EDITORIAL

# Converting Bystanders to Immediate Responders
## We Need to Start in High School or Before

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**Every minute counts** in the case of an emergency, and bystanders, such as family, friends, and good samaritans, play a crucial role in increasing the likelihood of survival until professional medical care arrives. In light of the increasing rate of unfortunate events, such as 9/11, the Boston Marathon bombing, and mass shootings like at the Pulse nightclub in Orlando, Florida, there has been an increase in national policy efforts to enhance survivability from intentional mass casualty and active shooter events. A better understanding of the time it takes for emergency medical service (EMS) personnel to arrive on the scene of an emergency, as presented in the study by Mell and colleagues,[1] is crucial to the development of interventions to save lives.

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In their study, Mell and colleagues[1] quantify the average time between a 911 call and the arrival of the first EMS unit to the scene using deidentified EMS agency records from across the United States. The authors compared EMS arrival time in urban, suburban, and rural populations. In 2015, there were 1 796 987 emergency encounters, most of which occurred in suburban populations (n = 1 576 019; 87.7%), followed by urban (n = 150 779; 8.4%) and rural (n = 70 189; 3.9%) areas. They report an overall median time to arrival of 7 minutes (interquartile range [IQR], 4-10), and 6 minutes (IQR, 4-10) in suburban areas, 6 minutes (IQR, 4-9) in urban areas, and 13 minutes (IQR, 8-19) in rural areas.

While the study results are compelling, there is concern over their generalizability, as the authors had to use what amounts to a convenience sample for their analyses. It also appears problematic to merge the very different urban and rural groups and come up with the overall 7.9-minute mean response time. We recommend reporting these independently. In fact, the overall median 13-minute response time for rural areas may offer a misleadingly positive impression about EMS response times in truly isolated rural regions. The IQR gives some information of the variation, with the longest 25% of times being more than 19 minutes. It would be interesting to know which patients are affected by particularly long response times and what are the characteristics of these areas (ie, population density, geographic terrain, and patients' race/ethnicity or socioeconomic status).

So what do we do for those crucial minutes? It's clear we need to facilitate the conversion of bystanders to immediate responders if we want to increase prehospital survival after an injury. To address this, the American College of Surgeons has used information from the Hartford Consensus, a multidisciplinary committee created in 2013,[2] with the aim to create a national policy to enhance survivability from intentional mass casualty and active shooter events. The underlying rationale behind the Hartford Consensus is that no one at these tragic events should die of uncontrolled bleeding. The committee identified 3 levels of response to intentional mass casualty and active shooter events: (1) immediate response, (2) professional first response, and (3) trauma team response. Lay bystanders represent the immediate response team as they are the first at the scene. A national representative survey of the public regarding bleeding control[3] showed that 98% would attempt bleeding control in a family member with severe bleeding. Ninety-two percent would attempt bleeding control in an unknown person involved in a car crash, and 75% would help bleeding control in a mass shooting scenario. Bakke and colleagues[4] demonstrated that 81% of bleeding patients had an attempt for hemorrhage control done correctly by a bystander. Those with prior training provided better first-aid than those without.

Mell and colleagues[1] ask a meaningful research question that reinforces the importance of bystanders as immediate responders by quantifying the median time until professional responder arrival in both rural and urban settings. This is particularly important in the realm of bleeding control where just a few minutes of effective action can save a life. Multiple steps need to be taken to enable bystanders to effectively help a critically injured and hemorrhaging patient especially in intentional mass casualty and active shooter events. These steps focus on education, empowerment, and access. First, bleeding control knowledge should be incorporated into existing emergency training programs, and available resources should be further disseminated to the general population. Second, the general population needs to be empowered to act as immediate responders by providing a legal framework to support the culture change from bystander to immediate responder in a bleeding emergency (as it is for cardiopulmonary resuscitation [CPR]). And last, easy access to emergency response resources, such as bleeding control packs, is needed. Placement of such packs in public spaces has the potential to save many lives and does not require major investments or large changes to infrastructure. As simple as these sound, administrative, financial, and usability challenges invite thoughtful deliberations before such steps are instituted not only to ensure their success, but also to prevent unintended harm to patients and would-be immediate responders.

There are several resources available for bystanders to learn how to be effective immediate responders. In 2015, the US

Department of Homeland Defense initiated the Stop the Bleed program (https://www.dhs.gov/stopthebleed) to educate and empower the general public regarding first response for proper bleeding control in emergency situations. Similarly, the Until Help Arrives program (https://community.fema.gov/until-help-arrives) is affiliated with the Federal Emergency Management Agency and provides web-based resources to assist injured individuals until professional help arrives. The online training focuses on 5 successive steps to help reduce mortality: (1) call 911, (2) stay safe, (3) stop the bleed, (4) position the injured, and (5) provide comfort. BleedingControl.org (http://www.bleedingcontrol.org) is an initiative of the American College of Surgeons that compiles credible online resources from private and nonprofit partners to help individual citizens prepare in the case of an active shooter or an explosive event. "Bleeding Control for the Injured (B-Con)" is a course found on Bleedingcontrol.org and designed to teach all levels of medical care professionals and civilians evidence-based, life-saving hemorrhage control techniques to increase casualty survival.

In 1993, when the US military Committee for Tactical Combat Casualty Care introduced the tourniquet as a form of first response, preventable death from extremity injury decreased by 67% from 23.3 deaths per year to 3.5 deaths per year.[5] In light of the resounding success of tourniquet use in the military, this knowledge has been translated to civilian emergency response, a key example supported by a National Academies of Medicine report.[6] In 2014, the American College of Surgeons Committee on Trauma published guidelines for external hemorrhage control in prehospital settings.[7] The general public has expressed an overwhelming willingness to help in cases of an emergency,[3] and translating clinical skill sets to civilian settings has seen success in other types of emergency situations.

Empowering the general public to save the lives of those in need has proven successful in other fields. For example, with the introduction of automatic electric defibrillators in public places and increased training of the public in cardiopulmonary (CPR) skills, we have seen significantly reduced morbidity and mortality from cardiac arrest.[8,9] Following prior success, and building on the Harford Consensus, we recommend 2 actions. First, we must empower citizens with legal protection similar to the good samaritan coverage, which allows bystanders to engage in rescue from a cardiac event with CPR or the Heimlich maneuver for choking. Bleeding/hemorrhage control should be included in these statutes. Second, we must provide laypersons with the education, knowledge, and skills needed for proper bleeding control in emergency situations by incorporating bleeding control training into established education programs, such as Basic Life Support and CPR training. In fact, 32 states have recognized the importance of bystanders in saving lives and have passed some type of legislation requiring high school students be trained in CPR/automatic electric defibrillators prior to graduation.[10-12] We believe that bleeding control initiatives need to be similarly incorporated in high school curricula nationwide. Young people are disproportionally affected by intentional mass casualties and active shooter events, as seen by the Pulse nightclub shooting and the Boston Marathon bombing, and they have the potential to be particularly effective. If the proper steps are taken to empower and train the public, bystanders could fill the missing link to saving lives during the critical time interval between injury and arrival of professional first response.

## ARTICLE INFORMATION

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