



## **Insulin-Treated Diabetes**

### **Guidelines for assessment of fitness to work as Cabin Crew**

#### **General Considerations**

As with all “medical guidelines” it is important that each individual case is assessed on its own merits. No “blanket” bans or restrictions should be imposed without a full individual assessment, a full and open consultation with the employee, and if necessary communication with the individual’s own medical advisers.

All fitness to work decisions must take the following considerations into account:

**1) Ethical considerations**

The need to meet operational requirements and maintain employment in a safety critical role, without compromising optimal management of the crewmember’s diabetes.

**2) Effect of Health on Work**

Are they fit to carry out the role effectively and safely, and will the interaction of their medical condition (and/or its treatment) and the job role pose unacceptable risks to the individual or others?

**3) Effect of Work on Health**

Will the job have a significant adverse effect on the condition or its management?

**4) Regulations**

Any relevant State (country) rules and regulations, which include local human rights and disability legislation.

**5) Other medical conditions**

The presence of a specified medical condition should not distract from the assessment of the individual as a whole; general fitness as well as the existence of other medical conditions must be considered.

## **Diabetes Considerations**

People should be physically and mentally fit in accordance with general standards for crew independent of the type of Diabetes or treatment they have. .

The main issue of concern with Cabin Crew fitness and insulin treated diabetes is that of sudden hypoglycaemic incapacitation resulting in inability to carry out the safety critical role, along with the impact of that incapacitation on fellow crew (i.e. is it significant enough to need the help of others). The risks to the individual through more subtle cognitive dysfunction as a result of hypoglycaemia whilst on the aircraft and down route and the impact of hyperglycaemia should also be considered. Additionally, crew have to work irregular hours, cross time zones and potentially stay in areas of the world where medical treatment may not be considered equal to the standard at home base.

## **Guide to Decision Making**

As a starting point and in order to try and adopt an evidence based approach as far as possible, it would seem reasonable to consider driving recommendations as a baseline for assessments, as this group has been widely researched.

There is no agreement on the level of medical incapacitation in cabin crew that is acceptable for flight safety. Crew are required to manage emergency situations to maximise the safety of passengers in such emergencies, and to act in a manner that is not a threat to flight safety. From an operational point of view they are also required to provide a high level of service to passengers, and impaired work performance from hypoglycaemia or hyperglycaemia may lead to reputational risks for the crewmember and operator.

## **General Guidelines.**

The following is a useful evidence based approach:

1. People should be physically and mentally fit in accordance with general crew standards.
2. The diabetes should be under regular (at least annual) review by either a specialist or general practitioner (primary care physician) who specialises in the treatment of diabetes.
3. Diabetes should be under stable control.
4. People should self monitor their blood glucose, and be well motivated in diabetes self-care.
5. There should be no disabling hypoglycaemia and awareness of hypoglycaemic symptoms must be preserved.
6. Crew should be discouraged from allowing their blood sugars to run high in order to prevent hypoglycaemic episodes and the risks of adverse long-term health consequences must be explained.
7. The individual should be advised to carry a medical talisman e.g. Medic Alert or similar.

8. There should be no:
  - a. retinopathy
  - b. nephropathy
  - c. peripheral or autonomic nerve damage
  - d. coronary heart disease
  - e. peripheral vascular disease
  - f. cerebrovascular disease.

that would cause functional incapacity, likely to interfere with the safe exercise of routine or emergency cabin crew duties.

9. Suitability for employment should be re-assessed annually by an Occupational Health Physician or his designee, and should be based on the criteria outlined above.

### Treatment

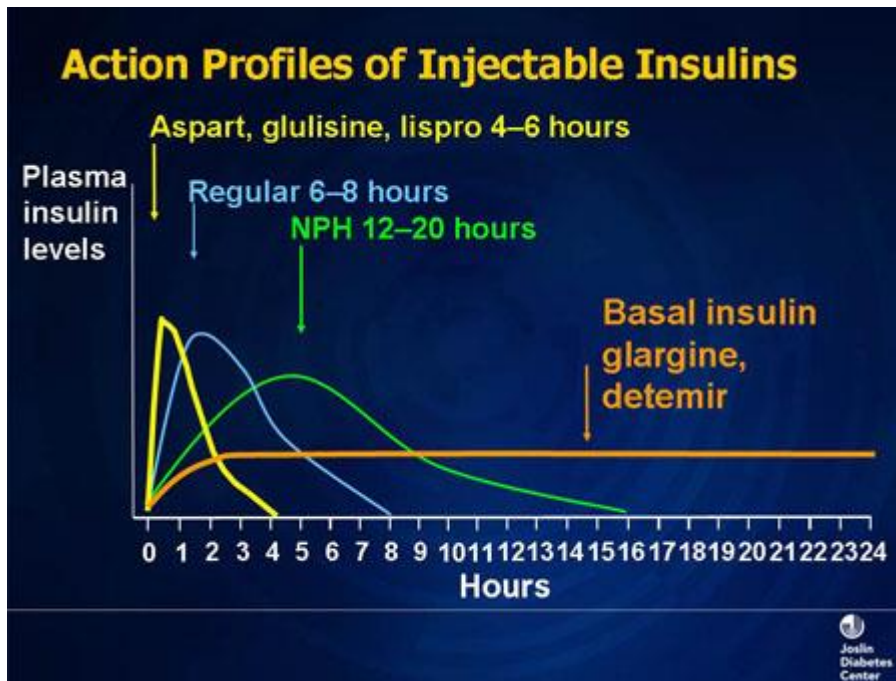
Modern long acting insulin preparations are able to give a flat predictable peak of action with an effective duration of up to 24 hours (see below). This allows the individuals to take their basal insulin with prandial doses of short acting insulin at meal times. Cabin crew could therefore stay on home base time with regard to when to take the basal dose, regardless of which time zone they are in. To assist with this, it might help for crew to have an additional or dual zone watch set to their home time.

This only represents one available treatment option. There may be other acceptable approaches.

<b>Estimated Pharmacokinetics of Current Insulin Preparations</b>			
	Onset	Peak	Effective Duration
Rapid acting	<15 min	0.5-1.5 hr	3 hr
Inhaled (powder)	10-20 min	0.5 – 3 hr	~ 6 hr
Regular (short)	0.5-1 hr	2-3 hr	3-6 hr
NPH	2-4 hr	7-8 hr	10-12 hr
Long-acting analogs	1-2 hr	Flat/Predictable	Up to 24 hr

Barnett AH, Owens DR. *Lancet*. 1997;349:97-51. White JR, et al. *Postgrad Med*. 1997;101:68-70.  
Kahn CR, Schechter Y. In: *Goodman and Gilman's The Pharmacological Basis of Therapeutics*. 1990:1463-1495.  
Coates PA, et al. *Diabetes*. 1995;44(Suppl 1):130A.

Joslin Diabetes Center



## Specific Guideline recommendations

### *Requirements for the initial assessment of fitness for flying duties*

#### *Exclusion criteria*

- One or more episodes of diabetes related hospitalization in the last year.
- Hypoglycaemia that resulted in a seizure, loss of consciousness, impaired cognitive function, or required intervention by another party in the last year
- One or more episodes of hypoglycaemic unawareness in the last year
- Absence of stability of blood glucose control in the previous 3 months

#### *Information to be provided*

- Copies of all medical records, as well as accident information relevant to their diabetes e.g. driving accidents
- A report of a completed medical examination by a specialist or general practitioner (primary care physician) who specialises in the treatment of diabetes. The report must include as a minimum:
  - Two measurements of glycosated haemoglobin (total HBA1c concentration with the laboratory reference range), separated by at least 90 days. The most recent result must be no more than 90 days old.
  - Specific reference to the crewmember's diet and insulin dosages.

- Specific reference to the management of cardiovascular risk factors.
- Specific reference to the presence or absence of Cerebrovascular, cardiovascular, peripheral vascular disease and neuropathy.
- Confirmation by an ophthalmologist of the absence of clinically significant diabetic eye disease.
- Verification that the crew member has received education in, and good awareness of, diabetes and its control, and understands the actions that should be taken if complications, especially hypoglycaemia, should arise.
- Verification that the cabin crewmember has the ability and willingness to satisfactorily monitor and manage his or her diabetes using acceptable equipment.
  - A single meter is to be used for testing, with a spare meter available in the event of malfunction.  
A crew member may use a continuous glucose monitoring system, as long as the airline's technical engineering has approved the use of the device on the airline's aircraft, there is verification from an appropriately qualified person that the crew member is able to use the system proficiently, and carries a back up portable glucometer in the event of a malfunction.

*Information to be considered in fitness for work decision-making*

- Criteria for blood glucose levels indicating reasonable control for consideration of fitness for duty are:
  - HBA1c between 6.5 to 8.0%
  - Self monitoring blood glucose results (over a three month period immediately prior to the initial assessment) indicating:
    - No more than 5% of readings below 4.0 mmol/L
    - 80% of readings between 5 and 15 mmol/L
- Other factors that maybe taken into account in the decision about fitness for duty may include but are not limited to:
  - Excessive frequency of hypoglycaemia or hyperglycaemia
  - Documented hypoglycaemic unawareness
  - Poor management and treatment compliance

### *Implications for cabin crew meeting these criteria*

- If a crewmember meets these criteria they can be considered by the airline medical unit/medical adviser for flying duties on a case-by-case basis.
- If accepted for flying duties the crewmember must agree to the required monitoring and actions during flight operations, as well as any subsequent medical fitness for duty evaluations.
- If and when, following detailed consideration, an individual treated with insulin enters cabin crew duties, they should initially be reviewed after three months, six months and then annually.

### Monitoring and Actions Recommendations during Flight Operations

- The crewmember should be encouraged to inform their cabin crewmember in charge on each flight of the diagnosis. In practice we have found that crewmembers often inform their colleagues of their disease.
- To ensure safety during flight, the crew member must carry
  - Two glucometers, one as a back up. Alternatively the crewmember may use a continuous glucose monitoring system, as long as there is a back up portable glucometer.
  - adequate supplies to obtain and test blood samples, and
  - amount of rapidly absorbable glucose, in 15 gram portions, appropriate to the planned duration of the flight.
- The crewmember must discuss these protocol with his/her treating medical practitioner /physician and obtain advice as to the best combination of food intake/ insulin/other medication that will optimise blood glucose control without adversely affecting safety.
- The following actions shall be taken in connection with flight operations:
  1. A crewmember must measure their blood glucose 30-60 minutes prior to the flight.
  2. If the glucose concentration is more than 15 mmol/l (300mg/dL) the crewmember cannot operate.
  3. If it is less than 5 mmol/L (100mg/dL) the crewmember must ingest some food or eat 15g glucose snack, and retest to ensure that their blood glucose concentration is within 5.5 – 15 mmol/l (100 – 300 mg/dL).  
If the blood glucose is less than 5.5 mmol/L (100mg/dL) the process must be repeated.
  4. During the flight the crewmember will monitor their blood glucose levels as they normally would, (usually at least four times per day), and if required take the following steps -

- (a) If the concentration is less than 5.5 mmol/L (100mg/dL) a 30g glucose snack must be ingested.
- (b) If the concentration is 5.5-15 mmol/L (100 – 300 mg/dL) no action is required.
- (c) If the concentration is above 15mmol/L (300mg/dL) the crewmember must stop operating. The crewmember may return to operations once the blood glucose concentration has returned to the 5.5 – 15 mmol/L (100 – 300 mg/dL) range.

5. In respect to undertaking blood glucose determinations in flight, the crewmember must use judgement in deciding whether measuring concentrations or operational/service requirements should take priority. In cases where it is decided that service/operational requirements take priority the crewmember must ingest a 15g glucose snack and measure his/her blood glucose level one hour later.

### ***Requirements to maintain position of cabin crew***

- The crewmember must report to the airline medical unit/adviser as soon as practicable any hypoglycaemic episode requiring external assistance.
- If and when, following detailed consideration, an individual treated with insulin returns to cabin crew duties, they should initially be reviewed after three months, six months and then annually.
- Every year the cabin crewmember will:
  - Provide copies of the complete self-monitoring data for the previous 6 month period from all blood glucose monitoring devices used. The downloaded results should be analysed to identify “low” and “high” readings outside the range of 4 – 15mmol/L (80 - 300mg/dL). Records must clearly show the results of “in-flight” tests. When not flying, the cabin crew will do 4 daily checks.
  - Report any involvement in accidents resulting in serious injury (whether or not related to hypoglycaemia).
  - Report any evidence of loss of control of diabetes.
  - Report any changes in his/her treatment management.
  - Report any new significant diabetic complications.
  - Report the results of any cardiovascular investigations (e.g. stress ECGs) performed during the interval period.
  - Provide a report by a physician specialising in diabetes, which includes a review of the interval medical history, review of the self-monitoring blood glucose results, and HBA1c results – including one within the last 90 days. The report should also confirm that there are no diabetic complications.
- Every two years the reports from the physician specialising in diabetes must include confirmation by an eye specialist of the absence of significant eye disease.

### *Implications for cabin crew meeting these criteria*

- If a crewmember meets these criteria they can be considered by the airline medical unit/ medical adviser for flying duties on a case-by-case basis.
- If accepted for flying duties the crewmember must agree to the required monitoring and actions during flight operations, as well as any subsequent medical fitness for duty evaluations.

Frequency of review should also be increased following return from illness. If blood glucoses are labile after a period of illness, it may be appropriate to require a period of stability of up to three months before returning to flying duties. However the precise length of time will depend on the circumstances in each individual case, depending on the nature of the intervening illness and following assessment as detailed above. (For example three months would be sensible where there have been a particularly labile period but a shorter period might be appropriate where there had been an obvious cause of the loss of control e.g. chest infection).

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