary to provide this intervention should include; two social workers, two case/outreach workers, and a parole and probation agent. We were able to complete this intervention research with grant funds totaling \$300,000 per year for three years. These funds supported the above – mentioned individuals, as well as part-

time support for a statistician, program manager, account manager, and student research assistant.

## REFERENCE

1. Scott KK, Tepas JJ 3rd, Frykberg E, Taylor PM, Plotkin AJ. Turning point: rethinking violence-evaluation of program efficacy in reducing adolescent violent crime recidivism. *J Trauma*. 2002; 53:21–27.