



INFLIGHT INCAPACITATION

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Definition

- **“ Any change in the ability of a flight crew member to function appropriately whether due to physiological or psychological reasons”**
- **The definition of Incapacitation Inflight must be inclusive of all possible disease states and other temporary and traumatic causes.**
- **Incapacitation Inflight is classified into Sudden and complete/Obvious e.g. Death inflight or Subtle and partial e.g. Stress and Fatigue**





Causes

The causes of Incapacitation inflight are many and may be classified into two groups:-

Physiological and Psychological

A. Physiological

- **Hypoxic hypoxia(Lack of enough oxygen) –flight above 10,000 ft in an unpressurised aircraft, or loss of cabin pressurization;**
- **Cardiovascular disease(heart attack, arrhythmia) and Cerebrovascular disease (stroke, migraine, seizure, fainting or syncope)**
- **Gastrointestinal disease e.g. Food poisoning, diarrhoea and vomiting , bleeding peptic ulcer and Food allergy(common with sea food)**
- **Other medical & surgical emergencies e.g. ruptured ectopic pregnancy, low blood sugar, spontaneous abortion and COVID -19**
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Causes

The causes of Incapacitation inflight are many and may be classified into two groups:-

Physiological and Psychological

A. Physiological

- **Smoke, Fire & fumes in cockpit e.g. contamination of air conditioning system;**
- **Sleeping –Obstructive sleep Apnoea in obese Pilots , Circadian rhythm ;**
- **Physical Injury –Bird strike, or falling**
- **Malicious act e.g. assault by unruly passenger, terrorist, small firearms, high powered lasers used by person on the ground);**
- **Pesticide poisoning during locust control or crop spraying.**



Causes

The causes of Incapacitation inflight are many and may be classified into two groups:-

Physiological and Psychological

B. Psychological

- **Alcohol and Drugs Use by flight crew member e.g. Positive alcohol or/and drug test results; -Very common and often unrecognized;**
- **Fatigue –lack of sleep, loss of focus, jet lag, ageing, flight after a heavy meal, over exertion;**
- **Stress due to social relationships, financial and emotional factors;**
- **Mental illness –Anxiety and depression –Common and rarely diagnosed;**
- **Any psychological condition that leads to impairment judgement and decision making.**



Causes

- **Medical Issues.**
- **Fatigue**
- **Fume Event**
- **Hypoxia**
- **Bird or Drone Strike**
- **Laser Strike**



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Why Is Incapacitation Inflight A Safety Imperative?

- **The impact of incapacitation inflight is Complete or Partial Loss of Control leading to accidents or incidents and loss of life and property;**
- **Obviously in a single pilot flight environment, the safety of the flight is severely compromised due to Loss of Control(LOC);**
- **Loss of Communication with ATC;**
- **In multi-crew operation, incapacitation of only one of the pilot is unlikely to present complete LOC , and this is mitigated during pilot training;**
- **Although rare it is possible to have Incapacitation of both Pilots;**
- **Compromised air space management e.g. infringement or loss of aircraft separation;**
- **Incapacitation places a heavy workload upon the remaining flight crew members.**



Classification of Incapacitation

- 1. Subtle incapacitation.**
- 2. Obvious incapacitation**





Subtle or Incomplete Incapacitation

- **Partial in nature.**
- **Duration short.**
- **Difficult to detect.**
- **Presents an operational hazard.**





Obvious or Complete Incapacitation

- **Immediately apparent.**
- **Frequently sudden.**
- **Usually prolonged.**
- **Complete loss of function.**





Controlling the Risk of Incapacitation

- **SOPs and Monitoring.**
- **Communication.**
- **Food Poisoning.**
- **Fatigue Countermeasures.**
- **Aeromedical Certification.**





Controlling the Risk of Incapacitation

- **Creating Awareness among crew and managers on conditions causing incapacitation;**
- **Initial and Period Medical assessment and healthy lifestyle promotion by AMEs.**
- **Random Alcohol and Drug Testing**
- **Staggering meal times and menu for crew before and during flight**
- **Ensuring availability and appropriate use of SOPs.**
- **Adhering to Recurrent Training of flight Crew members,**
- **Adequate maintenance of aircraft and especially training in control of the pressurisation system;**
- **Using Emergency Oxygen to prevent hypoxia and protect crew from effects of smoke and fumes in cockpit;**
- **Use of Onboard Therapeutic Oxygen for crew and passenger whenever needed**



Controlling the Risk of Incapacitation

The Pilot/AME Relationship





Recognizing Incapacitation

- **Strict adherence to SOPs.**
- **Monitoring and cross-checking.**
- **Challenge and response concept.**
- **Crew concept.**
- **“Two Communication Rule”.**





Two Communication Rule

Appropriate response to:

- **Two verbal communications or,**
- **Any verbal communication associated with a significant deviation from a standard operating procedure or a standard flight profile.**





- **An in-flight incapacitation requires special actions and good judgment of the remaining crew member left in command of the aeroplane**





Recent Examples

19 Sep 2024

Pilot, 35, collapsed in seat and became ‘rapidly incapacitated’ just three minutes after taking off from Dublin Airport

- The plane also faced problems when attempting to land back in Dublin
- A PILOT taking off from Dublin Airport "became incapacitated" and collapsed in his seat just three minutes after take off.
- The 35-year-old was the First Officer on the scheduled KLM flight containing 41 passengers and crew to Amsterdam Airport Schipho
- A new report by the Air Accident Investigation Unit also revealed that the KLM flight from Dublin to Amsterdam sustained a bird strike as it made an emergency landing back at the airport a short time later.



Recent Examples

09 February 2025

EasyJet Pilot Incapacitated Mid-Air, Flight Makes Emergency Landing

- An EasyJet (U2) flight from Hurghada (HRG), Egypt to Manchester (MAN) executed an emergency landing in Athens (ATH) after one of its pilots experienced a medical emergency mid-flight.
- The disrupted travelers remain at their provided hotel accommodations while awaiting return flights to Manchester.
- A passenger, speaking anonymously to the *Manchester Evening News*, described how the situation developed when cabin crew members suddenly rushed to the front of the aircraft where a man had collapsed. Several medically trained passengers responded to urgent calls for assistance from the crew. The gravity of the situation became apparent when crew members erected a privacy screen at the front of the aircraft and subsequently informed passengers that the collapsed individual was, in fact, one of the pilots. This revelation heightened anxiety among passengers, who realized the severity of the circumstances.



Recent Examples

05 February 2025

Lufthansa Pilot Incapacitated on Miami to Frankfurt Flight

- Approximately 2 hours and 20 minutes after the initial incident, the aircraft successfully landed in Montreal without further complications.
- The flight, cruising at FL350, underwent an unexpected leadership transition when the captain became incapacitated in the crew rest area.
- The senior first officer immediately assumed command, activating emergency protocols. A second first officer was summoned to the cockpit to provide additional support, Aviation Herald reported. Two flight attendants simultaneously administered first aid to the affected captain, demonstrating the crew's coordinated response to the medical emergency.
- The Canadian Transportation Safety Board confirmed the medical nature of the captain's incapacitation, highlighting the professionalism and preparedness of the Lufthansa crew in managing an unexpected in-flight medical emergency.



Recent Examples

22 December 2024

- United Airlines (UA) experienced multiple flight emergencies on December 22, 2024, involving its Chicago-Zurich routes. Flight UA12, traveling from Zurich to Chicago, diverted to Halifax, Canada, after a pilot became ill.
- Simultaneously, United Airlines flight UA3, en route from Chicago to Zurich, diverted to Gander International Airport in Canada due to a serious flight attendant injury.

04 December 2024

- On December 4, 2024, a WestJet (WS) Boeing 737 MAX flight demonstrated exceptional crew coordination during a medical emergency. Flight WS129, operating between Calgary and Vancouver, encountered a critical situation when the First Officer experienced rapid health deterioration mid-flight



Recent Examples

07 November 2022

Maui Flight Cabin Crew Incapacitated Causing Diversion

- The FAA reports that at least two Alaska Airlines flight attendants became incapacitated due to fumes on Saturday's flight 952 from Maui to Seattle.
- According to the reliable Aviation Herald, the Boeing 737-800 was en route at 34,000 feet over the Pacific, approximately 300 nautical miles from Maui, when the problem occurred. The flight diverted to Honolulu, and they summoned medical personnel. This diversion was confirmed by the flight tracking service FlightAware.



Occupational injuries among flight attendants

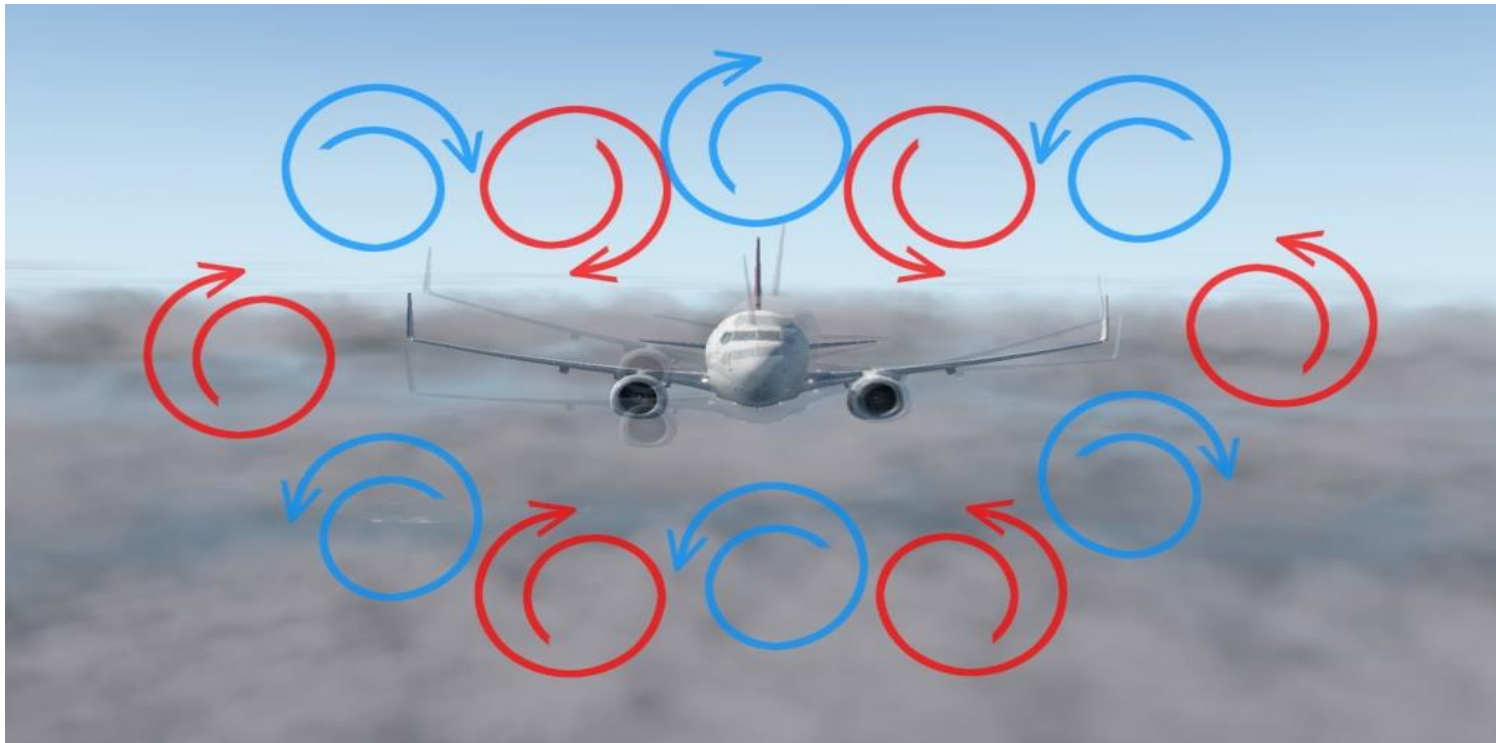
- The leading causes of injury was pulling, pushing or lifting (60.2%).
- The commonest type of injuries were strains and sprains (52.3%).
- Scalds from Hot Drinks: Accidental burns caused by hot beverages (37.8%)
- Turbulence related injuries were reported by flight attendants (29.7%)
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- The upper limbs (44.5%) and the back (32%) were the commonest sites affected.





Epidemiology of turbulence-related injuries in airline cabin crew, 1992-2001

- The purpose of this study was to determine the rate of flight attendant turbulence-related injuries in Part 121 air carrier operations from 1992-2001
- The National Transportation Safety Board's Aviation Accident Database was searched for the period from 1 January 1992 through 31 December 2001 for all records involving Part 121 air carrier turbulence-related accidents





Epidemiology of turbulence-related injuries in airline cabin crew, 1992-2001

- From 92 accident reports, 179 cases were identified. Of these cases, 82 (45.8%) involved serious injuries and 97 (54.2%) involved minor injuries
- There was a non-significant upward trend in the rate of turbulence-related injuries, especially during the period from 1995 through 2000.





Epidemiology of turbulence-related injuries in airline cabin crew, 1992-2001

- **Significant relationships were found between turbulence-related injuries and the phase of flight, location in the aircraft, seat belt sign illumination, aircraft type, and air carrier.**
- **The most frequent type of turbulence-related injury was lower extremity fractures, especially the ankle.**





The Most Recent Plane Accidents Caused by Turbulence

Air Europa UX045 turbulence event

Route: Madrid (MAD) to Montevideo (MVD)

Airplane: Boeing 787-9 Dreamliner with reg number EC-MTI, first flight 2018

Injuries: 6 serious (at least), 36 minor or serious

Turbulence encounter: 36,000 ft over the Atlantic Ocean

Date: 1 July 2024, 04:50 UTC

Summary: In early morning local time the plane was about to leave the Atlantic Ocean and enter into Brazil, when it suddenly encountered severe turbulence that caused many injuries to passengers, especially those who did not have their seatbelt on. The source of turbulence was not reported. Some possibilities could be thunderstorm activity (although thunderstorms are not very common in early morning), or convective turbulence induced by the temperature differences between land and sea, which tend to peak in early morning. The plane made an emergency landing in the nearby airport of Natal in Brazil



The Most Recent Plane Accidents Caused by Turbulence

Singapore Airlines SQ321 turbulence event

Date: 21 May 2024, 7:49 UTC

Route: London (LHR) to Singapore (SIN)

Airplane: Boeing 777-300ER with reg number 9V-SWM, first flight 2008

Injuries: 1 fatality, 104 severe or minor injuries

Turbulence encounter: 37000 ft over Myanmar

Summary: While cruising over Myanmar, the plane passed through an area of developing thunderstorm clouds. The pilots did not go into any of these clouds, but while flying around them they were suddenly hit by severe turbulence that tossed the aircraft up and down, inducing peak vertical accelerations of about 1.5Gs. This turbulence was most likely due to near-cloud turbulence such as an outburst of air from one of the clouds. Despite the large accelerations, the maximum vertical displacement of the plane was about 200 ft. After the turbulence, the pilots performed a controlled descent to 36,000 ft and diverted their landing in Bangkok. Upon arrival, it was confirmed that a 73 year old man had died from a heart attack during the flight. Other passengers with serious injuries were also reported, although the exact number of serious and minor injuries was not given.



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The Most Recent Plane Accidents Caused by Turbulence

Emirates EK421 turbulence event

Date: 4 December 2023, 21:05 UTC

Route: Perth (PER) to Dubai (DXB)

Airplane: Airbus 380-841 with reg number A6-EEV, first flight in 2014

Injuries: 5 serious, 23 minor, 462 none

Turbulence encounter: Maldives

Summary: While cruising over the Maldives, the pilots observed some off-path thunderstorm cloud formations and a layer of low-level clouds well below the plane's altitude. The pilots did not go through any of these clouds, but despite this, the plane encountered severe turbulence. Although further analysis is required, it could be due to near-cloud turbulence propagated from the neighboring thunderstorm cloud formations. Despite the injuries and damage to the aircraft interior, the plane continued to Dubai and landed safely there.



SAA MEDICAL SERVICES





Employee Health

- Provide occupational health, travel and aviation medicine, and employee wellness advice for SAA employees
- Ensure pre-employment and periodic medical assessment that focuses on the safety of the applicant and others, and on the airline's duty of care

Passenger Health

- Ensure, as far as possible, that passenger health does not deteriorate during flight, and that there are adequate measures in place to deal with any unforeseen in-flight medical emergency
- Provide medical clearance for passengers with recent or unstable medical conditions



SAA MEDICAL SERVICES

Statistics of Crew and Passenger Injury and Illness Sep 2021 – to-date

	Dec-24	Jan-25
Crew injury	1	10
Passenger Injury	2	2
Crew Illness	3	1
Passenger Illness	10	10
Death on Board	0	0
Birth on Board	0	0



MEDICAL SUPPLIES (ICAO ANNEX 6)

- The different types of medical supplies should be provided as follows: first-aid kit(s) for carriage on all aeroplanes, universal precaution kit(s) for carriage on all aeroplanes that require a cabin crew member, and a medical kit for carriage where the aeroplane is authorized to carry more than 100 passengers on a sector length of more than two hours.
- Where national regulations allow it, operators may elect to carry the recommended medication in the first-aid kit.



NUMBER OF FIRST-AID AND UNIVERSAL PRECAUTION KITS

First-aid kits

The number of first-aid kits should be appropriate to the number of passengers which the aeroplane is authorized to carry:

<i>Passenger</i>	<i>First-aid kits</i>
0 – 100	1
101 – 200	2
201 – 300	3
301 – 400	4
401 – 500	5
More than 500	6



Universal precaution kits

- For routine operations, one or two universal precaution kits should be carried on aircraft that are required to operate with at least one cabin crew member.
- Additional kit(s) should be made available at times of increased public health risk, such as during an outbreak of a serious communicable disease having pandemic potential.
- Such kits may be used to clean up any potentially infectious body contents such as blood, urine, vomit and faeces and to protect the cabin crew members who are assisting potentially infectious cases of suspected communicable disease.



Part 121 Cats -SACAA

121.05.13

FIRST AID, EMERGENCY MEDICAL AND UNIVERSAL PRECAUTION KITS

- (a) bandage, adhesive strips;
- (b) bandage, gauze 7.5cm × 4.5;
- (c) bandage, triangular 100cm folded and safety pins;
- (d) burns dressing 10cm × 10cm;
- (e) wound dressing, large and small;
- (f) adhesive tape and scissors;
- (g) small adhesive dressings;
- (g) small adhesive dressings;
- (h) antiseptic swabs (10/pack);
- (i) adhesive tape;
- (j) sponge gauze;
- (k) surgical mask;
- (l) umbilical cord clamp;
- (m) thermometer(non-mercury);
- (n) basic or advanced life support cards;
- (o) bag-valve mask
- (p) torch (flashlight) and batteries;
- (q) pocket mask;
- (r) first aid manual, current edition; and
- (s) incident record form



FIRST AID KIT CONTENTS

- (a) bandage, adhesive strips;
- (b) bandage, gauze 7.5cm × 4.5;
- (c) bandage, triangular 100cm folded and safety pins;
- (d) burns dressing 10cm × 10cm;
- (e) wound dressing, large and small;
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Note

- *The owner or operator shall ensure that only Schedule 0 medication is included in the first aid kits.*
- *The Department of Health has issued exclusions to previously accepted Schedule 0 medications.*
- *Owners or operators must consult a qualified pharmacist if they intend to include Schedule 0 medications in their first aid kit.*



Medical kit contents

- | | | |
|--|--|---|
| (1) Sphygmomanometer – non-mercury | (9) Adrenocortical steroid, e.g. hydrocortisone | (16) Atropine |
| (2) Stethoscope | (10) Major analgesic, e.g. nalbuphine | (17) Digoxin |
| (3) Syringes and needles | (11) Diuretic, e.g. furosemide | (18) Uterine contractant, e.g. Ergometrine/Oxytocin |
| (4) Oropharyngeal airways (2 sizes) | (12) Antihistamine, e.g. diphenhydramine hydrochloride | (19) Disposable gloves |
| (5) Tourniquet | (13) Sedative/anticonvulsant, e.g. diazepam | (20) Bronchial dilator – including an injectable form |
| (6) Coronary vasodilator, e.g. nitro-glycerine | (14) Medication for Hypoglycaemia, e.g. hypertonic glucose | (21) Needle disposal box |
| (7) Anti-spasmodic, e.g. hyoscine | (15) Antiemetic, e.g. metoclopramide | (22) Anti-spasmodic drugs |
| (8) Epinephrine 1:1000 | | (23) Catheter |



Universal precaution kit

(1)

An owner or operator operating aircraft for which the maximum certificated passenger seating is 20 or more shall ensure each aircraft carries on board at least two universal precaution kits.

(2)

The following items shall, as a minimum, be included in a universal precaution kit

–

(a) disposal gloves;

(b) dry powder that convert small liquid spill into sterile granulated gel;

(c) germicidal disinfectants for surface cleaning;

(d) skin wipes;

(e) face/eye mask;

(f) large absorbent towel;

(g) pick-up scoop with scraper; and

(h) bio-hazard disposal waste bag.



HIGH LEVEL PPE

1 COVERALL SUIT

PLASTIC APRONS

12 PAIRS SURGICAL GLOVES

2 FACE MASK WITH SHIELD

1 PAIR PLASTIC SHOE COVERS

1 PAIR LONG SLEEVE HEAVY DUTY GLOVES

1 BODY BAG

**NB: FOR CABIN CREW MEMBER ATTENDING
TO PATIENT**





EXAMPLES





SAA MEDICAL EQUIPMENT







- While in-flight medical events may be relatively common, major medical emergencies are rare. Cabin crew are trained in first aid and will manage most medical events on their own. When a medical professional volunteers to help with a medical emergency, he should secure the assistance of at least one cabin crew member, request the medical kit and the AED if appropriate (and if one is available).
- A medical emergency can be regarded as one which requires medical supplies other than those intended for first aid, a doctor's advice from ground medical support (specialized medical companies that provide advice from the ground directly to the aircraft), the help of an on board volunteer health professional, or results in a diversion or in death



- Ground-based medical support systems are widely used by airlines, especially by long haul aircraft, to provide advice to crew who are dealing with a medical emergency. The ground-based medical officer can provide invaluable advice to crew and to an on-board volunteer doctor (should one be available) since the ground-based medical officer is trained in the provision of aircraft related medical advice, knows exactly what is contained in a particular operator's on-board medical supplies and is aware of the medical facilities in the vicinity of the aircraft, should a diversion need to be considered.



Voluntary Medical Services on Board

- It is the responsibility of the passenger to notify the airline in a timely manner, before flight, if he/she has a serious medical condition
- Relatively few major medical events occur in-flight, bearing in mind the large number of passengers carried
- It is not feasible to provide on a commercial airliner the equivalent of a ground-based medical care facility
- Cabin crew are trained in first aid and understand the aviation environment. They have sufficient knowledge of emergency equipment to support a volunteer medical professional
- With adequate pre-flight preparation even those with serious medical conditions can fly safely
- Increased use of a medical “clearance to fly” process by the treating physician would probably prevent many in-flight medical events that currently occur



Summary Checklist for volunteer medical professionals

- Before flight, consider the possibility that you may be asked to provide on board medical assistance. If appropriate, consult your medico-legal insurance provider as to what cover is provided should you be involved in treating an individual during a flight. Consider carrying a copy of your medical license to practice.
- Decide if you are in a proper condition to respond to a medical emergency (e.g. if you have consumed a significant amount of alcohol, it may be inappropriate to respond to an emergency)
- Ask to see information provided by the airline to volunteer medical professionals (if available) e.g. information on liability
- Identify yourself and offer proof of credentials if you have them.
- If the situation appears to be serious, inquire if the airline has a contract with a medical ground support company. If so, ask that they be contacted to bring them into the loop as early as possible. Even if you are an emergency qualified physician the support of the ground company may become very helpful



Summary Checklist for volunteer medical professionals

- Request the emergency medical kit if one is available (small aircraft or those flying short-haul routes may not have an emergency medical kit). Inquire if telemedicine equipment is available (although most aircraft do not have such facilities). If the ill traveler has arrested, the cabin crew will normally provide an AED when one is available. If not provided, ask if one is available.
- Request that at least one cabin crew member remain available to answer your questions, to help with procedures, to communicate with the pilots, etc.
- If necessary, ask for an interpreter.
- When possible and if appropriate, treat the traveler whilst seated. If he needs to be horizontal, request that he be transported to where the intervention will interfere the least with mobility of the other cabin crew and the passengers.



Summary Checklist for volunteer medical professionals

- If resuscitation is required and you are presented with a “Do Not Resuscitate” order by the accompanying family member or friend, first decide if that is acceptable to you; note that if it is, the cabin crew may decide to continue resuscitation on their own if it is their company policy and/or ask for another volunteer 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 and your help may be very valuable.

Questions





SOUTH AFRICAN AIRWAYS

THANK YOU!