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Commentary

Global disparities in public access automated external defibrillation in pre-hospital emergency care: Implications for international travellers

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The most frequent cause of death in international travellers is cardiovascular disease.[1] We previously reported that two of the leading causes of concern among attendees at a travel clinic were how to access medical care abroad (59%) and the prospect of dying overseas (26%).[2] Since travellers often visit countries with poorly resourced health care systems, the chances of successful pre-hospital resuscitation are likely to be greatly diminished in the event of a cardiac arrest.

Public access automated external defibrillators (AEDs) play a critical role in improving survival rates for victims of cardiac arrest in the community. Without treatment, the chances of survival drop by 10% for every minute in cardiac arrest (www.eena.org). Prompt access to AEDs and the presence of a large network of individuals trained in their use are vital components of an effective response to acute cardiac emergencies.[3]

In a large Danish registry study, the chance of a bystander defibrillation in an out-of-hospital cardiac arrest was tripled, and 30-day survival rates doubled, when the closest AED was accessible at the time of the arrest.[4] However, stark disparities in AED availability, training provisions, and distribution exist between low- and middle-income countries (LMICs) and high-income countries (HICs), with significant public health implications for residents and travellers crossing international borders.

The standard of pre-hospital emergency medical services varies significantly across the globe and awareness of this deficit among travellers may be poor. Inadequate investment in pre-hospital emergency systems in LMICs contributes to a substantial number of avoidable deaths from time-sensitive critical illnesses. A recent systematic review concluded that pre-hospital care in LMICs is "fragmented and uncoordinated", with a lack of adequately trained emergency medical personnel, first responders, and basic resuscitation equipment.[5] A simulation-based study in South Africa of emergency medical service personnel competence at delivering effective cardiopulmonary resuscitation demonstrated substandard knowledge and skill performance.[6] Even developed countries do not always meet targets for the deployment of publicly accessible AEDs and training of volunteer lay first responders. The rollout of drone-assisted AED delivery is still in its infancy globally[7] and likely to be unavailable in most LMICs. The recent application of artificial intelligence and machine learning to AED technology has potential to more effectively detect shockable rhythms during cardiac arrest scenarios.[8]

While AED registries and geo-located maps to locate the nearest AED are available to emergency medical personnel and despatchers in many developed countries, they are beyond the reach of less developed economies, where AED distribution is sparse and fragmented. Furthermore, inadequate AED maintenance, including battery changes, may compromise their utility in the event of an out-of-hospital cardiac arrest. Where AEDs do exist in LMICs, language barriers and restrictions on who is allowed to use them present additional barriers.

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We advocate for greater global health agency and governmental funding towards population-level training in basic life support in LMICs, with installation of AEDs in as many public locations as possible, particularly in crowded areas and sports venues, which attract large numbers of international visitors. Publicly available mapped AED registries and public awareness campaigns will help bystanders to respond more effectively if they witness a cardiac arrest. Travellers at high risk for acute cardiac emergencies should ideally travel with at least one companion who is trained to provide basic life support. Their travel preparations should include knowledge of the limitations and challenges in accessing local emergency medical services at their destination, comprehensive travel health insurance, and active location of public AEDs in their immediate vicinity. Future research should investigate the basic life support training of international travellers and members of the travel industry, including in LMIC settings.

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