

# Medical Clearance for Suborbital Spaceflight

C. Marsh Cuttino<sup>1</sup>, MD, FAAEM, FACEP

(<sup>1</sup>Orbital Medicine, Inc, Richmond, Virginia, USA)

## Summary

Medical clearance is the process of determining the probability that an individual will have an adverse outcome, including injury and death, while participating in flight preparation and operations. The probability is based upon elucidating the medical risk based on their personal medical history. Identification of risks also allows for emergency medical preparedness for off nominal events.

There are currently a number of potential commercial space providers expected to provide platforms for space flight participants for research and space tourism. These flights are expected to be between 1 to 3 hours and provide 3 - 4 minutes of microgravity. Authorities frequently do not agree on medical guidelines, and in some cases contradictory standards have been suggested or applied to spaceflight medical clearance.

## Stresses of Flight

There are several stresses in suborbital spaceflight that are unique and could provide a challenge to the spaceflight participant. Some of these are platform dependant, so the capabilities of the flight provider will need to be taken into account. These factors include acceleration, microgravity effects, barometric pressure, radiation, noise and vibration. The expected short duration of suborbital spaceflights significantly limits the time frame and reduces the concern for conditions caused by extended exposure to microgravity.

## Standards

From a medical perspective, overly strict medical standards could lead to unnecessary disqualification<sup>i</sup>. Committees and position papers have recommended guidelines for medical certification for pilots<sup>ii</sup> and critical crewmembers<sup>iii</sup> of commercial suborbital spaceflights. NASA has strict medical requirements that are descended on those used by the military<sup>iv</sup>. NASA astronauts who have been selected have a different standard than astronaut candidates applying to the corps, leaving questions about the validity of the medical criteria

used. An example is atrial fibrillation<sup>v</sup>, a medical condition that is disqualifying for applicants, but astronaut Deke Slayton obtained a waiver and successfully flew in space.

The FAA has a document providing suggestions for medical clearance of passengers, including a list of conditions considered unstable<sup>vi</sup>. Some airlines have lists of medical conditions that are disqualifying for flight. All standards defer to an examining physician for individual cases and when to provide a medical waiver.

## Conclusion

The final decision on medical clearance falls to the examining physician and his medical judgment about the probability of an adverse event. Should an adverse event occur, there should be adequate emergency medical preparation to provide the appropriate medical response.

---

<sup>i</sup> Jennings RT, et al. 2006. *Medical qualification of a commercial spaceflight participant: not your average astronaut*. **Aviat Space Environ Med** 77(5): 475-84.

<sup>ii</sup> Ad Hoc Committee of the Aerospace Medical Association, 2009. *Medical certification for pilots of commercial suborbital spaceflights*. **Aviat Space Environ Med** 80, 824-6.

<sup>iii</sup> Aerospace Medical Association Commercial Spaceflight Working Group, 2011. *Position paper: suborbital commercial spaceflight crewmember medical issues*. **Aviat Space Environ Med** 82:475-84.

<sup>iv</sup> Doarn CR, 2011. *Medical Policy Development for Human Spaceflight at NASA: An Evolution*. **Aviat Space Environ Med** 82:1073-7.

<sup>v</sup> Barr YR, 2010 *Atrial Arrhythmia Summary Report*. **NASA/TP-2010-216124**.

<sup>vi</sup> FAA, 2006. *Guidance for Medical Screening of Commercial Aerospace Passengers*. **DOT/FAA/AM-06/1**.