Is There a Doctor Aboard?

Most passenger in-flight medical events over a 30-year period were not emergencies and had no severe consequences, but one-third led to aircraft diversions.

BY RICK DARBY

Passenger in-flight medical events, injuries and emergencies pose significant questions for air carriers and regulatory authorities. How much medical equipment, and what kind, should be required aboard aircraft?[1] To develop reasonable requirements for on-board medical equipment and cabin crewmember training for its use, objective data about the frequency and types of events are helpful.

The Australian Transport Safety Bureau (ATSB) sponsored a study of passenger in-flight injuries and medical conditions using data from Jan. 1, 1975, to March 31, 2006.[2] The study examined a database of 284 events — 15 accidents, one serious incident and 268 incidents, according to ATSB definitions — gleaned from the ATSB accident and incident database. The key findings included these:

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- The most common cause of in-flight death was heart attack.
- The most common medical event was minor musculo-skeletal injury.
- One-third of medical events resulted in the aircraft being diverted.

"In-flight medical events are a potentially significant problem," the report said. "The airliner cabin at 35,000 feet is far from advanced medical care, space is restricted, the appropriate and necessary equipment for handling a given emergency may or may not be present, and qualified medical personnel are not generally available unless they are traveling on-board as passengers. The cabin environment is also pressurized to an altitude in the range of 4,000 to 8,000 feet, which may pose its own difficulties for passengers with certain emergencies such as respiratory or cardiac arrest. Without treatment, a passenger suffering from a heart attack is unlikely to survive."

The aim of the study, the report said, was to determine the most common passenger in-flight medical events and what proportion resulted in diversions.

The database that was analyzed contained occurrences aboard Australian-registered civil aircraft operating within and outside Australia, and non-Australian-registered aircraft operating within Australian territory. Medical events included in the study were "passenger injuries sustained during routine or regular operations on board serviceable aircraft, which either complete the flight as originally planned or result

Injury Levels in Passenger In-Flight Medical Events

Injury Level	Number	Percentage
Fatal	9	3%
Serious	100	35%
Minor	150	53%
Not specified	25	9%
Total	**284**	**100%**

Note: Passenger in-flight medical events occurred in Australian-registered aircraft within and outside Australia, and non-Australian aircraft within Australia, January 1975 through March 2006.

Source: Australian Transport Safety Bureau

Table 1

in a diversion due to the state of the passenger's health." Injuries during boarding or exiting were included.

Medical events occurred during all types of civil operations. Airline operations represented about 75 percent of the total, charter operations 5 percent and commuter flights 2 percent.

The majority of injuries, 53 percent, were classified as minor (Table 1). Thirty-five percent were considered serious.[3] Nine fatalities occurred. In 25 events, 9 percent of the total, the nature of the passenger injuries was not specified. The report said that these were likely to have been minor, because any more serious injury would have been investigated and reported.

Types of medical event are shown in Table 2. The musculo-skeletal injuries were about 26 percent of the total. These included "minor joint, skin or limb injury, direct blunt trauma of a relatively trivial nature, etc." Frequent causes were turbulence, a minor fall or slip, and being struck by a cabin service cart, usually on the elbow, knee or foot.

In 43 events, 15 percent, a passenger had a heart attack during a flight. All but four of those passengers survived. There were four cases of burns, resulting from hot drinks served as part of the meal service being spilled. One passenger sustained second-degree burns to the arm.

Nine medical events were classified as fractures or dislocations. "The bones affected were generally limbs, such as ankles, arms and legs," the report said. "Falling [and] tripping were the most common reasons for a fracture or dislocation."

The data set included 29 instances of head injury. "The most common reason for this was loose objects falling out of the overhead locker [bin] onto the seated passenger underneath," the report said. "The responsible items usually consisted of briefcases, bottles and laptop computers. The next most common head injury was due to the passenger being thrown up and out of their seat during a period of turbulence and colliding with the overhead locker."

Nine passengers developed respiratory problems during a flight such as acute asthma attack, respiratory arrest or hypoxia — insufficient oxygen. "Asphyxiation occurred in one case and resulted in the death of the passenger," the report said. "This event involved a passenger choking on a small piece of steak which had been served as part of the in-flight meal."

Other than the deaths resulting from heart attack, no cause was responsible for more than one fatality (Table 3, page 52). One suicide was reported, a passenger who set fire to himself in the lavatory and died from burns.

Suspected heart attack was the most frequent reason for an aircraft diversion, in 33 of 95 diversions (Table 4, page 52). "The next

Factors in Passenger In-Flight Medical Events

Factor	Number	Percentage
Anxiety/panic attack	2	0.70%
Bruising/lacerations	14	4.93%
Burns	4	1.41%
Drunkenness and/or violence	14	4.93%
Ear injury	1	0.35%
Eye injury	3	1.06%
Fitting episode (seizure)	8	2.82%
Food poisoning	3	1.06%
Fractures/dislocations	9	3.17%
Fumes inhalation	1	0.35%
Head injury	29	10.21%
Heart attack	43	15.14%
Loss of consciousness	5	1.76%
Motion sickness	4	1.41%
Musculo-skeletal injury	74	26.06%
Obstetric emergency	1	0.35%
Pain	2	0.70%
Respiratory illness	9	3.17%
Stroke	2	0.70%
Suicide	1	0.35%
Unspecified serious illness	11	3.87%
Unspecified illness	44	15.49%
Total	**284**	**100.00%**

Note: Passenger in-flight medical events occurred in Australian-registered aircraft within and outside Australia, and non-Australian aircraft within Australia, January 1975 through March 2006.

Source: Australian Transport Safety Bureau

Table 2

Fatalities in Passenger In-Flight Medical Events

Aircraft Type	Operation	Cause
Boeing 727	Airline	Heart attack
Piper PA-28	Private	Heart attack
Douglas DC-3	Airline	Respiratory arrest
Boeing 747	Airline	Heart attack
Boeing 747	Airline	Asphyxiation
Cessna 402	Commuter	Heart attack
McDonnell Douglas DC-10	Airline	Suicide
Bell 206	Private	Fall from aircraft
Cessna 208	Sport aviation	Head injury

Note: Passenger in-flight medical events occurred in Australian-registered aircraft within and outside Australia, and non-Australian aircraft within Australia, January 1975 through March 2006.

Source: Australian Transport Safety Bureau

Table 3

most common specified condition was 'fitting episode' [seizure caused by epilepsy or another neurological disorder]," the report said. Unspecified illnesses, described as serious or otherwise, prompted 42 percent of all diversions.

First aid training for cabin crewmembers, advanced on-board medical kits and "telemedicine" communication links with emergency physicians on the ground may reduce the need for diversions and improve the outcomes of passenger emergencies, said the report.

"Increasingly, on-board medical kits are becoming more sophisticated," the report said. "There is also a growing trend among the world's airlines to make use of 24-hour ground-based medical centers that are able to directly communicate with an aircraft wherever it might be in the world, with the added ability to transmit patient medical data to the ground for definitive diagnosis. Coupled with greater levels of crew training, it is hoped that this will not only improve the chances of a passenger surviving the emergency, but also reduce the requirement for a diversion."

Passengers can improve the odds of avoiding injury. "Wearing seat belts during all phases of flight, as instructed by the cabin crew, and taking particular care with opening overhead lockers can help to prevent or minimize the possibility of some of the more common injuries suffered on

Passenger In-Flight Medical Conditions Leading to Aircraft Diversion

Condition	Number	Percentage
Drunkenness and/or violence	1	1%
Fall from aircraft	1	1%
Fitting episode (seizure)	6	6%
Food poisoning	3	3%
Head injury	1	1%
Heart attack	33	35%
Loss of consciousness	2	2%
Motion sickness	1	1%
Obstetric emergency	1	1%
Pain	1	1%
Respiratory illness	4	4%
Stroke	2	2%
Unspecified serious illness	10	11%
Unspecified illness	29	31%
Total	**95**	**100%**

Note: Passenger in-flight medical events occurred in Australian-registered aircraft within and outside Australia, and non-Australian aircraft within Australia, January 1975 through March 2006.

Source: Australian Transport Safety Bureau

Table 4

an aircraft," the report said. "Furthermore, passengers with medication for pre-existing medical conditions need to ensure they have easy access to their medication, particularly as some sectors are now between 14 and 19 hours long."●

Notes

1. FSF Editorial Staff. "Enhanced Emergency Medical Kits Increase In-Flight Care Options." *Cabin Crew Safety* Volume 26 (November–December 2001).
2. Newman, David G. *An Analysis of In-Flight Passenger Injuries and Medical Conditions, 1 January 1975 to 31 March 2006.* Australian Transport Safety Bureau (ATSB), Aviation Research and Analysis Report B2006/0171. October 2006.
3. For the study, *serious injury* was defined as an injury that required, or would usually require, admission to a hospital within seven days after the injury occurred. *Minor injury* was defined as an injury that would not require hospitalization, could be treated by first aid or other simple measures, and did not significantly affect the health of the individual.