Is There a Doctor on the Plane?

The Scope of the Problem

Riana Wurzburger, MD, MPH

June 28, 2019
Disclosures

• I have nothing to disclose
Flight Plan

- Scope of the problem
- Most commonly encountered medical issues
- Outcomes
- Available resources
- Take Away Points
Over 4 billion passengers fly each year


How Often Do In-Flight Medical Emergencies Occur?

1 in 6289 passengers

Inflight Emergencies During Eurasian Flights

Mustafa Kesapli, MD, Can Akyol, MD, Faruk Gungor, MD, Angelika Janitzky Akyol, MD, Dilek Soydam Guven, MD, and Gokhan Kaya, MD

Department of Emergency, Antalya Training and Research Hospital, Antalya, Turkey

DOI: 10.1111/jtm.12230
• 1 medical emergency in every 604 flights
• 44,000 in-flight emergencies annually
• Occurs daily
• Likely an underestimate

Original Article

Outcomes of Medical Emergencies on Commercial Airline Flights

Drew C. Peterson, M.D., Christian Martin-Gill, M.D., M.P.H.,
Francis X. Guyette, M.D., M.P.H., Adam Z. Tobias, M.D., M.P.H.,
Catherine E. McCarthy, B.S., Scott T. Harrington, M.D.,
Theodore R. Delbridge, M.D., M.P.H., and Donald M. Yealy, M.D.

ABSTRACT

BACKGROUND
Worldwide, 2.75 billion passengers fly on commercial airlines annually. When in-flight medical emergencies occur, access to care is limited. We describe in-flight medical emergencies and the outcomes of these events.

METHODS
We reviewed records of in-flight medical emergency calls from five domestic and international airlines to a physician-directed medical communications center from January 1, 2008, through October 31, 2010. We characterized the most common medical problems and the type of on-board assistance rendered. We determined the incidence of and factors associated with unscheduled aircraft diversion, transport to a hospital, and hospital admission, and we determined the incidence of death.

RESULTS
There were 11,920 in-flight medical emergencies resulting in calls to the center (1 medical emergency per 604 flights). The most common problems were syncope or presyncope (37.4% of cases), respiratory symptoms (12.1%), and nausea or vomiting (9.5%). Physician passengers provided medical assistance in 48.1% of in-flight medical emergencies, and aircraft diversion occurred in 7.3%. Of 10,914 patients for whom postflight follow-up data were available, 25.8% were transported to a hospital by emergency-medical-service personnel, 8.6% were admitted, and 0.3% died. The most common triggers for admission were possible stroke (odds ratio, 3.36; 95% confidence interval [CI], 1.88 to 6.03), respiratory symptoms (odds ratio, 2.13; 95% CI, 1.48 to 3.06), and cardiac symptoms (odds ratio, 1.95; 95% CI, 1.37 to 2.77).

CONCLUSIONS
Most in-flight medical emergencies were related to syncope, respiratory symptoms, or gastrointestinal symptoms, and a physician was frequently the responding medical volunteer. Few in-flight medical emergencies resulted in diversion of aircraft or death; one fourth of passengers who had an in-flight medical emergency underwent additional evaluation in a hospital. (Funded by the National Institutes of Health.)
Why an Underestimate?

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<tbody>
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<td><strong>REVENUES, $ billion</strong></td>
<td>720</td>
<td>767</td>
<td>721</td>
<td>709</td>
<td>755</td>
<td>812</td>
<td>865</td>
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<tr>
<td>% change</td>
<td>2.1</td>
<td>6.5</td>
<td>-6.1</td>
<td>-1.6</td>
<td>6.5</td>
<td>7.6</td>
<td>6.5</td>
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<tr>
<td>Passenger, $ billion</td>
<td>537</td>
<td>538</td>
<td>509</td>
<td>498</td>
<td>534</td>
<td>561</td>
<td>589</td>
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<td>Cargo, $ billion</td>
<td>92.1</td>
<td>92.9</td>
<td>83.8</td>
<td>80.8</td>
<td>95.9</td>
<td>111.3</td>
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<td>Traffic volumes</td>
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<tr>
<td>Passenger growth, rpk, %</td>
<td>5.7</td>
<td>6.0</td>
<td>7.4</td>
<td>7.4</td>
<td>8.1</td>
<td>7.4</td>
<td>5.0</td>
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<tr>
<td>Sched passenger numbers, millions</td>
<td>3,145</td>
<td>3,328</td>
<td>3,569</td>
<td>3,817</td>
<td>4,095</td>
<td>4,378</td>
<td>4,579</td>
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</table>


Flight Plan

• Scope of the problem
• **Most commonly encountered medical issues**
• Outcomes
• Available resources
• Take Away Points

Aircraft flying above the clouds 52014.
What Emergencies Occur?²

- Other 23.4%
- Syncope/Presyncope 37.4%
- Respiratory 12.1%
- Nausea/Vomiting 9.5%
- Cardiac 7.7%
- Seizures 5.8%
- Abdominal pain 4.1%

<table>
<thead>
<tr>
<th>Category</th>
<th>All Emergencies</th>
<th>Aircraft Diversion</th>
<th>Transport to a Hospital</th>
<th>Hospital Admission</th>
<th>Death</th>
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<tbody>
<tr>
<td>All categories</td>
<td>11,920/11,920 (100)</td>
<td>875/11,920 (7.3)</td>
<td>2804/10,877 (25.8)</td>
<td>901/10,482 (8.6)</td>
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<tr>
<td>Syncope or presyncope</td>
<td>4463/11,920 (37.4)</td>
<td>221/4463 (5.0)</td>
<td>938/4252 (22.1)</td>
<td>267/4123 (6.5)</td>
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<tr>
<td>Respiratory symptoms</td>
<td>1447/11,920 (12.1)</td>
<td>81/1447 (5.6)</td>
<td>311/1371 (22.7)</td>
<td>141/1336 (10.6)</td>
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<tr>
<td><strong>Infectious disease</strong></td>
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<tr>
<td><strong>Agitation/Psychiatric</strong></td>
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<tr>
<td><strong>Allergic reaction</strong></td>
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<tr>
<td><strong>Possible stroke</strong></td>
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<tr>
<td><strong>Trauma</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Diabetic complication</strong></td>
<td></td>
<td></td>
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<td>Respiratory symptoms</td>
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<td>81/1447 (5.6)</td>
<td>311/1371 (22.7)</td>
<td>141/1336 (10.6)</td>
<td>1</td>
</tr>
<tr>
<td>Nausea or vomiting</td>
<td>1137/11,920 (9.5)</td>
<td>56/1137 (4.9)</td>
<td>243/1025 (23.7)</td>
<td>61/994 (6.1)</td>
<td>0</td>
</tr>
<tr>
<td>Cardiac symptoms</td>
<td>920/11,920 (7.7)</td>
<td>169/920 (18.4)</td>
<td>370/813 (45.5)</td>
<td>162/770 (21.0)</td>
<td>0</td>
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<tr>
<td>Seizures</td>
<td>689/11,920 (5.8)</td>
<td>83/689 (12.0)</td>
<td>224/626 (35.8)</td>
<td>75/602 (12.5)</td>
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<tr>
<td>Abdominal pain</td>
<td>488/11,920 (4.1)</td>
<td>50/488 (10.2)</td>
<td>164/412 (39.8)</td>
<td>41/391 (10.5)</td>
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<tr>
<td>Infectious disease</td>
<td>330/11,920 (2.8)</td>
<td>6/330 (1.8)</td>
<td>45/239 (18.8)</td>
<td>8/232 (3.4)</td>
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<tr>
<td>Agitation or psychiatric symptoms</td>
<td>287/11,920 (2.4)</td>
<td>16/287 (5.6)</td>
<td>38/249 (15.3)</td>
<td>17/244 (7.0)</td>
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<tr>
<td>Allergic reaction</td>
<td>265/11,920 (2.2)</td>
<td>12/265 (4.5)</td>
<td>40/233 (17.2)</td>
<td>8/229 (3.5)</td>
<td>0</td>
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<tr>
<td>Possible stroke</td>
<td>238/11,920 (2.0)</td>
<td>39/238 (16.4)</td>
<td>92/214 (43.0)</td>
<td>46/196 (23.5)</td>
<td>0</td>
</tr>
<tr>
<td>Trauma, not otherwise specified</td>
<td>216/11,920 (1.8)</td>
<td>14/216 (6.5)</td>
<td>34/185 (18.4)</td>
<td>5/180 (2.8)</td>
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<tr>
<td>Diabetic complication</td>
<td>193/11,920 (1.6)</td>
<td>15/193 (7.8)</td>
<td>45/181 (24.9)</td>
<td>13/172 (7.6)</td>
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<tr>
<td>Headache</td>
<td>123/11,920 (1.0)</td>
<td>10/123 (8.1)</td>
<td>23/108 (21.3)</td>
<td>4/107 (3.7)</td>
<td>0</td>
</tr>
</tbody>
</table>

**Obstetrical/gynecologic symptoms** 61/11,920 (0.5%)

**Cardiac arrest** 38/11,920 (0.3%)
Who is Responding?

- Physicians 48.1%
- Nurses 20.1%
- EMS providers 4.4%
- Other health care professionals 3.7%
- Flight crew 23.7%


Flight Plan

• Scope of the problem
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• **Outcomes**
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• Take Away Points

Aircraft flying above the clouds 52014.
What Are The Outcomes?

3,402 (31%) resolve in the air

11,920 (77%) occur in flight

2,804 (37%) had EMS transport

901 (31%) admitted to hospital

4 (0.04%) died

14 (0.01%) died

16 (0.6%) died
So Realistically… Should We Be Scared?

- 7% require aircraft diversion
- 31% of cases resolve in the air
- 8.6% of cases require hospital admission
- Mortality rate 0.3%


Flight Plan

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What *People* are Available?

- Flight attendants are trained in first aid, CPR, and AED use
- Ground-based medical consultation
- Other providers on the plane


The Emergency Medical Kit (EMK)

- FAA mandates airlines carry an EMK with specific supplies and medications
- Also requires an AED, oxygen, and a basic first aid kit
- Some airlines have supplemental supplies
A Word About Oxygen

- Aircraft portable oxygen bottles have two settings
  - Low: 2 L/min
  - High: 4 L/min
## FAA Mandated Equipment

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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<tbody>
<tr>
<td>Sphygmomanometer</td>
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<tr>
<td>Stethoscope</td>
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<tr>
<td>Oropharyngeal airway (3 sizes)</td>
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<tr>
<td>Self-inflating manual resuscitation device with 3 masks</td>
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<tr>
<td>CPR masks (3 sizes)</td>
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<tr>
<td>Intravenous administration set (tubing with Y connectors)</td>
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<tr>
<td>Needles and syringes</td>
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<tr>
<td>Alcohol sponges</td>
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<tr>
<td>Adhesive Tape, 1 inch</td>
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<tr>
<td>Tape scissors</td>
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<tr>
<td>Tourniquet (for IV placement)</td>
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<tr>
<td>Protective gloves</td>
<td></td>
</tr>
<tr>
<td>Instructions on kit use</td>
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</tr>
<tr>
<td>FAA Mandated Medications</td>
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<td>--------------------------</td>
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<tr>
<td>Saline solution, 500 cc</td>
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<tr>
<td>Analgesic, non-narcotic, tablets, 325 mg</td>
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<tr>
<td>Antihistamine tablets, 25 mg</td>
<td></td>
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<tr>
<td>Antihistamine injectable, 50 mg</td>
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<tr>
<td>Atropine, 0.5 mg, 5 cc</td>
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<tr>
<td>Aspirin tablets, 325 mg</td>
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<tr>
<td>Bronchodilator, inhaled (metered dose inhaler)</td>
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<tr>
<td>Dextrose, 50%/50cc injectable</td>
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<tr>
<td>Epinephrine 1:1000, 1 cc, injectable</td>
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<tr>
<td>Epinephrine 1:10,000, 2 cc, injectable</td>
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</tr>
<tr>
<td>Lidocaine, 5 cc, 20 mg/ml, injectable</td>
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<tr>
<td>Nitroglycerine tablets, 0.4 mg</td>
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</tbody>
</table>

Instructions on use of drugs in the kit

Allergy

ACS

ACLS
What’s Missing?

- Syncope/Presyncope: 37.4%
- Respiratory: 12.1%
- Nausea/Vomiting: 9.5%
- Cardiac: 7.7%
- Seizures: 5.8%
- Abdominal pain: 4.1%
- Other: 23.4%
Others

- VS: Pulse oximeter, thermometer
- DM: Glucometer, insulin
- Nausea/vomiting: anti-emetics
- Pain: opioid analgesics, Narcan
- Seizure: benzodiazepines, anti-epileptics
- Agitation/psychiatric: benzodiazepines, antipsychotics
- Pediatric supplies

Challenges

• Unfamiliar environment
• Limited diagnostic supplies
• Limited treatment supplies
• Lack of standardization among air carriers
Other Resources: Guidance

Table 3. Suggested guideline for initial assessment of in-flight emergencies

<table>
<thead>
<tr>
<th>Cardiovascular Symptoms</th>
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</table>

- Initial assessment

- Identify if any prior myocardial infarction or other cardiovascular history.

- In some settings, a 12-lead electrocardiogram may be obtained and transmitted for ground review (and/or volunteer review if qualified to read).

- Suspected acute coronary syndrome: Chest pain, dyspnea, arm or jaw pain.

- Suspected arrhythmia: Persistent bradycardia, tachycardia, or irregular heartbeat.

- Suspected dyspepsia: Isolated epigastric burning with no associated symptoms. This is a consideration of exclusion, supported by history of similar symptoms.

Management and expected course

- If suspected acute coronary syndrome ➔ Aspirin, 325 mg orally; nitroglycerin, 0.4 mg sublingually every 5-10 min (if systolic blood pressure is ≥100 mm Hg).

- If any dyspnea or respiratory distress ➔ Give oxygen, unless saturations are known to be near or at normal levels.

- If dyspepsia suspected ➔ Antacids or other analgesics can be given after appropriate risk stratification. Alternative causes should first be considered.

- If persistent or additional symptoms ➔ Contact ground-based medical support for additional recommendations.
Free Download on iOS

Free Download on Android

Fly Away Points

• In flight emergencies occur regularly, though they are typically less severe than feared
• The FAA mandates that airlines carry a limited set of medical supplies
• There are accessible tools that provide guidance on how to respond to in-flight medical emergencies
Thank You

Aircraft flying above the clouds 52014.
References


