A biopsychosocial approach to gun violence can drastically enhance patient treatment and violence prevention.

Gun violence

A biopsychosocial disease

Stephen Hargarten is a professor in the Department of Emergency Medicine and serves as the Senior Injury and Policy Advisor for the Comprehensive Injury Center at the Medical College of Wisconsin. His research resides at the vital but neglected intersection of violence prevention, medicine, and health policy, with a particular focus on gun violence as a biopsychosocial disease. Research Features caught up with Stephen about his current research.

Stephen Hargarten. Professor in the Department of Emergency Medicine and Senior Injury and Policy Advisor for the Comprehensive Injury Center at the Medical College of Wisconsin.

Hargarten's research into ballistics helps clinicians to plan treatment strategies based on a diverse array of bullet injuries.

Professor Stephen Hargarten has been a vocal advocate of gun violence education in medical schools. His research has also been instrumental in informing the Centers for Disease Control and Prevention's (CDC) National Violent Death Reporting System (NVDRS), which collates over 600 data elements relating to violent deaths from numerous sources into an anonymous database. His research recognises that an effective social response to the disease of gun violence must be holistic, collaborative, and multidisciplinary. To this end, Hargarten looks beyond the biomedical dimension of gun violence, integrating the social and behavioural determinants that might predispose one to violence. In our interview, we discussed the importance of a biopsychosocial model for the study of gun violence, and looked at Hargarten's future research plans.

Could you explain what is meant by the term 'biopsychosocial disease', and how the term relates to the research you are undertaking into gun violence?

For the past century, medical school education and treatments have been steeped in the biomedical sciences including physiology, pathology, anatomy, biochemistry, and immunology. Physician-scientists have devoted their research to these basic sciences, with laboratories discovering more and more elements of cellular metabolism and organ function. This is all good! But over the past several decades, there has been increasing interest in broadening the curriculum of medical schools and pulling in other sciences to further inform how one takes care of patients and the communities they reside in.

The biopsychosocial model (BPS) of illness was initially described by Dr Engel in 1977. He felt, as many of us also feel, that there is more to a patient's 'illness' than is covered or understood by the biomedical sciences that result in laboratory results, x-rays, and

Only when we begin to treat the epidemic of gun violence as a biopsychosocial disease, will we be able to treat it in its full complexity.

pharmacologic interventions. There are behavioural health issues for patients and there are social determinants of health issues that are part of a patient's life. He stressed that this model can further inform and broaden our care of patients. Gun violence is one example – by framing gun violence as a complex interaction of biomedical, behavioural, health, and social issues, we can begin to better understand our patients who have been injured by a bullet, strengthen care, improve outcomes, and perhaps inform primary prevention.

Could you explain how your previous work in linking data systems contributed to the National Violent Death Reporting System?

We received a small grant in the early 1990s to do a pilot project, linking the information of the police, the medical examiner, and the crime lab, to construct a comprehensive 'picture' of the violent death. This was the first time this had been done. Since 1975, motor vehicle crash deaths have been 'linked' to provide a more comprehensive understanding of another violent death, car crashes. After

His research recognises that an effective social response to the disease of gun violence must be holistic, collaborative, and multidisciplinary.

Fusing the social and medical sciences will enable us to more fully understand the needs of patients.
sebra/Shutterstock.com

Freedom Studio/Shutterstock.com

Hargarten works to reconcile biomedical and social responses to gun violence.

The National Violent Death Reporting System collates a large range of data related to violent deaths.
Photographee.eu/Shutterstock.com

an editorial written by Professor Teret and others, calling for a similar system for gun violence, we developed the system, first in Milwaukee County, then regionally, then for the entire state. Our pilot efforts served to inform other states that eventually resulted in the CDC's NVDRS.

How important is gun violence education in medical schools, and why is the issue not more widely taught?
I think gun violence education is not universally seen as 'important' for a few reasons. Firstly, the pathophysiology of the disease occurs 'out there' in the community, on a street, in a park; in virtually every other disease that physicians treat, a portion of the pathophysiology of the disease is witnessed and assessed at the bedside. Second, there is a widespread thought that this isn't a problem for physicians to teach about or to actively engage in to prevent and treat. Many of us strongly feel otherwise.

Do you have any suggestions for how this form of education should take shape?
Yes, but every curriculum at a medical school is different. I think that it simply needs to be a requirement, everyone can then figure out how to do it.

What barriers or resistance do proponents encounter when trying to implement gun violence education?
The barriers are at multiple levels – first and foremost, with the dominance of the biomedical sciences that form the

platform for learning about disease and medicine. I fully recognise that this remains important and vital to advancing the science of medicine, but there is more! More social sciences (the first department of social medicine in the US was founded in the 1960s) are needed to more fully understand the patient's needs as well as the obstacles for achieving health and safety. Another barrier/challenge rests with my previous comments. Gun violence is largely viewed as a crime issue, so it isn't considered the domain of medicine. Yet, over 250,000 people are dying each year from bullets: the pathogen of this disease. We need to frame gun violence as a disease for it to 'gain entry' into the medical school curriculum, just like the other diseases that are part of the curriculum.


Hargarten encourages medical schools to teach more about gun violence.
bangland/Shutterstock.com

What strategies do you propose for a holistic and collaborative approach to the study of the causes of gun violence?
From day one, presenting medical education as a science and art – weaving these sciences and arts throughout the school and not artificially separating the cellular organ functions that make it easier for the faculty to teach, but in the end, don't result in a holistic model that is BPS. Medical education is currently
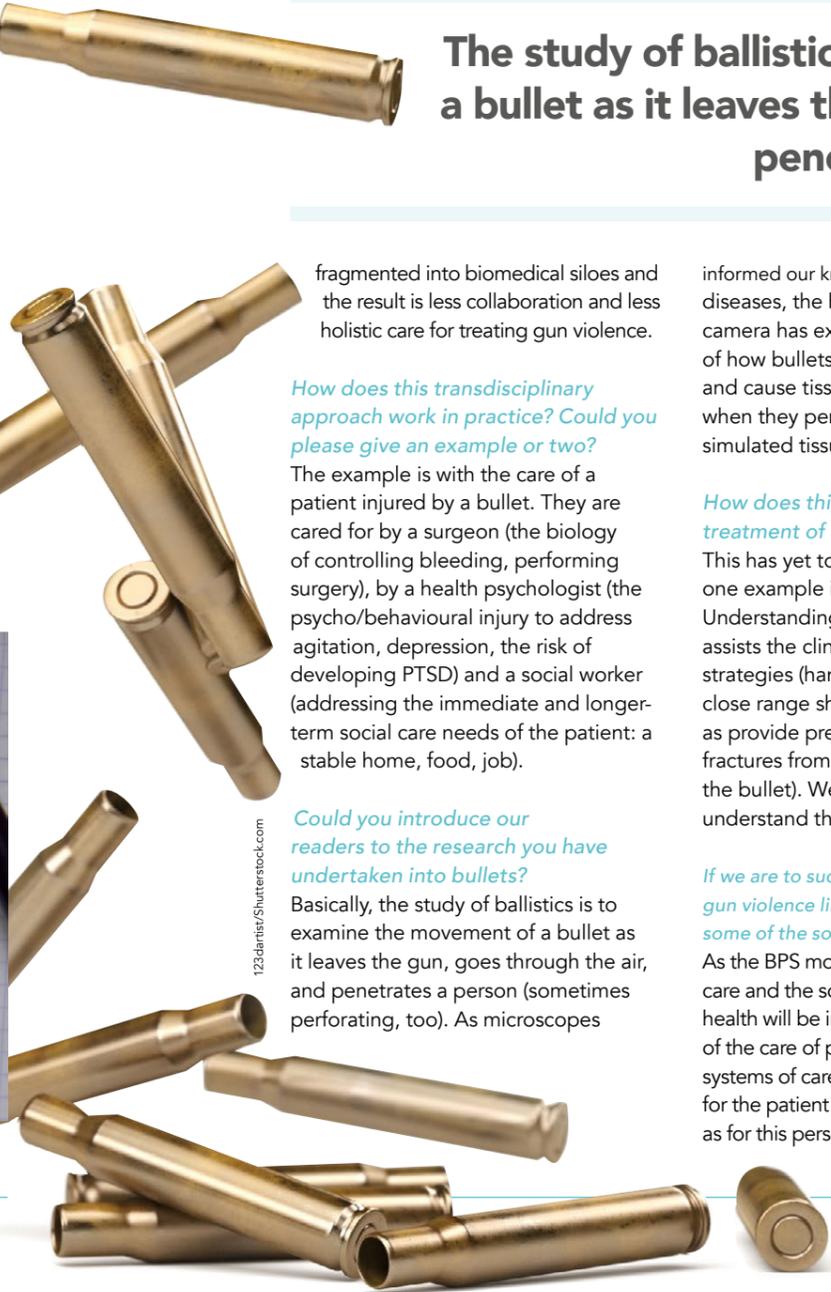
fragmented into biomedical siloes and the result is less collaboration and less holistic care for treating gun violence.

How does this transdisciplinary approach work in practice? Could you please give an example or two?
The example is with the care of a patient injured by a bullet. They are cared for by a surgeon (the biology of controlling bleeding, performing surgery), by a health psychologist (the psycho/behavioural injury to address agitation, depression, the risk of developing PTSD) and a social worker (addressing the immediate and longer-term social care needs of the patient: a stable home, food, job).

Could you introduce our readers to the research you have undertaken into bullets?
Basically, the study of ballistics is to examine the movement of a bullet as it leaves the gun, goes through the air, and penetrates a person (sometimes perforating, too). As microscopes

123artist/Shutterstock.com

informed our knowledge of bacterial diseases, the high-speed video camera has expanded our knowledge of how bullets release their energy and cause tissue and organ damage when they penetrate and perforate simulated tissues.

How does this new knowledge help treatment of bullet injuries?
This has yet to be fully appreciated. But one example is in the area of fractures. Understanding the energy dynamics assists the clinician to plan treatment strategies (handgun vs rifle injuries, or close range shotgun injuries) as well as provide preventative care (occult fractures from the energy impact of the bullet). We are just beginning to understand the implications.

If we are to successfully begin treating gun violence like a disease, what might some of the social implications be?
As the BPS model has done, the social care and the social determinants of health will be integrated into the fabric of the care of patients and be part of the systems of care. So, it will be as important for the patient to get an antibiotic as well as for this person to have housing.

The study of ballistics is to examine the movement of a bullet as it leaves the gun, goes through the air, and penetrates a person.

What directions will your future research take?
We will continue our study of interventions using the BPS platform. We now have 24/7 psychosocial care in some Emergency Departments. Multi-centered studies are needed to determine how this model/platform improves the short and long-term care of the patient as well as lowering the risk of the patient receiving another bullet injury. How and why do the health psychologists make a difference in patient care? We now have a follow-up clinic with a health psychologist – that's new for the care of patients. We'll also be asking: what difference does that new team member make beyond the biomedical care of the surgeon treating the patient for a gunshot wound?

MEDICAL COLLEGE OF WISCONSIN
E: Hargart@mcw.edu