

# **IN-FLIGHT MEDICAL EMERGENCIES**

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**Emergency Medicine Residency**

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# INTRODUCTION

Around 9,728 planes carrying 1.2 million passengers in the air at any given time

**In-flight medical emergencies** are estimated to occur in approximately 1 per 604 flights



# PROBLEMS RELATED TO PRESSURIZATION

***Cabins are only pressurized to 8,000 ft***

Drops the partial pressure of oxygen down to 110-120mmHg (sea level=140mmHG)

- Significant secondary to relative hypoxemia (CAD & COPD)
- Gas expansion (occult pneumothorax & bowel gas expansion)





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# Medically Necessary Personal Oxygen

**Carry On Bags:** ! Yes (Special Instructions)

**Checked Bags:** X No

You may bring personal medical oxygen cylinders through the screening checkpoint and into the gate area. However, personal medical oxygen cylinders are not permitted in the aircraft cabin as they are considered hazardous materials by the Federal Aviation Administration.

Please contact your airline for instructions on arranging oxygen service. Airlines are not required to provide oxygen service and many do not.

[For more prohibited items, please go to the 'What Can I Bring?' page.](#)

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 *The final decision rests with the TSA officer on whether an item is allowed through the checkpoint.*



# PROBLEMS RELATED TO PRESSURIZATION

Occluded tubes that cannot equalize pressure

- Endotracheal tube
- Chest tube (never fly a pneumothorax without a chest tube)
- Eustachian tubes





**ARE YOU**



**Daniel Shoskes**  
@dshoskes

... **HELP?**

***Ethically, yes***

US, Canada, and  
to assist unless t

- In some Europe  
Australia, physi

Some doctors w  
boarding

Replying to [@AndreaLMerrill](#) and [@Delta](#)

On a Lufthansa flight I was amazed that they asked doctors to identify themselves at the start of the flight, then had us go through their supplies and procedures, then gave us a First Class goody bag for being willing to help.

8:56 AM · 6/12/22 · [Twitter Web App](#)

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duty  
relationship

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# **FAA REGULATIONS**

**Requires all U.S. commercial airlines weighing 7,500 pounds or more and serviced by at least one flight attendant to carry a defibrillator and an enhanced emergency medical kit**

**-No requirement for helicopters**

**Flight attendants must be certified in CPR, including the use of an AED, every 2 years.**

- **Pilots must also be trained in the use of the AED**



# AED Use in a Passenger During a Long-Haul Flight: Repeated Defibrillation With a Successful Outcome

[Heini Harve](#) <sup>1</sup>, [Olavi Hämäläinen](#), [Jouni Kurola](#), [Tom Silfvast](#)

Affiliations + expand

PMID: 19378914 DOI: [10.3357/asem.2340.2009](#)

## Abstract

**Introduction:** Sudden cardiac arrest is one of the leading causes of death, and early defibrillation of ventricular fibrillation (VF) is the single most important intervention for improving survival. The automated external defibrillator (AED) and the concept of public access defibrillation provide a solution to shorten defibrillation delays. Commercial aircraft create a unique environment for the use of the AED since an emergency medical service system (EMS) response is not available. We review published studies on this subject and describe the case of a passenger who developed VF during an intercontinental flight and was successfully resuscitated despite recurrent episodes of VF.

**Case report:** A 60-yr-old man developed VF during a flight from Tokyo to Helsinki. VF frequently recurred and shocks were delivered 21 times altogether. The aircraft was diverted to the city of Kuopio. When the local EMS crew encountered the patient 3 h after the onset of the cardiac arrest, the rhythm again converted to VF and three further shocks were delivered. The patient recovered, and 3 wk later he was transported to his home country, fully alert.

**Discussion:** There are three large studies reporting placing AEDs on commercial aircraft. No

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# **THE MEDICAL KITS ON FLIGHTS ARE VARIED**

Some flights are limited to bandages while others have defibrillators, meds and intubation equipment.

The size of the plane typically correlates with the size of the medical kit.

A commuter flight may be very limited in resources but an overseas flight will likely have more available



# FAA EMK REQUIREMENT

- **No international regulations requiring the complete kit to be available**

CONTENTS	QUANTITY
Sphygmomanometer	1
Stethoscope	1
Airways, oropharyngeal (3 sizes): 1 pediatric, 1 small adult, 1 large adult or equivalent	3
Self-inflating manual resuscitation device with 3 masks (1 pediatric, 1 small adult, 1 large adult or equivalent)	1: 3 masks
CPR mask (3 sizes), 1 pediatric, 1 small adult, 1 large adult, or equivalent	3
IV Admin Set: Tubing w/ 2 Y connectors	1
Alcohol sponges	2
Adhesive tape, 1-inch standard roll adhesive	1
Tape scissors	1 pair
Tourniquet	1
Saline solution, 500 cc	1
Protective nonpermeable gloves or equivalent <sup>1</sup>	1 pair
Needles (2-18 ga., 2-20 ga., 2-22 ga., or sizes necessary to administer required medications)	6
Syringes (1-5 cc, 2-10 cc, or sizes necessary to administer required medications)	4
Analgesic, non-narcotic, tablets, 325 mg	4
Antihistamine tablets, 25 mg	4
Antihistamine injectable, 50 mg, (single dose ampule or equivalent)	2
Atropine, 0.5 mg, 5 cc (single dose ampule or equivalent)	2
Aspirin tablets, 325 mg	4
Bronchodilator, inhaled (metered dose inhaler or equivalent)	1
Dextrose, 50%/50 cc injectable, (single dose ampule or equivalent)	1
Epinephrine 1:1000, 1 cc, injectable, (single dose ampule or equivalent)	2
Epinephrine 1:10,000, 2 cc, injectable, (single dose ampule or equivalent)	2
Lidocaine, 5 cc, 20 mg/ml, injectable (single dose ampule or equivalent)	2
Nitroglycerine tablets, 0.4 mg	10
Basic instructions for use of the drugs in the kit	1



# EMERGENCY MEDICAL KIT CONTENTS

If there are any questions regarding the use of this kit, please call MedLink® at +1 (602) 239-3627.



## YELLOW — IV Equipment

- Start Kit -**
- 1 Curaplex® IV Start kit w/ tourniquet (non-latex)
  - 1 safety catheter, IV: 18g
  - 1 safety catheter, IV: 20g
  - 2 safety catheter, IV: 22g
  - 2 pr gloves, non-latex
  - 2 safety infusion butterfly 21g
  - 4 pads, alcohol prep
  - 1 pr scissors, trauma
  - 1 tape, 1" roll
  - 1 drape, surgical 18 x 26
  - 1 IV administration tubing w/2 luer lock connectors
- Needle & Syringe Kit**
- 1 safety needle, 18g
  - 2 safety needle, 20g
  - 6 safety needle, 22g
  - 2 syringe, 1cc
  - 2 syringe, 5cc
  - 1 syringe, 10cc
  - 1 sodium chloride intravenous fluid, 0.9% 500 ml
  - 2 pr gloves, non-latex
  - 4 alcohol pads

## ORANGE — Medications

- Hypoglycemia Kit -**
- 1 dextrose injection 50%, 50 ml vial (IV use)
  - 1 syringe, 30cc
  - 1 safety needle, 18g
  - 2 pads, alcohol prep
- Allergy Kit -**
- 4 diphenhydramine, 25mg pills (antihistamine)
  - 2 diphenhydramine injection, 50mg/ml 1ml
  - 2 syringes, 1cc
  - 2 safety needles, 21g x 1 1/2"
  - 2 alcohol pads
- Anaphylaxis Kit -**
- 2 epinephrine injection, 1:1,000 1ml
  - 2 syringes, 1cc
  - 2 safety needles, 21g x 1 1/2"
  - 2 alcohol pads
- Atropine Cardiac Kit -**
- 2 atropine pre-filled syringe 0.1 mg/ml 10ml (IV use)
  - 2 alcohol pads
- Epinephrine Cardiac Kit -**
- 2 epinephrine pre-filled syringe 1:10,000 10ml (cardiac care use only) (IV use)
  - 2 pads, alcohol prep

## ORANGE — Medications - continued

- 2 pk acetaminophen, 325 mg pills (2/pk) - (analgesic)
- 2 pk aspirin, 325 mg pills (2/pk)
- 2 lidocaine single dose vial, 2% 5 ml
- 1 bt nitroglycerin, 0.4 mg pills (25/bt)
- 6 ondansetron, 4mg oral disintegrating (nausea)
- 1 Narcan®, 4mg nasal spray
- 1 bronchodilator, inhaled

## BLUE — Airway

- 6 airways, oropharyngeal (6 sizes)
- 3 CPR/resuscitation masks (pediatric, small adult, large adult)
- 1 resuscitator, adult
- 1 valve, one-way CPR

## BLACK — Diagnostic Equipment

- 1 blood pressure cuff
- 1 stethoscope

## PERIMETER

- 3 seals, green
- 1 sharps container
- 1 speedicath intermittent urinary catheter 14fr
- 2 lubricant, gel 5gm
- 1 usage form
- 1 basic instructions for use of the drugs in the kit

**\*\* ALL KIT CONTENTS ARE LATEX FREE \*\***

**KIT DOES NOT CONTAIN  
EPINEPHRINE 1:10000 PFS  
OR DE...**

Weight = 10 pounds (4.54 kg)

**MDS 11-08 R18 / REV: 06-07-2019**

MedAire Item Numbers: 500025 / 501212  
This document is UNCONTROLLED when printed. Verify currency of document against QMS.  
Length = 14 inches (35.5)





**Dr. Andrea Merrill**

@AndreaLMerrill



Dear [@Delta](#), I just assisted in a medical emergency in the air. Your medical kits need a glucometer, epi pen, and automatic blood pressure cuffs- it's impossible to hear with a disposable stethoscope in the air. Please improve this for passenger safety!

7:16 AM · 6/12/22 · [Twitter for iPhone](#)

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## Exemption Details

### Exemption Info

**Exemption Number:** 10690E  
[Document](#)

### Status

**Disposition:** Granted  
**Effective Date:** 1/29/2016

### Petitioner

**Petitioner:** Robert Ireland  
**Company:** Airlines for Ame  
**Address:** Washington, DC

### Petition Details

**Regulations:** Part 121.803(c)(3)

## Appendix A to Part 121—First Aid Kits and Emergency Medical Kits

### EMERGENCY MEDICAL KITS

Appendix A to part 121 specifically requires, as of April 12, 2004, at least one approved emergency medical kit that must contain certain appropriately maintained medical equipment and drugs in specified quantities, which includes:

- Atropine, 0.5 mg, 5 cc (single dose ampule or equivalent) Quantity-2
- Dextrose, 50%/50 cc injectable, (single dose ampule or equivalent) Quantity-1
- Epinephrine 1:1000, 1 cc, injectable, (single dose ampule or equivalent) Quantity-2
- Epinephrine 1:10,000, 2 cc, injectable, (single dose ampule or equivalent) Quantity-2
- Lidocaine, 5 cc, 20 mg/ml, injectable (single dose ampule or equivalent) Quantity-2

### The petitioners require relief from the following requirements:

Section 121.803(c)(3) prescribes, in pertinent part, that airplanes with seating capacity of more than nine passengers carry an Emergency Medical Kit (EMK) with contents as specified in Appendix A to part 121, which includes Atropine, Dextrose, Epinephrine and Lidocaine.

### The petitioners support their request with the following information:

The petitioners noted that, since 1986, large passenger-carrying aircraft have been required to carry an EMK to assist crewmembers or other volunteers in responding to an in-flight medical emergency. The scope of that requirement was expanded in 1995 to cover 20-30 seat

computer aircraft (60 FR 65821). In 2001, the FAA issued new regulations implementing the

**Equipment:**



# WHAT IS YOUR ROLE?

*Think of yourself as a helpful bystander*


- Doctors typically determine disposition and call the shots, but you need to adopt a different mindset when responding on a plane

**Every airline has online medical control with a physician to handle medical calls**


- This is due to the complicated finances and logistics involved in diverting a plane



## Leadership & Management



AU Health Trained 1,150 Providers on Telehealth in 2 months



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# Why airlines hope physicians aren't on board during medical emergencies

Leo Vartorella - Tuesday, May 29th, 2018 [Print](#) | [Email](#)



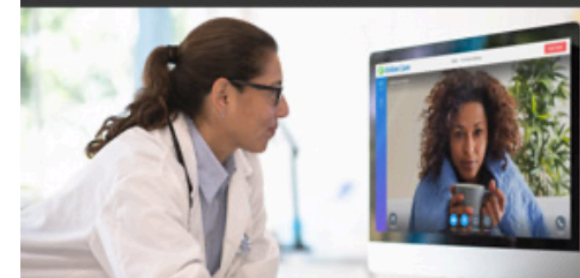
Physicians and other clinicians are called upon to help passengers during in-flight medical emergencies, but airlines often prefer the guidance of on-the-ground consultants in order to avoid diversions, according to [Bloomberg](#).

A medical emergency occurs once every 604 flights, with 7.3 percent leading to diversions that ground the plane, according to a study [The New England Journal of Medicine](#). While it is standard protocol to first find out if a medical professional is on board before calling a consultant, a diversion can cost as much as \$200,000, and airlines look to avoid these diversions whenever possible.

Passenger clinicians are more likely to recommend diversions, so airlines rely on contracted consultants on the ground, who are less likely to recommend such action, to guide pilots. Though the final decision rests with pilots and dispatchers, they rely heavily on the advice of consultants.

"It's fairly expensive to divert an aircraft, and so a captain has to take into account a whole host of issues," Jose Nable, MD, an assistant professor at Washington, D.C.-based MedStar Georgetown University Hospital, told [Bloomberg](#).

## Telehealth's Role in One Hospital's COVID-19 Response



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# **WHAT IS YOUR ROLE IF YOU HAVE A CRITICALLY ILL PATIENT?**

International carriers may not be able to land in other countries

- If you demand a pilot diverts the plane, they will still talk to their online medical control
- The best strategy is to give your best medical opinion, “I think this patient may die”

**Airlines expect to have deaths in-flight and often will not divert even if death occurs**

- Insurers estimate the incidence of 1 death on a trans-pacific flight every 1-5 years





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The MedAire assistance team is available 24/7 to provide medical and travel security support. The medical team have a passion for emergency medicine and assisting people in remote environments.

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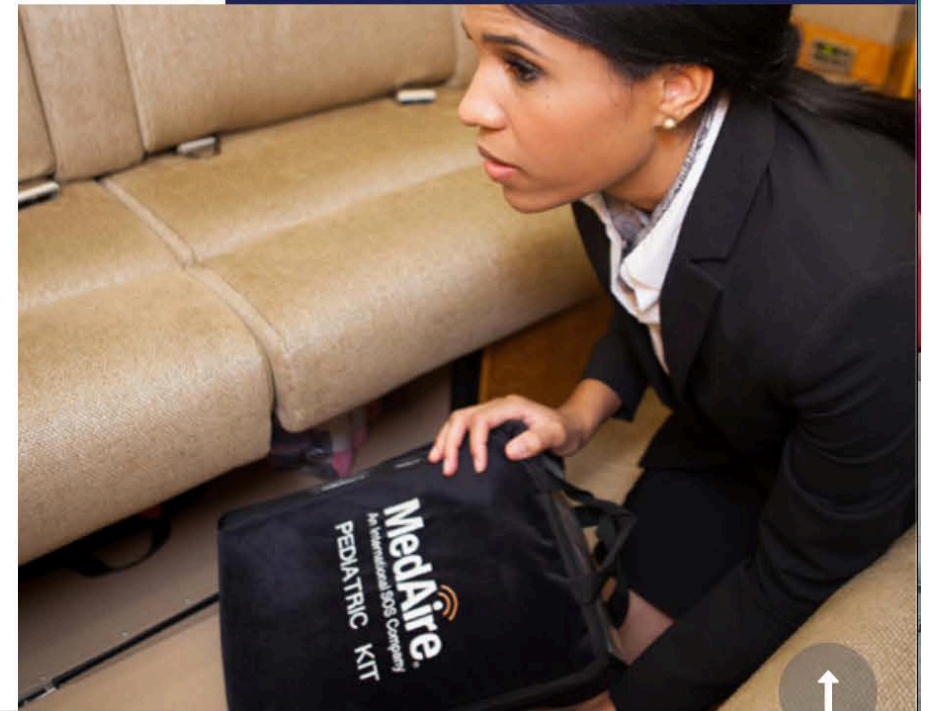
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MedAire medical kits are based on three decades of providing medical assistance to first responders in the air, on land, and at sea. They are so highly regarded, they are standard equipment on the world's leading aircraft and yachts.

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# **PETERSON DC, ET AL. *OUTCOMES OF MEDICAL EMERGENCIES ON COMMERCIAL AIRLINE FLIGHTS.* N ENGL J MED. 2013 MAY**

11,920 in-flight emergencies, found only 7% resulted in diversions

- Only about 25% of the patients in diversions went to the ER: 8% were admitted and 0.3% died
- There was approximately 1 medical emergency per every 604 flights
- The most common problems were syncope or pre-syncope (37% of cases), respiratory symptoms (12%), and nausea/vomiting (about 10%)
- Cardiac arrest was documented in only 24 of 134 patients in whom an AED was applied, and shocks were delivered to only 5 patients





**Kashif N Chaudhry** ✓

@KashifMD

Cardiac Arrest 35,000 feet in the air.

Earlier today, on our flight to Phoenix, a young lady in her 20s passed out. Screams of panic by onlookers was quickly followed by announcement of a medical emergency. 1/

10:36 PM · Mar 4, 2022 · Twitter for iPhone

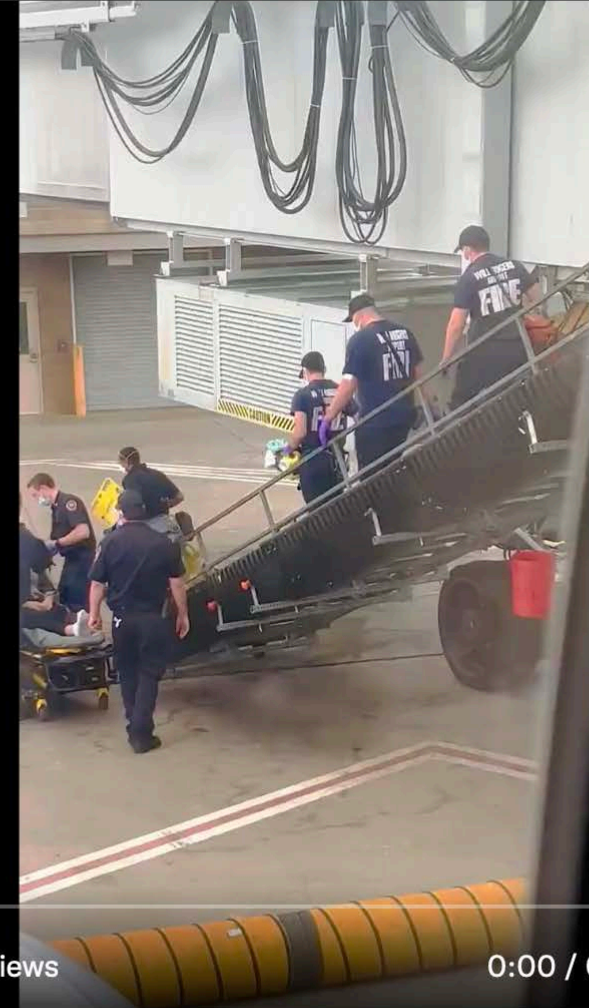
4,912 Retweets 678 Quote Tweets 21.6K Likes



**Kashif N Chaudhry** ✓ @KashifMD · Mar 4

... and with support, we got her back to her seat.

Based on our shared assessment, plane was diverted to nearest airport. By the time plane landed, she was far more oriented. A preliminary EKG by EMS crew was unremarkable. 5/



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🗨️ 29 🔄 264 ❤️ 4,646 📤

# DO YOU HAVE ANY LEGAL PROTECTION?

## **Aviation Medical Assistance Act (1998):**

Offers broad medico-legal protection to medically qualified individuals, such as physicians, physician assistants, nurse practitioners, and paramedics.

- *This is broader protection than the Good Samaritan law*

The law does indicate that accepting a gift does not compromise your status as a Good Samaritan.

You shouldn't submit a bill to the patient or an airline



# AIRLINE GIFTS

- Upgrade to 1<sup>st</sup> class
- Free alcohol
- Free miles



# THERE IS NO STANDARD OF CARE

*Expected to do the best you can and to avoid gross negligence and obvious misconduct*

Anecdotally, there have been lawsuits filed but the physician hasn't lost

- There is limited information regarding lawsuits and their outcomes
- It appears to be exceedingly rare and to lose would be even rarer





# **AVIATION MEDICAL ASSISTANCE ACT (1998)**

Specifically states that the flight crew is supposed to ask for your help

They also may ask to verify your credentials (Depends on the airline)

- Some people carry a copy of their medical license in their wallet

Only covers airlines that are based in the United States

For international flights, you are bound by the laws of the airline's country of registry



JAMA | Review

# In-Flight Medical Emergencies A Review

Christian Martin-Gill, MD, MPH; Thomas J. Doyle, MD, MPH; Donald M. Yealy, MD

**IMPORTANCE** In-flight medical emergencies (IMEs) are common and occur in a complex environment with limited medical resources. Health care personnel are often asked to assist affected passengers and the flight team, and many have limited experience in this environment.

**OBSERVATIONS** In-flight medical emergencies are estimated to occur in approximately 1 per 604 flights, or 24 to 130 IMEs per 1 million passengers. These events happen in a unique environment, with airplane cabin pressurization equivalent to an altitude of 5000 to 8000 ft during flight, exposing patients to a low partial pressure of oxygen and low humidity. Minimum requirements for emergency medical kit equipment in the United States include an automated external defibrillator; equipment to obtain a basic assessment, hemorrhage control, and initiation of an intravenous line; and medications to treat basic conditions. Other countries have different minimum medical kit standards, and individual airlines have expanded the contents of their medical kit. The most common IMEs involve syncope or near-syncope (32.7%) and gastrointestinal (14.8%), respiratory (10.1%), and cardiovascular (7.0%) symptoms. Diversion of the aircraft from landing at the scheduled destination to a different airport because of a medical emergency occurs in an estimated 4.4% (95% CI, 4.3%-4.6%) of IMEs. Protections for medical volunteers who respond to IMEs in the United States include a Good Samaritan provision of the Aviation Medical Assistance Act and

+ Author Audio Interview

+ Supplemental content

+ CME Quiz at  
[jamanetwork.com/learning](http://jamanetwork.com/learning)





# SYNCOPE / NEAR-SYNCOPE

30% of all in-flight emergencies

## Initial assessment-suspect

- Vasovagal:** Pale, diaphoretic, improves with simple measures in 15-30 min.
- Cardiac cause (eg, myocardial infarction):** Chest pain, dyspnea, arm or jaw pain, persistent bradycardia.
- Pulmonary:** Dyspnea, pleuritic chest pain.
- Stroke:** Slurred speech, facial droop, or arm weakness.
- Hypoglycemia:** Diaphoretic, cool skin; assess with glucometer if available.

## Management and expected course

- If unconscious** ▶ Lie flat, elevate legs, apply oxygen. If no pulse or signs of life, follow cardiac arrest card.
- If transient syncope** ▶ Supine position, elevate legs. Oral fluids with head raised if nausea absent. If improves in 15-30 min, slowly sit up and return to seat if tolerated.
- If hypoglycemia** ▶ Oral glucose or 25 g of dextrose 50% intravenously.
- If other conditions suspected** ▶ Refer to relevant card.
- If no improvement or not progressing as expected** ▶ Contact ground-based medical support for additional recommendations.





# GASTROINTESTINAL ILLNESS

15% of all in-flight emergencies

## Initial assessment

- Identify extent and timing of symptoms, including nausea, vomiting, diarrhea, bleeding, and specifics of any abdominal pain (location, quality, and severity).

## Management and expected course

- If nausea/emesis** ▶ Use an oral antiemetic if available; if not tolerated, consider a parenteral antiemetic.
  - Provide oral hydration if tolerated.
  - Use sugar-containing liquids if symptoms of hypoglycemia.
  - If oral intake not tolerated, consider intravenous fluids.
- If dyspepsia** ▶ Use an antacid if available in the emergency medical kit.
- If diarrhea** ▶ Use an antidiarrheal if available in the emergency medical kit.
  - If patient has fever and persistent diarrhea (>14 d), contact ground-based medical support, as local public health authorities may need to be contacted at the destination.
- If severe abdominal pain, tenderness on examination, rigid abdomen, or blood in bodily fluid** ▶ Contact ground-based medical support for additional recommendations.







# RESPIRATORY DISTRESS

10% of all in-flight emergencies

## Initial assessment

- Identify history of respiratory disease, scuba diving, extremity swelling, or infectious symptoms.
- If available, check pulse oximetry.

## Management and expected course

- If ongoing dyspnea or known oxygen saturation is <95% ▶**  
Administer oxygen.
  - If passenger's portable oxygen concentrator fails or is not used for a patient with preexisting lung disease, consider trial of oxygen therapy.
  - If passenger uses  $\geq 4$  L/min on the ground, the onboard oxygen supply may not be enough to reverse hypoxia.
  - Monitor flow rate of oxygen administered; canister consumption is variable and aircraft may not have sufficient oxygen for continuous use for the duration of the flight.
- If bronchospasm ▶** Administer albuterol, 2.5 mg inhaled.
- If allergic reaction ▶** Refer to allergic reaction card.
- If passenger does not improve ▶** Contact ground-based medical support for additional recommendations.





# CARDIOVASCULAR SYMPTOMS

7% of all in-flight emergencies

## 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  $\geq 100$  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.





# STROKELIKE SYMPTOMS

— Up to 5% of all in-flight emergencies —

## ► Initial assessment

- A focused history should include the time of symptom onset, specific motor and sensory components, and any other associated symptoms including headache or sensorium changes.
- Screening for stroke:** Speech disturbance, facial droop, or arm weakness.

## ► Management and expected course

- Administer oxygen, unless saturations are known to be near or at normal levels.
- If patient has ongoing neurological deficits suggestive of a stroke ►**  
Contact ground-based medical support.
  - Recommendation may include diversion, which may not be to the closest airport if stroke care is not present at that airport.
  - Ground-based team should have information on capabilities for medical care near most major airports.





# SEIZURE

— Up to 5% of all in-flight emergencies —

## ▶ Initial assessment

- Identify the symptoms the passenger exhibited during the event:** Including onset, duration of movement activity, quality of movements (eg, tonic-clonic), and loss of bowel or bladder function.

## ▶ Management and expected course

- If unresponsive** ▶ Lay passenger on floor on side, monitor airway, and assess vital signs with ongoing neurological examination as above.
- If ongoing seizing** ▶ Administer parenteral benzodiazepines if available in the emergency medical kit (not usually available on US commercial airlines).
- If alert following a prolonged or recurrent seizure** ▶ Ground-based medical support may recommend an added dose of the patient's own antiepileptic medication (if history of seizures and available) or an oral benzodiazepine (if available in the emergency medical kit).
- If seizure resolves and patient regains normal mental status** ▶ Diversion is not commonly necessary.







# TRAUMA

5% of all in-flight emergencies

## Initial assessment

- Assess all injuries for any open wounds, tenderness, deformity, or active bleeding.
- Assess patients with injury to the head, neck, or back for any neurological symptoms.

## Management and expected course

- Injuries from falling luggage** ▶ Typically minor and may be assessed further at the destination.
- Active bleeding** ▶ Control bleeding with direct pressure using a gloved hand.
- Ongoing heavy extremity bleeding** ▶ Consider applying a tourniquet.
- Suspected long bone or joint injuries** ▶ Splinting material is not commonly found in the emergency medical kit, but may be improvised from available equipment (eg, a U-shaped half-rolled magazine secured with tape will make a good forearm or wrist splint).





# ALLERGIC REACTION

2% of all in-flight emergencies

## Initial assessment

- Identify any known or likely allergen exposure; duration and severity of symptoms; and any airway swelling, respiratory involvement, or signs of systemic reaction such as generalized hives.
- Suspected local allergic reaction:** Localized pruritic rash or isolated hives.
- Suspected anaphylaxis:** Airway swelling, respiratory distress, generalized hives, hypotension, nausea/vomiting.

## Management and expected course

- If local allergic reaction** ▶ Diphenhydramine, 25-50 mg in adults or 1 mg/kg in children orally.
  - If unable to tolerate oral ingestion, diphenhydramine intravenously/intramuscularly at above dose.
  - Try a different histamine blocker if available in the emergency medical kit.
- If anaphylaxis** ▶ Epinephrine, 1 mg/mL (0.3 mL in adults, or 0.15 mL in children intramuscularly), diphenhydramine, and steroids if available in the emergency medical kit. Epinephrine may be available as an autoinjector or in an ampoule to be drawn up via syringe.
- If there is no improvement** ▶ Contact ground-based medical support for additional recommendations.





# PSYCHIATRIC SYMPTOMS

Up to 3% of all in-flight emergencies

## Initial assessment

- Aim to create a rapport with the passenger to deescalate the situation.
- Elicit information and consider the passenger's use of mood-altering substances.
- Identify if patient takes specific psychiatric medications, dosing, last dose taken, and if available on aircraft.

## Management and expected course

- If verbal deescalation ineffective** ▶ Consider a benzodiazepine if available from an extended emergency medical kit.
  - Benzodiazepines are not commonly available in the emergency medical kit and are infrequently necessary even when available.
- If combative** ▶ Refer to flight crew for individual airline security protocols, which take precedence over attempts at medical management.
  - Airline security protocols vary by airline and may include restraining the passenger or diverting the aircraft for the safety of other passengers and crew.





# OBSTETRIC EMERGENCIES

1% of all in-flight emergencies

## Initial assessment

- Identify onset and detailed description of symptoms, along with information about the pregnancy (eg, parity, gestational age, and any preceding complications).
- Vaginal bleeding:** Assess duration and severity (ie, equivalent of pads per h).
- Labor suspected:** Regular contraction, gush of vaginal fluid.

## Management and expected course

- If vaginal bleeding <1 pad per h** ▶ Expectant management is common.
- If preterm labor in third trimester** ▶ Place the passenger on left side and consider fluid intravenously if any concerns exist for blood loss or distress.
- Active labor, ongoing/severe vaginal bleeding, or increasing/severe abdominal pain** ▶ Contact ground-based medical support for additional recommendations.







# SUBSTANCE ABUSE AND WITHDRAWAL

Up to 3% of all in-flight emergencies

## Initial assessment

- Identify type, amount, and timing of substances used.
- Identify symptoms and mental status, along with vital signs.
- Suspected opioid ingestion:** Altered mentation, constricted pupils, respiratory depression.
- Suspected alcohol ingestion:** Altered mentation, slurred speech, behavior changes.
- Suspected stimulant ingestion:** Altered mentation, tachycardia, dilated pupils, agitation.

## Management and expected course

- If normal vital signs and no respiratory compromise** ▶ Observation only.
- If suspected opioid ingestion with respiratory depression** ▶ Naloxone, 0.4-0.8 mg intravenously or 2 mg intramuscularly/intranasally.
- If suspected alcohol overdose** ▶ Observe and provide antiemetic therapy.
- If suspected stimulant ingestion** ▶ Observe and hydrate (for tachycardia). Consider benzodiazepine if available from the emergency medical kit.
- If ongoing respiratory distress or combativeness** ▶ Contact ground-based medical support for additional recommendations. Refer to airline crew for individual airline security protocols.





# CARDIAC ARREST

0.2% of all in-flight emergencies

## Initial assessment

- Check breathing and pulse; limit pulse checks to <10 seconds.

## Management and expected course

- If no pulse or signs of life ▶**
  - Start chest compression-only cardiopulmonary resuscitation, with addition of bag-valve-mask ventilation (30 compressions to 2 ventilations) when the emergency medical kit is available and someone skilled is present.
  - Obtain and apply automated external defibrillator as soon as possible and follow instructions for defibrillation.
  - If no shock is advised, or AFTER a shock is delivered, resume cardiopulmonary resuscitation if there is no pulse.
  - If no response to cardiopulmonary resuscitation and automated external defibrillator, initiate an intravenous line. Administer epinephrine (0.1 mg/mL) 1 mg intravenously, along with consideration of causal reversible conditions such as hypovolemia and tension pneumothorax.
- Instruct flight crew to notify the ground team and pilot if not already done. If no shock is delivered, the decision to divert will be influenced by how long ongoing cardiopulmonary resuscitation exists without return of circulation.



# IN-FLIGHT EMERGENCY PEARLS

- 1. Stay Calm!**
- 2. Utilize the ground medical team!**
- 3. Legal repercussions are very unlikely.**
- 4. DON'T treat patients if YOU'VE BEEN DRINKING!**
- 5. Be prepared to improvise (e.g. ask another passenger for a glucometer or epi-pen)**



# REFERENCES

**EMRAP:** Lin Sessions In flight emergencies May 2015

<https://www.acepnow.com/article/prepared-flight-medical-emergencies/2/>

<https://thecurbsiders.com/medical-education/sle19-respond-flight-emergencies>

- Pubmed





# QUESTIONS?

- Thank you!

