

In-person training proves most effective method to educate laypeople in bleeding control

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The most common cause of preventable death following traumatic injury is uncontrolled bleeding, and traumatic injury is the leading cause of death for Americans under 46. Researchers at Brigham and Women's Hospital devised the PATTS Trial (Public Access and Tourniquet Training Study) to measure how effective different training methods are in preparing laypeople, the non-medical public, to control bleeding with a tourniquet and whether they could retain that skill. The findings are published this week in *JAMA Surgery*.

On April 15, 2013, Boston experienced a tragic mass casualty event when two homemade bombs left three dead and 243 people injured near the Boston Marathon finish line. A combination of factors - increased medical staffing at the scene, multiple experienced Level I Trauma Centers close by, and short transport times - contributed to quick and effective medical care despite the severity of injuries. "The concept that laypeople can be empowered and help save lives was clearly demonstrated on that day," said Eric Goralnick, MD, MS, medical director of Emergency Preparedness, emergency medicine physician at Brigham and Women's Hospital, and lead author on this study.

Since the Boston Marathon bombing, several national initiatives, including the White House's "Stop the Bleed" and FEMA's "You Are the Help Until Help Arrives" have emerged to empower laypeople to act as immediate responders. Point-of-care instructional interventions,

flashcards and audio or video kits have also been developed in response to scalability challenges associated with in-person [training](#). But questions remain regarding the type, frequency, and format of training needed to competently prepare non-medical personnel for hemorrhage control.

Funded by The Gillian Reny Stepping Strong Center for Trauma Innovation, and in partnership with Gillette Stadium and the New England Patriots, the PATTS Trial was designed to not only train Gillette Stadium staff in responding to uncontrolled bleeding but to test whether, and under what conditions, such training was effective. Under the PATTS Trial, 465 Gillette Stadium employees with no previous hemorrhage control training were randomized into four arms, each utilizing either point-of-care interventions or the Bleeding Control Basic (B-Con) course before being assessed for correct tourniquet application in a simulated situation. After testing, all participants attended the B-Con course, and 303 of these participants were retested three to nine months after training to assess retention.

Researchers found that in-person training, via the B-Con Course, was the most effective instructional method and resulted in 88 percent of participants correctly applying a tourniquet. By comparison, participants who received no training applied a tourniquet correctly only 16 percent of the time, and participants who had access to instructional flashcards or an audio kit plus flashcards experienced only small gains in effectiveness (correctly applying the tourniquet 19.6 percent and 23 percent of the time, respectively). The PATTS Trial also evaluated skill retention over a period of three to nine months after training and found that 54.5 percent of those reassessed during that time span could correctly apply a tourniquet, emphasizing the need for refresher training.

"Before the PATTS trial, we didn't know what was the best way to train the public in bleeding control. Now that we know, we can be more effective in creating training programs, public awareness campaigns, and

tools to empower people," said Adil Haider MD, MPH, a trauma surgeon and Kessler Director of the Center for Surgery and Public Health at BWH.

Researchers stress that most external hemorrhages can and should be controlled by direct pressure. While bystanders were critical first responders following the Marathon bombings, of the 27 improvised tourniquets applied at the scene, subsequent research indicated that all were applied incorrectly. Most commonly, an incorrectly applied tourniquet is one that is too loose to stop blood flow or one that is positioned as to stop venous rather than arterial blood flow, meaning it accelerates blood loss.

"The PATTS Trial is a critical learning tool in understanding how to react and respond to an uncontrolled bleeding event," said Jim Nolan, chief operating officer of Gillette Stadium and the New England Patriots. "We are proud to partner with Brigham and Women's Hospital on this important research and extremely grateful to have participated in such an important and effective program that will undoubtedly save lives by demonstrating to the general public the proper way to react and treat uncontrolled bleeding injuries."

Said Goralnick, "Our next steps include convening a consensus conference with clinicians and researchers from the medical and [public health](#) sectors to define a common research agenda for laypeople and bleeding control."

"Intervention from bystanders in any situation, not just mass casualty, can help save a life," said Meghan McDonald, a trauma nurse at BWH and co-author of the study. "Some people hesitate, especially when it comes to tourniquets, because they are afraid of causing more harm. Educating laypeople on hemorrhage control, be it direct pressure or tourniquet application, is not only the responsible thing to do as a trauma

center, it is the right thing to do."

Researchers from the Level 1 Trauma Center, the Center for Surgery and Public Health, and the Department of Emergency Medicine at BWH were collaborators in designing the PATTS Trial.

Provided by Brigham and Women's Hospital

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