

## Impact of gun violence

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## SUMMARY

In our societal focus on gun mortality, we lose sight of the long-term effects of these injuries, including the cost and treatment burden that victims and their families incur and, in fact, the nation at large. Measuring the impact of gun violence by mortality rate alone is a gross underestimation of its true impact. While the debate on how to reduce rate of gun violence continues, it is imperative that we make every endeavor to ensure that victims of gun violence receive the care they need to reduce disability and morbidity. It is crucial that we prevent firearm-related deaths, and we must address the sequelae of these injuries and the casualties that these injuries bring the opportunities and livelihoods of the survivors of gun violence.

Gun violence is a well-known and long-standing public health crisis in the USA partially due to its politically divisive nature and historical lack of research funding. The impact of gun violence is often measured by mortality rates. In 2018, annual mortality from gun injuries in the USA was estimated to be 200 deaths per million per year. Firearm mortality is estimated to be 23 deaths per million per year in our nearest developed neighbor, Canada. The US gun violence rate has significantly increased since the onset of the COVID-19 pandemic. Many victims of gun violence do not lose their lives. Instead, they lose their livelihoods because many survive with long-term disabilities. It is estimated that up to 66% of all gunshot injuries do not lead to death. In our societal focus on gun mortality, we lose sight of the long-term effects of these injuries, including the cost and treatment burden that victims and their families incur and, in fact, the nation at large. Measuring the impact of gun violence by mortality rate alone is a gross underestimation of its true impact.

As a society, we seem to remember that gun violence is a problem only when it makes it to the news. Amid the backdrop of many mass shootings and high-profile stories of gun violence are many cases of gun violence that never make the headlines. I want to share one of such stories and the long-term impact of gun violence on a patient, patient's family and society:

Patient was an adult in their 30s who was admitted as a level 1 trauma following multiple gunshot wounds to the left thigh leading to acute blood loss, hemodynamic shock, femoral shaft fracture, and left superficial femoral artery transection. Patient was taken emergently to the operating room for prompt SFA bypass surgery, wound exploration, and fasciotomies. While recovering in the intensive care unit, the early postoperative course was complicated by bypass failure, development of necrosis and

rhabdomyolysis below the knee, multiple hematomas, and soft tissue infections. Patient ultimately required a left guillotine above-the-knee amputation followed by repeated wound washouts and debridement. After 24 days in the ICU, patient was transferred to the stepdown floor with a wound vacuum-assisted closure (VAC) device to the left AKA stump.

While on the floor, patient progressed well with adequate wound healing. By the 34th day in the hospital, patient was meeting all discharge milestones. Knowing that upon discharge the patient would need acute rehabilitation and home health nursing services given the recent amputation and continued need for VAC therapy, I contacted our case manager to initiate the next steps in discharge planning. I was shocked when she informed me that no rehabilitation facility or home health agency would agree to care for the patient given that the patient was a victim of gun violence. She notified me that rehab facilities refuse to accept victims to their facility due to fear of further violence from their attackers during their stay. Additionally, home health agencies refuse to send their staff to victims' homes because they fear the neighborhoods will be too unsafe for their staff. Given these unsafe discharge conditions, the patient subsequently remained in the hospital with minimal needs other than routine VAC therapy for the stump wound and physical therapy. The patient's wound healed well and was ultimately closed by the plastic surgery team via complex wound closure. After 55 days in the hospital, the patient was discharged home with pain medications and a referral to the pain service. However, two months later, the patient continues to present to the emergency department repeatedly due to uncontrolled pain despite being managed by the postsurgical anesthesia pain service.

Frequently, victims of gun violence, like this patient, are members of disadvantaged and marginalized populations. Recent studies have found that the risk of subsequent disability associated with gun violence is higher with certain patient characteristics such as lower socioeconomic status, an urban home location, a night-time injury, intentional gun injury, history of mental illness or substance abuse, or a recent emergency department visit. In the case of this patient, who was the breadwinner of the home, the associated morbidity, healthcare burden, and the cost to society included a 24-day stay in the intensive care unit, a total of 55 days in the hospital, recurrent utilization of emergency department services after discharge, chronic pain, increased risk of patient dependence on narcotic drugs for chronic pain control, and loss of income to the patient and patient's family.

As I reflected on patient's story, I wondered what measures could have improved the quality of patient's care and outcomes. In hospitals, we do not turn away victims of gun violence due to security concerns. Instead, we employ security measures

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such as using aliases and placing them in secure units, hence keeping them and staff safe while caring for them. Given the burden of gun violence in America, it is necessary to develop an analogous mechanism for aftercare facilities. Additionally, home health agencies could employ staff who reside in neighborhoods with increased rates of firearm-related injuries and, therefore, where these patients live. This increase in focused workforce will ensure that more patients have access to continued care, and it will provide meaningful employment opportunities for residents of forgotten zip codes. I hope, as a society, we can create public health and policy interventions that will significantly reduce the rate of gun violence. Nevertheless, while the debate on how this can be achieved continues, it is imperative that we make every endeavor to ensure that victims of gun violence receive the care they need to reduce disability and morbidity. It is crucial that we prevent firearm-related deaths, and we must address the sequelae of these injuries and the casualties that these injuries bring the opportunities and livelihoods of the survivors of gun violence.

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