

IS THERE A DOCTOR ONBOARD?

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Disclaimer

- Senior Medical Advisor-Passenger Health
 - *Air Canada*
- Medical Consultant
 - *Air Transat*
- Director “*Onboard Medical Emergencies*” course
 - McGill University
- Speaker
 - Pfizer



Objectives

- To present the epidemiology of in-flight medical emergencies
- To understand human physiology at altitude
(in an airplane cabin)
- To become familiar with the resources available onboard for dealing with an in-flight emergency
- To look at the legal aspect of helping onboard

Epidemiology

- **2018: 3.3 billion passengers**
 - **Canada 95 million**
 - USA: 769 million
- Emergencies 1 in 10 000 to 40 000 passengers
 - 350 / day
- 1:150 000 requires professional medical help
 - 80 / day

Epidemiology (MedAire/ 2018)

– Neurological	40%
– Gastrointestinal	15%
– Respiratory	10%
– Cardiac	9%
– Psychiatry	3%
– Allergy	3%
– Orthopedic/MSK	2%
– ENT	2%
– Trauma	2%
– Burn	1%
– Other: ObGyn, Uro, ID, dental	15%

Unscheduled Landings

- Diversion
 - 1 : 10 000 flights
 - 4 - 11% of in-flight emergencies
- Usually in discussion with “Radio doctor”
- In-flight : minimum 40 min
- Taxiing: average of 10-15 min
- Costs: ~\$100,000-200,000
 - dumping fuel, landing fees, connecting passengers

Online Ground Support

- 75 airlines with **MEDAIRE** “*Medlink*”
 - **Air Transat, Westjet**, Emirates, British Airways, United, Virgin...
 - **17000 calls last year**
- 7 airlines with **STATMD**
 - **Air Canada**, Delta, Southwest, American Airlines
- KLM, Korean Air, Air France: *SAMU*
- 24 hrs/day via satellite

Inflight Medical Emergencies

- *Personal factors*

- Anxiety
- Medication
- EtOH
- Pre-existing illness

- *Demographic issues*

- Older passengers
- Decreased mobility
- Sicker passenger

- *Aviation factors*

- Cabin pressure
- Turbulence
- Dry air
- Longer flight
- Hypoxia

- *Airport factors*

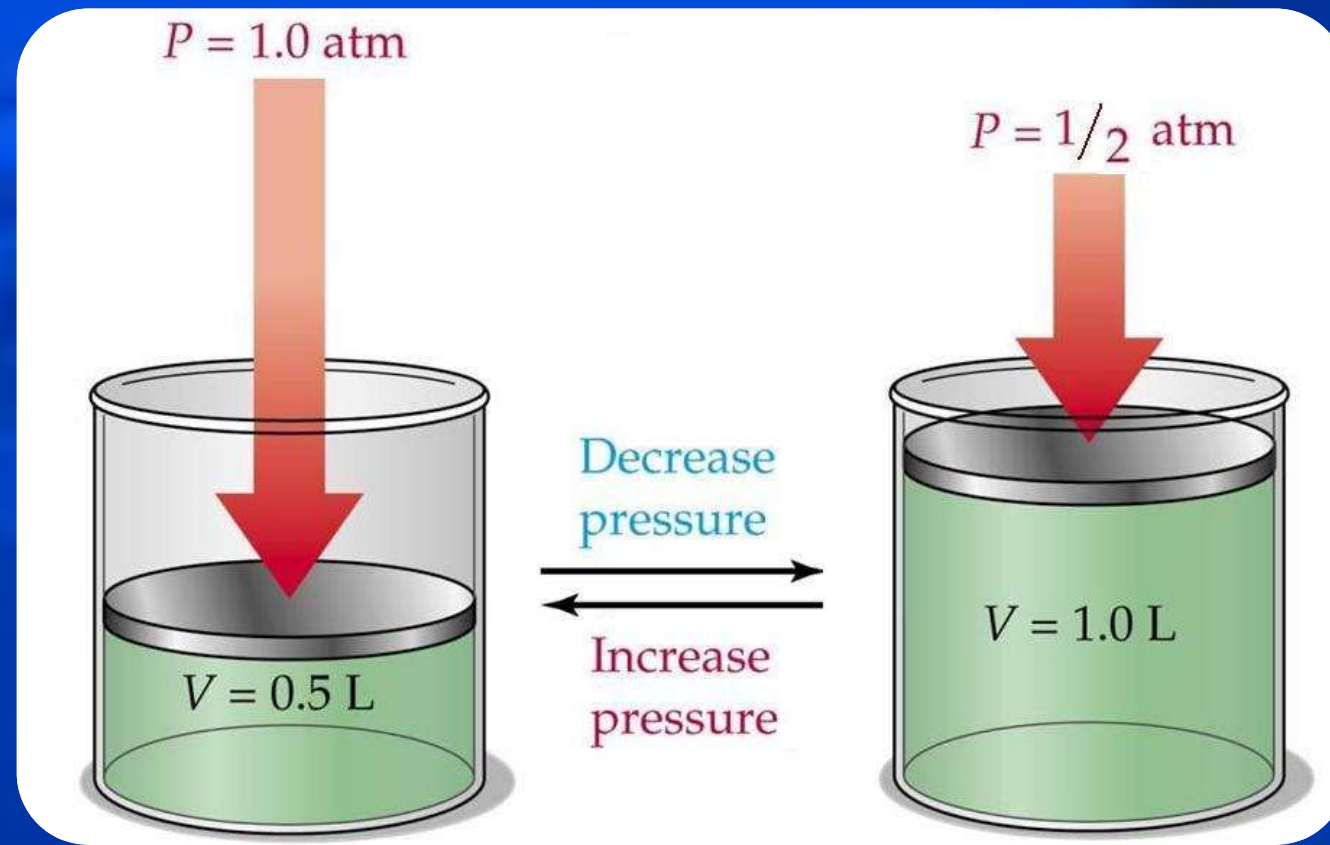
- Walking to gate
- Luggage

In-Flight Physiology

- Cruising altitude:
22 000 ft - 44 000 ft
- Cabin partially pressurized:
5000 ft - **8000 ft** (2400 m)
6000' (*B-787, A-350, A-380*)
- Above 10 000 ft
– supplemental O₂

Boyle's Law (Barotrauma)

- The volume of gas is inversely proportional to the pressure exerted on the gas, with temperature remaining constant



Case 1

- Mrs. Poughie, a 68 yo ♀ COPDer
- Complains of SOB in-flight to Montreal
- Differential Diagnosis?
- Treatment?

DDx

- Hypoxia
- Pneumothorax
- Pulmonary Embolus
- Bronchospasm/COPD exacerbation
- Congestive Heart Failure
- Angina
- Anxiety

Rx in-flight Hypoxia

- Use on-board O2 (medical kit)
- Request lowering flight altitude
- Ask for flight diversion
- Trial of meds
 - Furosemide, Salbutamol, NTG

Hypoxia

- Altitude ↑, Pressure of O₂ ↓
 - $PO_2 = \text{atm. Pressure (sea level)} \times FiO_2$
= 760 mmHg x 21 % = 159.2 mmHg
 - At 8000'
= 565 mmHg x 21 % = **118.4 mmHg**
- O₂ Saturation ↓: 118.4 mmHg = **93 %**
- 118 mm Hg equivalent **FiO₂ 15%** at sea level

Practical test

- Walk 50 meters
- If saturation $< 93\%$: needs supplemental oxygen

Indications for Medical Oxygen Onboard Flights (2-5 L)

- **Use of O₂ at sea level**
- **O₂ saturation < 93% at sea level**
- Baseline PaO₂ less than 70 mmHg
- Angina CCS class III-IV
- Cyanotic congenital heart disease
- Primary pulmonary hypertension
- Any CV disease with known baseline hypoxemia
- Sickle cell
- **Hgb < 90**



FFT/MEDIF Form and Medical Certificates



If any of the following apply, we advise you to obtain a medical certificate from your doctor addressed to the airport authorities, and to carry this with you when you travel:

- if you have a heart pacemaker or a metal implant such as an artificial joint or a metal fixture for a fracture (in such cases, you will need to present your medical certificate before the security check)
- if you have diabetes or a chronic condition requiring medication (in this case your certificate should state both the diagnosis and the required medication you are carrying)
- if you are travelling to a destination which requires certain vaccinations (in this case you should bring a vaccination record showing that the vaccinations concerned have been obtained)
- if you need to use syringes for medical purposes.


Depending on your medical condition, SWISS may also ask you to complete an SAF/MEDIF form. This form is issued by the International Air Transport Association (IATA) and ensures that you obtain all the information from the doctor treating you that an airline will require in connection with your flight. Please ask for the form

SECTION 1 – TRAVELLING WITH OXYGEN

1) Oxygen *

-  a) Does the patient already use oxygen on the ground? No Yes : please provide the following information:
- O₂ tank by Nasal Prongs / Mask Flow Rate: _____ Lpm Hours per day: _____
- Personal oxygen concentrator (POC) ▶ Type: _____ Setting: Pulse Continuous
- ▶ if Pulse, settings: 1 2 3 4 5 6 ▶ if Continuous _____ Lpm Hours per day: _____
-  b) Oxygen saturation: _____% Room air O₂ _____ Lpm continuous
- O₂ POC pulse settings: 1 2 3 4 5 6


c) Choose one of the following options for flight:

-  **Option 1 - Oxygen Request** * (provided by Air Canada – nasal prongs only, no mask):

Oxygen cylinder – required flow: 2 LPM 3 LPM 4 LPM 5 LPM 6 LPM 7 LPM 8 LPM

Is humidified gaseous oxygen a medical necessity: Yes No

Is a pediatric mask required? Yes No

-  **Option 2 - Personal oxygen concentrator***** (passenger provided) – Type: _____

▶ if Pulse, settings: 1 2 3 4 5 6 ▶ if Continuous _____ Lpm

Prognosis for a safe trip: Good Guarded Poor

If your patient has a medical condition other than his/her need to use oxygen that **may affect his/her fitness for air travel or which may affect his/her need for oxygen**, please complete Section 2. Otherwise, sign and date this form.

ADVANCE NOTICE REQUIRED

* North America: 48 hours

* International: 72 hours

* POC or CPAP: 48 hours

Best efforts will be made to accommodate requests made within this delay.

Physician Signature

Date

Case 2

- 55 yo Mr. Karr Diak, while stepping over Mrs Poughie, collapses on the way to the toilet
- PMHx: CAD, remote VF x 1
- Wife & Flight Attendants are panicking
- FA runs into the cockpit and says:

Ethics & Law

- Commercial airlines are not legally responsible for providing medical care
- 85% flights have a physician on board
- Only **45%** response rate
- **No legal obligation**
 - USA, Canada & UK (MD license, not carrier)
 - Except in Quebec
- Obligated
 - Australia and other European countries

Ethics & Law

- Good Samaritan law (USA):

Aviation Medical Assistance Act 1998:

*“Individual shall **not be liable** for damages in any such action arising out of acts or omissions in providing or attempting to provide such assistance, **except for gross negligence or willful misconduct**”*

- But no remuneration...

CLARIFYING CMPA ASSISTANCE WHEN PROVIDING CARE AS A GOOD SAMARITAN

someone requiring urgent or emergent medical assistance where other organized medical assistance may not be readily available (e.g., sick or injured persons encountered at the scene of a motor vehicle crash, or on a domestic or international flight).

The role of a Good Samaritan is not constrained by location and it may occur within Canada, in other nations, or in international waters or airspace.

While CMPA assistance is intended for professional work done in Canada, members will be eligible for assistance if Good Samaritan care is provided within Canada, in other countries or in international jurisdictions.

Lawsuits

- Number of lawsuits, to date, against physicians rendering assistance inflight:

0

What do you do next?

What do you do?

- Ask for Emergency Medical Kit
- Ask for Automatic External Defibrillator
- Ask for Oxygen
- Ask for ambubag
- Ask to speak to Medlink/StatMD/ground

Emergency Medical Kit

EMK

- Blood pressure cuff
- Stethoscope
- 3 oropharyngeal airways
- Nitroglycerin 0,4 mg: 10 tab
- Gloves
- Diphenhydramine 50 mg: 2 amp
- 4 syringes & 6 needles
- D50%: 1 amp 50ml
- Epinephrine 1:1000 : 2 amp
- 1 bag-valve device & 3 masks
- 1 IV set
- 3 pocket-masks
- Diphenhydramine 25 mg: 4 tab
- Acetaminophen 325mg: 4 tab
- ASA 325 mg: 4 tab
- Bronchodilator: 1 inhaler
- 1 bag 500 cc NS
- Atropine 0.5 mg: 2 amp
- Lidocaine 100mg: 2 amp
- Epinephrine 1:10 000 : 2 amp
- AED
- Instructions for meds

Air Canada Medical kit

- ASA
- Acetaminophene
- Epinephrine
- Atropine
- Lidocaine
- Diphenhydramine
- Dextrose 50%
- Nitroglycerine
- NaCl 0.9%
- Salbutamol
- Sterile water
- 3 airways
- Emergency tracheal catheter
- Dressing box
- IV box
- Stetho, sphygmo
- O2 (2-6 l/min)
- AED
- Pulse Oximeter
- Dimenhydrinate
- Haloperidol
- Furosemide
- Solumedrol
- Lorazepam
- Diazepam
- Ketorolac
- Naloxone
- Cord clamp
- Foley catheter
- Glucometer

AEDs

- Air Transat, BA, Delta, Virgin
 - **Medtronic**
 - **Lifepak 500**
- Swiss, Lufthansa, Emirates
 - **Phillips**
 - **HeartStart, Heartstream**
- Air Canada, American Airlines
 - **HeartSine**
 - **Samaritan**



Tempus IC

- Telemedicine
 - *Virgin, Emirates, Etihad, Kuwait Airways, Qatar Airways*

Functions

 Glucometer	 Full diagnostic 12-lead ECG
 Breath gas analysis and respiration	 Real time voice and data
 Tympanic temperature	 Photo and real time video
 Blood pressure and pulse oximetry	



Case 2...

- Mr. Karr Diak is now pulseless, cold and blue
- He is dead...
- What do you do with him?

In-Flight Death

- 1 : 1~3 million passengers
- 300 deaths per year worldwide
- 1/day
- Causes:
 - Cardiac (V.Fib) 56%
 - Predisposing medical problem 19%
 - Pulmonary 8%
 - CNS 0.5%
 - Overdose/Suicide 0.5%
 - Unknown 15.5%

What do we do with dead pax?

- Leave it in seat
- Rarely: crew rest area
- Toilet ???
- Aisle???
- Body bag + cold storage unit
 - « corpse cupboards » (*Singapore Airlines*)
- No emergency landing



In summary

- Be aware of problems at altitude
- Use the medical equipment onboard
- Use ground support
 - diversion
- Good communication between you & crew!



ONBOARD MEDICAL EMERGENCIES

WWW.ONBOARDME.COM

Onboard Medical Emergencies

December 11th 2019

December 9th 2020

- Aviation physiology
- Fit-to-fly
- Onboard equipment: EMK, O2
- Safety onboard
- Crew training
- Rx of inflight emergencies
- **Simulator**

Information



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