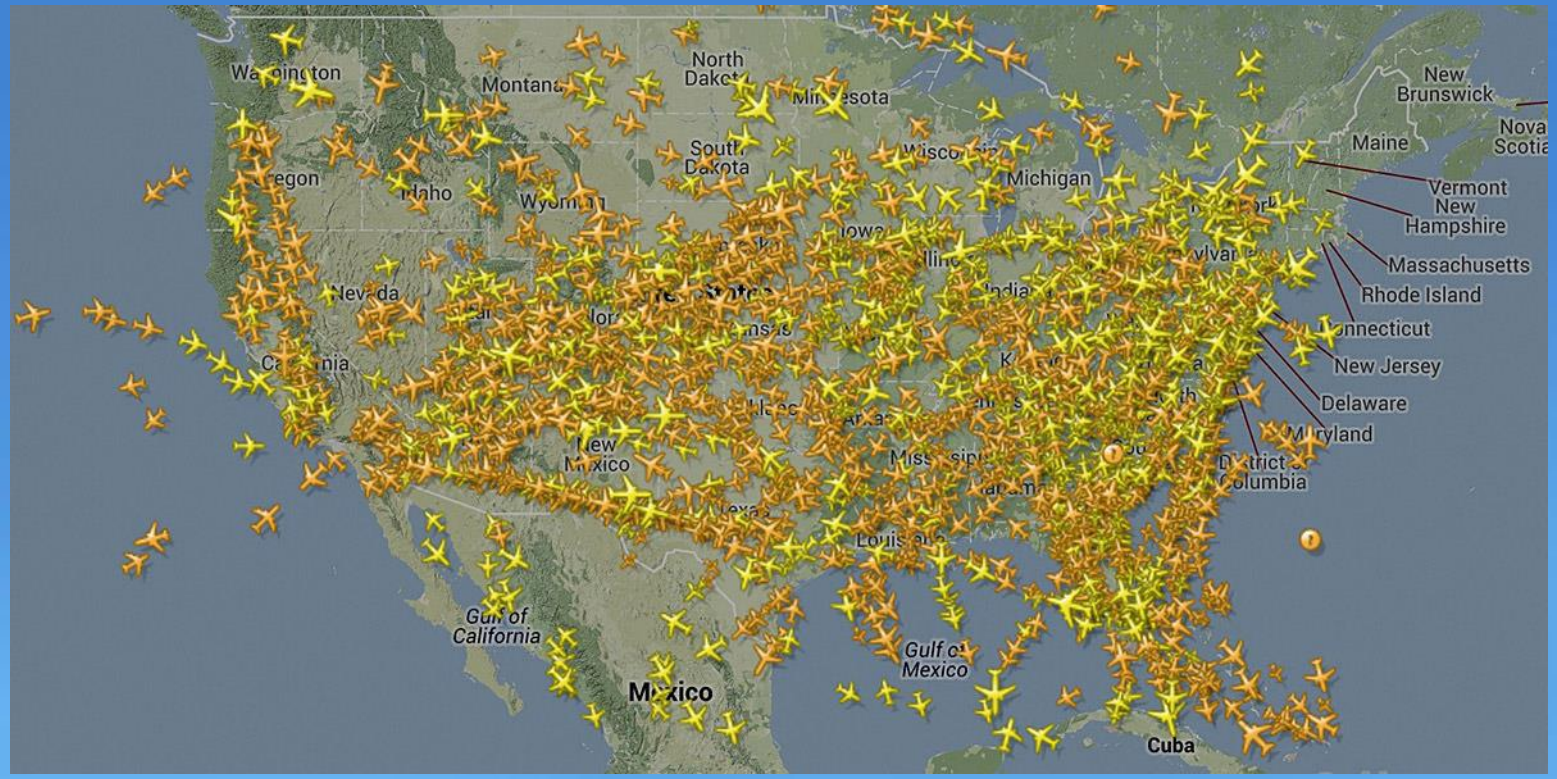
Preparing for an In-Flight Medical Emergency

Presented By: Katie Freeman

Aircraft Interiors Mechanical Engineer

Cabin Safety Research Workshop

City in the Sky



- 2,587,000 Fly In and Out of US airports daily[1]
- 1.27 million in airspace at one time on average[2]
- Chicago Population: 2.705 Million[3]
- Dallas Population: 1.317 Million[3]

Commercial Aircraft Medical and Emergency Equipment

First Aid Kit – 14 CFR 121.803(C)(1)

Required Contents	Required Qty
Adhesive bandage compresses, 1-inch	16
Antiseptic swabs	20
Ammonia inhalants	10
Bandage compresses, 4-inch	8
Triangular bandage compresses, 40-inch	5
Arm splint, noninflatable	1
Leg splint, noninflatable	1
Roller bandage, 4-inch	4
Adhesive tape, 1-inch standard roll	2
Bandage scissors	1

No. Passengers	No. of Req. First Aid Kits
0-50	1
51-150	2
151-250	3
250+	4

Enhanced Medical Kit – 14 CFR 121.803(C)(3)

Required 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
Tourniquet	1
Saline solution, 500 cc	1
Protective nonpermeable gloves or equivalent	1
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 tables, 25 mg	4
Antihistamine injectable, 50 mg, (single dose ampule or equivalent)	2
Atropine, 0.5 mg, 5 cc (single does ampule or equivalent)	2

Required Contents Continued	Qty
Aspirin tablets, 325 mg	4
Bronchodilator, inhaled (metered does 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
Nitroglycerin tablets, 0.4 mg	10
Basic instructions for use of the drugs in the kit	1

Automatic External Defibrillator – 14 CFR 121.803(C)(4)

- At least one approved automated external defibrillator, legally marketed in the United States in accordance with FDA requirements, that must:
- 1. Be stored in the passenger cabin.
- 2. After April 30, 2005:
- (a) Have a power source that meets FAA Technical Standard Order requirements for power sources for electronic devices used in aviation as approved by the Administrator; or
- (b) Have a power source that was manufactured before July 30, 2004, and been found by the FAA to be equivalent to a power source that meets the Technical Standard Order requirements of paragraph (a) of this section.
- 3. Be maintained in accordance with the manufacturer's specifications.[8]

Oxygen – 14 CFR 121.333(e)(3) and 25.1443(d)

- Primary purpose for Flight Attendant use during a decompression event
- First Aid Oxygen for 2% of the passengers after a decompression event also required
- Mass flow rate of 4 L/min[7]

Universal Precautions Kit

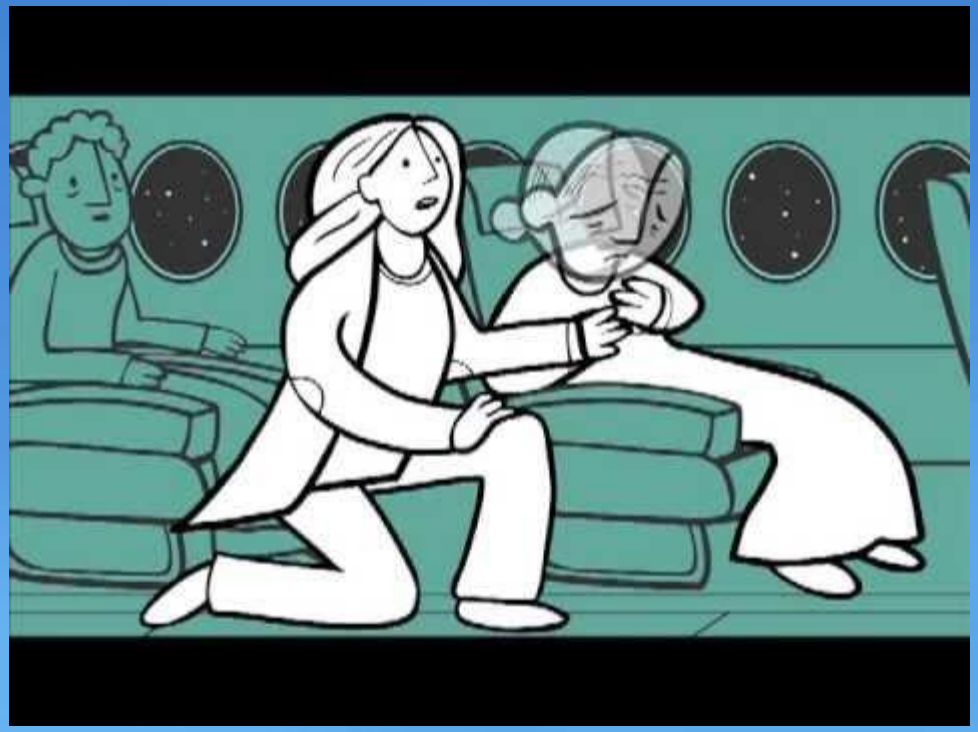
Typically contains items such as:

- Gloves
- Gown
- Mask
- Spill clean up absorbent powder
- Surface disinfectant wipe
- Hand towelette
- Biohazard Bag

Additional Airline Kits

- Additional kits that are not required by the FAA
- May include commonly used items such as bandages, thermometer strips, stethoscope, and blood pressure cuffs
- Primarily to support minor medical emergencies before the use of the advanced medical kit is required
- Kits with medical headsets to talk with ground medical personal and the pilot
- Additives to the emergency kits such as anti nausea medication, thermometer, urinary catheter, etc.

Managing In-Flight Medical Events



Flight Attendant Training – 14 CFR 121.805

Training Includes:

- Instruction in emergency medical event procedures, including coordination among crewmembers.
- Instruction in the location, function, and intended operation of emergency medical equipment.
- Instruction to familiarize crewmembers with the content of the emergency medical kit.
- Instruction, to include performance drills, in the proper use of automated external defibrillators.
- Instruction, to include performance drills, in cardiopulmonary resuscitation.
- Recurrent training, to include performance drills, in the proper use of an automated external defibrillators and in cardiopulmonary resuscitation at least once every 24 months.
- The crewmember instruction, performance drills, and recurrent training required under this section are not required to be equivalent to the expert level of proficiency attained by professional emergency medical personnel.

https://www.youtube.com/watch?v=toP4a3gWzTA

Medical Emergencies on Commercial Airline Flights New England Journal of Medicine

Most Common Emergencies[4]:

- Fainting/lightheaded (37.4%)
- Respiratory Symptoms (12.1%)
- Nausea/vomiting (9.5%)

Most Common Treatments[4]:

- Oxygen
- Aspirin
- Saline

Less Common Emergencies[4]:

- Obstetrical (0.5%)
- Cardiac Arrest (0.3%)

Medical Volunteers Preparation Checklist from Aerospace Medical Association

- Before flight consider the possibility you may be asked to help
- Decide if you are in proper condition to respond (e.g. alcohol consumption etc.)
- Identify yourself and offer proof of credentials if you have them
- If situation is serious, ask if they have medical ground support to get them involved early
- Request the emergency medical kit and AED if needed
- Request that at least one cabin crew member remain available to answer your questions and to communicate with the pilot
- If necessary, ask for an interpreter
- If possible and appropriate, treat the traveler while seated
- If the passenger needs to be horizontal, request that he be transported to where the intervention will interfere the least with mobility of other cabin crew and the passengers
- If resuscitation is required and you are presented a DNR order, decide if that is acceptable to you, note that the cabin crew may continue resuscitation on their own or ask for another medical professional
- Document your findings and treatment, preferably on the airline form if one is available. Keep your own personal copy.
- Do not attempt to practice beyond your level of expertise, but remember that whatever your level of expertise is, it is better than any non-health professional[5]

Good Samaritan Law
Aviation Medical Assistance Act of 1998

Section 5(b)

Liability of Individuals.--An individual shall not be liable for damages in any action brought in a Federal or State court arising out of the acts or omissions of the individual in providing or attempting to provide assistance in the case of an in-flight medical emergency unless the individual, while rendering such assistance, is guilty of gross negligence or willful misconduct.[6]

Airline Protocol for Maintaining Aircraft Emergency Equipment

Inspection of Emergency Equipment

Before every flight:

- Flight Attendants verify location and presence of emergency equipment
- Flight Attendants verify AED status light is blinking green

Periodically:

- Scheduled maintenance inspections for expiration and condition

Removal from aircraft:

- Expired or used equipment sent to FAA certified repair stations who replenish kits to certain specifications built by the airline
- Every replacement is documented in the aircraft log book

Engineering Responsibilities

- Verify all equipment meet or exceed FAA requirements
- Write all work instructions for inspection, repair, or replacement
- Create drawings of equipment
- Create component maintenance manuals
- Approve any allowable deviations from normal operations
- Work with manufacturers to source new equipment or make changes where necessary
- Work with In-Flight, Occupational Health, and Maintenance to evaluate any new change requests

RFID Tags

- Allows maintenance to quickly assess presence and expirations of emergency equipment
- Allows airlines to track specific emergency equipment expirations on every aircraft
- Allows airlines to utilize emergency equipment right up until the expiration

Specific Challenges for Aircraft

- Aircraft Space Availability
- Extreme Environment (vibrations, temperature, pressure, etc.)
- International and Local Laws (hazardous material and narcotics)
- Regulations
- Off Aircraft Storage Capability
- Liability
- Costs


Questions?

Credits

Information

1. https://www.faa.gov/air_traffic/by_the_numbers/
2. http://www.travelandleisure.com/airlines-airports/number-of-planes-in-air
3. https://en.wikipedia.org/wiki/List_of_United_States_cities_by_population
4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3740959/
5. https://www.asma.org/publications/medical-publications-for-airline-travel/managing-in-flight-medical-events
6. https://www.congress.gov/congressional-report/105th-congress/house-report/456/1
7. https://www.ecfr.gov/cgi-bin/text-idx?SID=ca6c9218d3eef651e8ad69e121ab1f49&mc=true&tpl=/ecfrbrowse/Title14/14cfr121_main_02.tpl
8. https://www.ecfr.gov/cgi-bin/text-idx?SID=ca6c9218d3eef651e8ad69e121ab1f49&mc=true&node=ap14.3.121.0000_0nbspnbspnbsp.a&rgn=div9

Credits

Videos

1. https://www.youtube.com/watch?v=toP4a3gWzTA

Graphics

1. https://flightaware.com/live/
2. https://certifiedsafetymfg.com/product/24m-faa-federal-aviation-metal/
3. http://www.medaire.com/products-services/bga-products-services/medical-kits-and-equipment-for-aviation/aircraft-first-aid-kit-(afak)
4. https://www.heartsmart.com/defibtech-lifeline-view-aed-defibrillator-p/dcf-a2310.htm?gclid=Cj0KCQjwhoLWBRD9ARIsADIRaxSSUAn1qAdao6271QVytq60utdK-4cYxXrtbXEb6ek3BnmulFda80EaAvXOEALw_wcB
5. https://www.allaero.com/aircraft-parts/176965smb3
6. https://www.conney.com/product/safetec-universal-precautions-kit-polybagged-kit
7. https://www.youtube.com/watch?v=ZDSm8iZMT9k
8. https://www.aliem.com/2014/01/doctor-on-board-5-tips-dealing-in-flight-emergencies/
9. https://www.fricknet.com/Products/SmartMark_RFID/Aircraft_Emergency_Equipment_RFID_Tag.html