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DEMOGRAPHICS OF FIREARM INJURY: IMPLICATIONS FOR MEDICAL PRACTICE

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Injury is the leading cause of death in Americans under the age of 45 years, and the seventh leading cause of death in Americans over the age of 65 years.¹ Despite the magnitude of this public health problem, injury has not been recognized by the American public as a major concern. In fact, objective measures such as National Institutes of Health funding demonstrate that injury is badly under appreciated, and thus, significantly underfunded.²

Physicians and nurses who staff the nation's large inner city hospitals spend their days and nights battling the results of the growing epidemic of personal violence occurring on America's streets. Much of this is secondary to an increasing number of gunshot wounds. Firearm violence has become a near epidemic problem. If trends established in the mid-1990s continue, firearm-related injury will become the leading cause of death from trauma within the next ten years.³ Over one million Americans have been killed by firearms since 1933; more than the number killed in all wars combined.⁴ From 1985 to 1991, 103,000 more Americans died from firearms than died from AIDS.⁵ It is difficult to understand why a problem of this magnitude had not received the attention it deserves.

Firearm injury occurs most often within America's large cities.⁶ The economically and politically disadvantaged people living in these locales have little political voice. Many are poorly educated and see

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1. See Thomas M. Scalea & Ronald B. Low, *Approach to Multiple Trauma*, in 2 EMERGENCY MEDICINE 975, 982 (John M. Howell et al. eds., 1998); Center for Disease Control, *1998 United States Unintentional Injuries and Adverse Effects* (visited Nov. 12, 2000) <http://webapp.cdc.gov/cgi-bin/broker.exe?_program=wisqars.details.sas&_service=v7dev&>.

2. See *Deaths Resulting From Firearm- and Motor-Vehicle Related Injuries, United States, 1968-1991*, 43 MORBIDITY AND MORTALITY WEEKLY REP. 37, 41 (1994).

3. See *id.* at 37.

4. See Garen J. Wintemute, *Firearms as a Cause of Death in the United States, 1920-1982*, 27 J. TRAUMA 532, 532-33 (1987).

5. See *Slow the slaughter - fix gun laws now*, USA TODAY, Dec. 29, 1993, at 10A.

6. See Lois A Fingerhut et al., *Firearm and Nonfirearm Homicide Among Persons 15 through 19 Years of Age*, 267 JAMA 3048, 3053 (1992).

little help coming from the American political system. As budgetary restrictions in America's cities have become tighter, programs designed to combat inner city violence are often the first to be cut. The repetitive nature of urban firearm violence had made many residents of America's cities begin to believe that this is the norm. Virtually every youngster living in the inner city knows someone who has died from firearm violence.⁷ A family member or friend is likely to have been involved in some interaction with the American judicial system in which firearms played some role.⁸ The lack of adequate role models from American inner city youth continues to perpetuate this cycle. Inner city poverty continues to be a problem of enormous magnitude, providing these young people little hope for meaningful change. Living fast and dying young has become an accepted way of life in America's streets.

Some local programs still exist to address injury in the urban setting. Perhaps the best known of these is the "Kids, Injuries, and Street Smarts" sponsored in Harlem by the New York City Emergency Medical System (EMS).⁹ This program was designed by Dr. Barbara Barlow, Chief of Pediatric Surgery at Harlem Hospital.¹⁰ Dr. Barlow was able to galvanize community leaders to support trauma prevention in their neighborhoods.¹¹ Safe playgrounds have been restored and after-school youth activities have been supported.¹² The program encourages children to stay in school, avoid drugs, and teaches them the dangers of firearms.¹³ Dr. Barlow was able to convince the city's leadership to support her efforts using data-driven arguments.¹⁴ She pioneered the research of Harlem's epidemic of violence, and she then designed specific violence prevention programs.¹⁵ In addition to the "Kids, Injuries, and Street Smarts" program for young children, teens are taught skills such as conflict resolution without the use of weapons.¹⁶ Dr. Barlow has been able to demonstrate that her programs led to a decrease in the number of gunshot wounds, stab wounds, and

7. See generally, John D. and Catherine T. MacArthur, *Exposure to Violence* (visited Nov. 9, 2000) <<http://www.macses.ucsf.edu/Research/Psychosocial/notebook/violence.html>>.

8. See *id.*

9. See *Making a Difference: Creating an Injury-Free World for Urban Kids* (visited Nov. 9, 2000) <<http://www.cpem.org/newsletter/diff.html>> [hereinafter *Making a Difference*].

10. See *id.*

11. See *id.*

12. See *id.*

13. See *The Medicine of Prevention* (visited Nov. 9, 2000) <http://cpmenet.columbia.edu/news/journal/archives/jour_v14n3_0008.html> [hereinafter *The Medicine of Prevention*].

14. See *Making a Difference*, *supra* note 9.

15. See *id.*

16. See *id.*

assault injuries.¹⁷ Unfortunately, this program has been successful in only one neighborhood.

Those who live outside the city in American suburbs or rural areas often do not understand the pervasiveness of inner city firearm violence, as they are not affected on a day-to-day basis. They often discount firearm violence as an important issue. However, urban violence has social and economic ramifications that extend far outside of urban geographic boundaries. It is a national problem that must be solved.

In order to discuss the demographics of firearm injury and the implications for medical practice, it is necessary to elucidate several issues. The first issue is defining whether a problem really exists, and the magnitude of that problem. Secondly, it is necessary to demonstrate the effects, if any, that this problem has on medical practice. Lastly, it is important to attempt to understand which efforts are necessary to change this trend. This task is unfortunately hampered by a general underreporting of urban firearm injuries in scientific literature. Much of the data that does exist remains unpublished. Surgeons, emergency physicians, and all others who care for victims of urban firearm injuries have amassed a large amount of personal experience, but little objective data. This often fuels emotional discussions that are unlikely to advance our understanding of the issue.

Firearm violence is a disease of the young. Homicide remains a leading cause of death in Americans under the age of forty-five years.¹⁸ More than eighty percent of firearm deaths among American youths occur in the fifteen- to nineteen-year age group.¹⁹ This represents a seventy-five percent increase over the last twenty years.²⁰ The largest group affected is young African American males.²¹ In fact, the most common cause of death in fifteen- to nineteen-year-old African American males is firearm homicide.²² Sing demonstrates a nearly two hundred twenty-five percent increase in nonfatal firearm injuries in one inner city.²³ Sing found that handguns accounted for eighty-

17. See *The Medicine of Prevention*, *supra* note 13.

18. See The Violence Prevention Task Force of the Eastern Association for the Surgery of Trauma, *Violence in America: A Public Health Crisis - The Role of Firearms*, 38 J. TRAUMA 163, 163 (1995).

19. See *id.*

20. See *id.*

21. See *Homicide Among Young Black Males, United States, 1978-1987*, 48 MORBIDITY AND MORTALITY WEEKLY REP. 869, 871 (1990).

22. See *id.*

23. See Ronald F. Sing et al., *Geographic Variation in Serious Nonfatal Firearm Injuries in Pennsylvania*, 43 J. TRAUMA 825, 827 (1997).

one percent of these firearm injuries, and the rate of shotgun injuries was three times higher in the city, when controlled for the population, as compared with injuries occurring outside of the urban area.²⁴ Davis documented similar results demonstrating that, in the ten year period between 1985 and 1995, assault with a deadly weapon rose two hundred twenty percent in one urban California area.²⁵ Penetrating trauma increased from twenty-seven percent to thirty-five percent of the admissions to this inner city trauma service.²⁶ Youths between the ages of eleven and twenty years shooting their peers rose from twenty-four percent to almost fifty percent during the study period.²⁷

The weaponry on the street has changed as well. Handguns have always accounted for the vast majority of urban firearm injury.²⁸ However, the type of firearm changed between the 1980s and 1990s. Although there was a marked decrease in the use of revolvers, there has been an increase in the use of semi-automatic weapons, particularly 9 mm pistols.²⁹ Of the revolvers used, the more traditional .38 caliber handguns gave way to the more powerful .357 magnum.³⁰ The relationship between firearm violence, drug use, and previous criminal activity has always been assumed. McGonigal found that firearm use was increasingly associated with a prior history of either drug or firearm arrest.³¹ Associated alcohol use seemed to decrease while cocaine use increased.³²

When comparing 1985 to 1990 in the city of Philadelphia, the total urban firearm deaths more than doubled from 145 to 324 per year.³³ Young African American males made up a significant portion of the increase.³⁴ While the deaths fell from a mean age of thirty-five to twenty-eight years, the increase in the fifteen to twenty-four-year old subpopulation was three hundred sixty-seven percent.³⁵ This is especially concerning as it occurred at a time of immense change in the Philadelphia Emergency Medical System. During that same period of

24. *See id.*

25. *See* James W. Davis et al., *More Guns and Younger Assailants: A Combined Police and Trauma Center Study*, 132 ARCHIVES OF SURGERY 1067, 1068 (1997).

26. *See id.*

27. *See id.* at 1068-70.

28. *See* Micheal D. McGonigal et al., *Urban Firearm Deaths: A Five-Year Perspective*, 35 J. TRAUMA 532, 533 (1993).

29. *See id.*

30. *See id.*

31. *See id.* at 534.

32. *See id.*

33. *See id.* at 533.

34. *See id.*

35. *See id.*

time, the city underwent trauma center designation, and resuscitation schemes were streamlined to emphasize the need to limit time at the scene.³⁶ "Scoop and run" replaced a "stay and play" philosophy where attempts were made to stabilize patients at the scene.³⁷ Despite these innovations, mortality rose dramatically. One can only wonder how many more people would have died had these innovations not occurred.

The resultant cost of gunshot wounds has been greatly under appreciated until recently. Cook recently investigated two New York hospitals, two Maryland hospitals, and one Emergency Department in South Carolina.³⁸ He estimated that \$2.3 billion in lifetime medical costs were incurred for gunshot wounds in the United States, averaging over \$17,000 per injury.³⁹ More than seventy-five percent of the gunshot wounds were deemed to be assaults.⁴⁰ The lifetime costs for nonfatal gunshot wounds in that study were over \$35,000 per injury.⁴¹ Nonfatal gunshot wound hospital costs were \$14,500 per patient, and approximately \$12,500 if the patient died.⁴² A large percentage of these costs were incurred in the Emergency Department.⁴³

In 1994, Mock compared 1,116 patients with gunshot wounds to the 1,529 patients who were admitted to Harborview Medical Center with stab wounds.⁴⁴ During the study period (1986 to 1992), the number of gunshot wounds nearly doubled while the number of stab wounds remained stable.⁴⁵ The cumulative total hospital charges were over \$15 million for gunshot wounds and approximately \$9.5 million for stab wounds.⁴⁶ Less than one quarter of the patients who sustained gunshot wounds had private insurance that met the majority of the hospital charges.⁴⁷ Of the patients with stab wounds, this rate was only twelve percent.⁴⁸ Similar trends existed for physician professional

36. *See id.* at 535.

37. *See generally id.*

38. *See Philip J. Cook et al., The Medical Costs of Gunshot Injuries in the United States*, 282 JAMA 447, 447-48 (1999).

39. *See id.* at 453.

40. *See id.*

41. *See id.*

42. *See id.* at 451.

43. *See id.* at 450.

44. *See Charles Mock et al., Comparison of the Cost of Acute Treatment For Gunshot and Stab Wounds: Further Evidence of the Need for Firearms Control*, 36 J. TRAUMA 516, 517 (1994).

45. *See id.*

46. *See id.*

47. *See id.* at 518.

48. *See id.*

fees.⁴⁹ Charges per patient were higher for gunshot wounds than stab wounds.⁵⁰

These acute hospital charges represent only a small portion of the lifetime costs of the inpatient medical care for firearm injuries. Wintemute and Wright documented that secondary hospitalization for treatment of gunshot wounds alone added twelve percent to hospital costs at their single medical center.⁵¹ The authors also point out that patients may have been hospitalized elsewhere.⁵² Thus, these figures may badly underestimate the real cost. The literature seems fairly consistent in its findings that the costs for these injuries are largely borne by the public. At least eighty percent of hospital charges for the treatment of firearm injuries are reimbursed by government programs or are written off by the hospitals as bad debt.⁵³ As the magnitude of the problem continues to rise, the number of dollars necessary to care for these patients will increase. As the weaponry becomes more sophisticated, one can only assume that the charge per case will rise as well.

Changes in the demographics of injury have changed medical practice in a number of ways. The military utilizes the increase in violence as an opportunity to maintain battle readiness. Our experience in the Persian Gulf underscored the relative lack of military surgeons experienced in trauma. The United States military has, therefore, begun to use major civilian trauma centers as training grounds for their residents, fellows, and experienced staff.⁵⁴ While there have always been ties between military physicians and civilian trauma centers, this has recently been expanded into a much larger programmatic effort. Currently, Ben Taub Hospital in Houston serves as the only organized training center.⁵⁵ However, the military plans to expand this to an additional three to five centers over the coming year. At Ben Taub Hospital, ten military teams per year rotate through the surgical service.⁵⁶ Each team consists of four surgeons (three general trauma surgeons, one orthopaedic surgeon) and

49. *See id.* at 518-19.

50. *See id.* at 517.

51. *See* Garen J. Wintemute & Mona A. Wright, *Initial and Subsequent Hospital Costs of Firearm Injuries*, 33 J. TRAUMA 556, 558 (1992).

52. *See id.* at 559.

53. *See id.*

54. *See id.*

55. *See* Charles Marwick, *Military Physicians Train in Civilian 'War'*, 266 JAMA 1047, 1047 (1991).

56. *See generally* ArmyLINK News, *Training program on cutting edge of military medicine* (visited Nov. 12, 2000) <<http://www.dtic.mil/armylink/news/Oct1998/a19981015medical.html>>.

twenty-six other members, which includes nurses that staff the Emergency Departments, operating rooms and intensive care units.⁵⁷ Nurse anesthetists and technical support people are also included in the team.⁵⁸ Afterward, comparisons are made between civilian and military experiences.

The same training opportunities exist in surgical residencies in the United States. In the 1980s, trauma cases accounted for a very small percentage of the cases of an average general surgery chief resident, prompting a concern within the trauma community that training was inadequate.⁵⁹ The mean number of cases between 1980 and the early 1990s more than tripled, and the number of residents finishing with fewer than ten cases during their residency fell to under ten percent.⁶⁰ Medical care had been re-evaluated in light of these changing demographics. Surgeons and emergency physicians caring for victims of urban firearm violence have attempted to devise new strategies to battle this epidemic.

Traditional resuscitation involved the insertion of an intravenous catheter as early as possible in the field.⁶¹ Victims who were found to be hypotensive from blood loss had fluids infused in an attempt to normalize blood pressure.⁶² Clinicians believed that large volumes of fluid were necessary to prevent the consequences of shock.⁶³ However, as early as World War I, Cannon stated that large volumes of intravenous fluids before surgical control of bleeding may be harmful.⁶⁴ While a low blood pressure could be detrimental, he believed that patients would tolerate it for a short period of time.⁶⁵ In addition, the homeostatic mechanisms that govern injury often produce spasm of the injured blood vessel, allowing a clot to form on the injured vessel wall.⁶⁶ Raising the blood pressure to normal tends to displace this clot causing recurrent bleeding.⁶⁷ This was tested scientifically by Shaftan in 1965, who clearly demonstrated that ani-

57. *See id.*

58. *See id.*

59. *See* Michael Rotondo et al., *On the Nature of Things Still Going Bang in the Night: An Analysis of Residency Training in Trauma*, 35 J. TRAUMA 550, 550 (1993).

60. *See id.* at 551.

61. *See* W.B. Cannon et al., *The Preventive Treatment of Wound Shock*, 70 JAMA 618, 620 (1918).

62. *See id.*

63. *See id.* at 621.

64. *See id.* at 620.

65. *See id.* at 621.

66. *See* Gerald W. Shaftan et al., *Fundamentals of physiologic control of arterial hemorrhage*, 58 SURGERY 851, 853 (1965).

67. *See id.* at 853-54.

mals resuscitated to a normal blood pressure and normal blood volume bled more than animals who were allowed to remain hypotensive.⁶⁸

The marked increase in urban firearm injury provided an opportunity to redefine this strategy in humans. In 1995, Bickell published a large randomized prospective trial of patients who were hypotensive in the field after suffering penetrating injury to their chest, abdomen, or neck.⁶⁹ Patients were randomized to receive a traditional resuscitation scheme, attempting to normalize blood pressure.⁷⁰ Patients randomized to the low blood pressure group received no intravenous fluids regardless of their blood pressure.⁷¹ Those who received no fluid until the time of anesthetic induction, in fact, had a statistically significant increase in survival when compared to those who were treated traditionally.⁷² This has revolutionized medical practice and is now considered standard of care for such patients. Current projects are underway to see if this philosophy is useful in other patients.

The increase in urban violence has produced other significant changes in medical practice. A new philosophy coined "damage control" is now routinely practiced in America's civilian trauma centers. Traditional dogma suggested that patients requiring surgery should remain in the operating room until all injuries were definitively repaired.⁷³ In the early 1990s, many American trauma surgeons performed Herculean technical procedures to repair a multiplicity of injuries, only to have these patients die in the early post operative period in the Intensive Care Units.⁷⁴ Recently, a more staged approach, utilizing the technique of damage control, has been advocated.⁷⁵ Only immediately life-threatening injuries, such as those causing exsanguinating hemorrhage, are definitively addressed during the first operation.⁷⁶ Other injuries, such as those to the gastrointestinal tract, are controlled, but not repaired.⁷⁷ In desperate situations, vascular injury can be temporized by shunting as opposed to definitive repair.

68. *See id.* at 851.

69. *See* William H. Bickell et al., *Immediate Versus Delayed Fluid Resuscitation for Hypotensive Patients with Penetrating Torso Injuries*, 331 *NEW ENG. J. MED.* 1105, 1105 (1994).

70. *See id.* at 1106.

71. *See id.*

72. *See id.*

73. *See* Michael F. Rotondo et al., *'Damage Control': An Approach for Improved Survival in Exsanguinating Penetrating Abdominal Injury*, 35 *J. TRAUMA* 375, 375 (1993).

74. *See id.*

75. *See id.* at 376.

76. *See id.*

77. *See id.*

Non-anatomic bleeding is controlled with packing.⁷⁸ The patient is then taken to the Intensive Care Unit for re-warming and ongoing resuscitation.⁷⁹ Non-operative techniques for hemostasis are often useful at this point as well.⁸⁰ When the patient is warm, his coagulation profile is normal, and cardiovascular and pulmonary function is optimized, the patient is returned to the operating room for removal of packing.⁸¹ Minor bleeding can be addressed at this time, and gastrointestinal injuries reconstructed.⁸² A temporary reconstruction can be achieved at the time of re-operation, usually 48 hours after the initial surgery.⁸³ More definitive reconstructive procedures are often deferred until much later (somewhere between six and twelve months) in order to achieve final closure.

Despite all the advances in medical practice, a number of patients simply do not survive. One lesson learned from urban warfare is the need to define futility. Emergency Department thoracotomy (opening a patient's chest in a desperate attempt to salvage life) became popularized in the 1970s.⁸⁴ While there has been considerable discussion about the proper indications for this technique, there is no question that it has saved a number of lives. It is most useful in patients with penetrating injury to the heart.⁸⁵ Very clearly, thoracotomy is the least successful in patients who present to the Emergency Department with more profound physiologic deficits and serious anatomic cardiac injuries.⁸⁶ Patients with recordable vital signs and a stab wound to a single chamber of the heart survive nearly forty percent of the time.⁸⁷ Recently, Rhee published the results of a cumulative series of Emergency Department thoracotomies.⁸⁸ In the 1970s, the rate of survival was between seven and twenty-five percent.⁸⁹ This rate has now fallen to a dismal two to five percent.⁹⁰ The reason for this almost certainly lies in changing demographics. The number of patients who present

78. *See id.*

79. *See id.*

80. *See id.*

81. *See id.*

82. *See id.*

83. *See id.* at 380.

84. *See* C. William Schwab et al., Emergency Department Thoracotomy (EDT) A 26-Month Experience Using an "Agonal" Protocol, 52 AM. SURG. 20, 20 (1986).

85. *See id.* at 28.

86. *See id.* at 20.

87. *See id.* at 25.

88. *See* Peter M. Rhee et al., *Survival after Emergency Department Thoracotomy: Review of Published Doctor from the Past Twenty-Five Years*, 190 J. AM. COLLEGE SURGEONS 288, 291 (2000).

89. *See id.* at 290.

90. *See id.*

in extremis without recordable vital signs may now be as high at seventy percent.⁹¹ The percentage of these patients who sustain gunshot wounds, which has been reported to be about fifty percent, may now be as high as eighty percent.⁹² Thus, the decrease in survival should be expected.

Recently an increase in trauma recidivism has been identified. Relatively young patients are now presenting with recurrent injury. It is common for urban trauma centers to see patients with gunshot wounds two or three separate times before they reach the age of twenty.⁹³ We recently admitted an eighteen-year-old for his third life-threatening injury from gunshot wounds. It is difficult to believe that people who are repeat victims of violence will survive over a long period of time. The [UMMS] Shock Trauma Center has recently undertaken an intervention strategy in an effort to prevent trauma recidivism. Two hundred patients who were re-admitted were studied. The average cost for the repeat hospitalization was \$42,000. As one might expect, when compared to primary victims of non-urban violence, the study population is African American, uninsured, and has a known history of violence and social disadvantage more reliably than the control population. The intervention project to channel these patients into a program designed to provide employment and support has been funded by the governor's office of the State of Maryland, as well as the Able Foundation. At this point, it is too early to report results.

The relationship between drug use, alcohol use, and injury continues to be significant. A study by Soderstrom reported a statistically significant increase in drug use associated with violence.⁹⁴ Alcohol use in this population has remained about the same.⁹⁵ As more individuals with impaired judgment carry guns, it is not surprising that injury continues to grow as a problem in urban America. The only way to truly impact the problem of urban violence is through significant behaviour change. While this is a daunting task, it is not unlike others that America has faced in the past.

91. *See id.* at 294.

92. *See id.* at 291.

93. This is based on a common perception of those who, like the author, work urban trauma centers.

94. *See* Carl A. Soderstrom et al., *Psychoactive Substance Use Disorders Among Seriously Injured Trauma Center Patients*, 277 JAMA 1969, 1972 (1997).

95. *See id.* at 1971.

Tuberculosis was a lethal epidemic during the Industrial Revolution at the end of the nineteenth century.⁹⁶ There is no question that the use of good antimicrobials and vaccination has done a good deal to help eradicate this disease. However, the greatest decline in tuberculosis rates actually took place approximately one hundred years before the development of drug therapy or vaccination.⁹⁷ The greatest decline in tuberculosis came from behavioral changes and public health solutions.⁹⁸ Poor sanitation, nutrition, housing, and overcrowding were identified as contributing to the spread of the disease.⁹⁹ Risk groups were identified and public education began.¹⁰⁰ As people changed their lifestyles, the rate of tuberculosis fell dramatically.¹⁰¹ A solution like this could go a long way toward solving the problem of firearm violence. Unfortunately, the group perhaps best suited to help comment on the ravages of firearm violence, the physician, has been slow to advance this cause. To date, only the Eastern Association for the Surgery of Trauma (EAST) has published an official comment on the problem of urban violence.¹⁰²

In 1993, C. William Schwab, M.D., the President of EAST, delivered the presidential address entitled "Violence: American's Uncivil War," and appointed the Violence Prevention Task Force of the society.¹⁰³ In 1995, that task force published a paper entitled "Violence in America: A Public Health Crisis and the Role of Firearms."¹⁰⁴ In that manuscript, EAST made concrete recommendations in an attempt to achieve an effective control of firearm proliferation and availability.¹⁰⁵ They called for the creation of a nonpartisan committee on violence to conduct a comprehensive national study of violence and to establish a national database on violence, violent crime, wounding, and death.¹⁰⁶ The manuscript also mandated the development of a public campaign against all aspects of crime and violence, with an emphasis

96. See C. William Schwab, *Violence: America's Uncivil War — Presidential Address, Sixth Scientific Assembly of the Eastern Association for the Surgery of Trauma*, 35 J. TRAUMA 657, 662 (1993).

97. See *id.* at 661-62.

98. See *id.* at 662.

99. See *id.*

100. See *id.*

101. See *id.*

102. See The Violence Prevention Task Force of the Eastern Association for the Surgery of Trauma, *Violence in America: A Public Health Crisis — The Role of Firearms*, 38 J. TRAUMA 163, 163 (1995).

103. See Schwab, *supra* note 96, at 657.

104. See *id.*

105. See *id.* at 166.

106. See *id.*

on firearm violence, and the consolidation of firearm regulations under one federal law enforcement agency.¹⁰⁷ EAST members called for strict enforcement of the existing ban on the use and ownership of firearms by potentially dangerous or irresponsible individuals, and for regulation of the domestic manufacturing and importation of firearms, as well as restrictions on ownership of excessively lethal firearms.¹⁰⁸ The society asked for the registration and licensure of individual dealers; taxation on the manufacture and sale of firearms and weapons; manufacturer, dealer, and owner liability; and the modification of firearms and ammunition to improve their safety.¹⁰⁹ Finally, EAST called for mandatory sentencing for firearm-related crime and regulation of firearm carrying and storage.¹¹⁰

While efforts continue, few states have adopted many of these recommendations. A number of cities have attempted to stem urban violence through the use of various strategies.¹¹¹ In some locales, penetrating injury has decreased as much as fifty percent.¹¹² While politicians and heads of municipal police forces all rush to claim credit, the reason for the decrease is unclear. In fact, in some cities such as Baltimore, penetrating trauma has not decreased at all.¹¹³

Penetrating trauma and urban firearm injury continue to be an epidemic in some cities in the United States. The caliber of the weaponry continues to increase and the relationship between injury, drugs, and alcohol has shown little change. If anything, it continues to worsen. Trauma recidivism is a growing problem. While medical practice has reacted to this epidemic of urban violence, America's youth continue to die on its streets. Society will need to address the underlying socioeconomic problems at the root cause of this issue before any progress is made.

107. *See id.*

108. *See id.*

109. *See id.* at 167.

110. *See id.*

111. *See Making a Difference, supra* note 9 (discussing programs in Atlanta, Chicago, and Dallas created to curtail injury among inner city children and adolescents).

112. *See, e.g.,* New York State Office of the Governor, *Governor Pataki Signs Legislation to Combat Gun Violence* (visited Dec. 28, 2000) <http://www.state.ny.us/governor/press/year00/aug9_00.htm>.

113. *See generally,* City of Baltimore, *Baltimore's Plan to Dramatically Reduce Crime: A Plan of Action for Transforming the Baltimore Police Department into a High Performance Organization* (visited Dec. 28, 2000) <<http://www.ci.baltimore.md.us/news/crime/crime.html>>.