

## ONLINE FIRST

# Navigating the Challenges of In-flight Emergencies

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**A**S THE FLIGHT BEGINS ITS DESCENT, A CALL COMES over the intercom: "Is there a physician on board?" Three internists traveling together to a meeting respond. A woman has lost consciousness. She is incontinent and unresponsive, with a strong pulse and intermittent breathing. The physicians ultimately determine the patient has hypoglycemia and a seizure. It takes multiple requests before the flight attendants provide the physicians with the emergency medical kit. When the kit arrives, the flight attendants disappear, and the physicians search in vain for glucagon or intravenous dextrose. The physicians massage oral glucose gel into the patient's buccal mucosa, and the seizure eventually stops. After landing, the cabin crew records the names and contact information of the physicians, with no discussion of the incident.

Other reports have recounted physicians having challenging experiences with in-flight medical emergencies.<sup>1,2</sup> Like physicians in these other reports, these physicians faced challenges in providing care: the physical space was difficult to work in, the emergency medical kit was not immediately available for use, the physicians were unfamiliar with its contents, and the flight attendants were absent for much of the episode.

The quality movement in health care has focused increasingly on standardization of processes of care to improve reliability and patient safety. Ironically, key concepts in this movement, such as root cause analyses of poor outcomes and near misses, originated in the airline industry; these approaches have so improved aviation safety that there were no fatalities on US domestic flights in 2010.<sup>3,4</sup> Judging from events such as the emergency landing on the Hudson River, as well as other incidents, flight attendants are well trained in emergency landings and evacuations. Because of improved aviation safety, most individual flight attendants will never experience an emergency landing or evacuation during their careers. By contrast, in-flight medical emergencies occur frequently. Yet the kinds of approaches that have improved flight safety have not been extended to providing optimal care for passengers who become acutely ill while on board airplanes.

Available evidence suggests there is significant room to improve and standardize the care that is provided to patients during in-flight medical emergencies. A survey of European airlines identified 10 000 in-flight medical emergencies during a 5-year period.<sup>5</sup> The study noted that each airline had its own reporting system and protocol. Even though emergency medical kits are mandated to contain certain medications and equipment, the actual kits vary from airline to airline.<sup>6</sup> The US Federal Aviation Administration (FAA) mandates that flight attendants receive training "to include performance drills, in the proper use of AEDs [automated external defibrillators] and in CPR [cardiopulmonary resuscitation] at least once every 24 months."<sup>7</sup> However, the FAA "does not require a standard curriculum or standard testing."<sup>7</sup> Many airlines also contract with a commercial on-ground support company that can, in theory, offer radioed, real-time medical advice.

To improve the chances that passengers who become ill during air travel will do well, airlines and their regulators could take steps similar to what they have done to ensure flight safety for all flights under FAA jurisdiction including the following.

First, a standardized recording system for all in-flight medical emergencies should be adopted, with mandatory reporting of each incident to the National Transportation Safety Board, the organization responsible for reviewing safety events and recommending changes to practice. This approach should include a systematic debriefing of anyone directly involved with the in-flight medical emergency. Whenever possible, this debriefing should happen immediately; otherwise, follow-up telephone interviews should be conducted. The debriefing will help improve the recording of the incident as well as help define how to improve the handling of such incidents. Collecting these records and disseminating lessons learned may help improve the care given during in-flight medical emergencies throughout the domestic airline fleet.

Second, based initially on expert recommendations and later on the results of reporting, the optimal content of the first aid kits on airplanes should be determined, with a man-

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date that a standard kit, with identical elements, in identical locations, be on every flight. The current mandated emergency medical kit is a start, but because many airlines augment the contents, emergency medical kits vary in appearance and organization. Because of this irregularity, health care practitioners responding to in-flight medical emergencies are likely to lack familiarity with each airline's emergency medical kit, delaying delivery of proper care as they first must identify and locate medications and supplies.

Third, the training of flight attendants in how to deal with medical emergencies should be enhanced and standardized. Although the FAA has mandated that flight attendants must be familiar with the contents of the emergency medical kit, flight attendants must absolutely understand what is in the emergency medical kit, where it is located, and how to assist medical personnel at the time of an in-flight medical emergency.<sup>8</sup> Moreover, the obligations of the flight attendants to the sick passenger must be clear. The standards should state explicitly that a single flight attendant be assigned to such emergencies, and stay nearby until the patient is safe. In the presence of health care personnel, the flight attendant (supported by his or her colleagues) should ensure rapid access to the first aid materials available on the plane. In the absence of health care professionals, the flight attendants should be trained in and demonstrate expertise in first aid. Training and expectations of flight attendants should be defined by expert panels, and these standards should be refined by review of the incidents that occur on domestic or international flights.

Fourth, access of flight crews to ground-to-air medical support should be standardized. If this form of support is deemed to be effective, then it should be available to all passengers, on all flights when on-plane health care professionals are not available. The elements of programs providing this support should be defined, and flight crews should receive standardized training in how to interact effectively with those providing such support.

With standard emergency medical kits and standardized training of flight personnel, it will become possible to provide to physicians and nurses some rudimentary training in in-flight medical emergencies. Recent review articles provide an initial framework for this kind of training.<sup>9,10</sup> If such approaches were adopted by the FAA, similar standards of reporting and care for acutely ill passengers could be adopted internationally.

Little information exists on the outcomes of medical emergencies occurring during air travel; therefore, it is not possible to know whether these suggestions will improve patient outcomes. However, experience in systematic quality improvement in health care, as well as the success of the airline industry in improving flight safety, suggests that standardizing the emergency medical kits on planes and the training and expectations of flight attendants should improve the chances that passengers who become ill in flight will have the best possible outcomes. Because the airline industry has already developed standardized reporting and responses to many forms of in-flight emergencies, the adoption of these measures by airlines and their regulators should not add a great deal of expense, but such sensible measures have the potential to improve outcomes for airline passengers who become ill.

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