

## Letters

**The Western Front pilgrimage for World War I veterans, 1993**

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TO THE EDITOR: In the previous issue of *ADF Health*, Capps and Killer described the preflight work-up of a group of aged veterans soon to travel to Europe.<sup>1</sup> An altitude chamber was used to assess the physiological response to mild hypoxia expected in aircraft.

As a respiratory physician who has never seen, let alone needed, a barochamber, I am reassured that I have never yet lost a patient *par avion*. I recommend the subject undergo a case-specific assessment, which should include investigating the possibility of undiagnosed obstructive sleep apnoea or central sleep apnoea, as the most dangerous period inflight is during recumbent rapid-eye-movement sleep. Although the elderly spend considerable time asleep during flight, Capps and Killer did not mention sleep apnoea or Cheyne–Stokes breathing.

For the vast majority of travellers, regardless of age, a forced expiratory volume in one second greater than one litre and resting oxygen saturation greater than 90% bodes well for air travel (no need for measurement of arterial blood gases). I have never been let down once by this maxim. For smokers or those with basal crackles, I measure diffusing capacity (CO uptake). This takes five minutes and, with a few added extras, it is possible to work out the five causes of hypoxaemia:

1. Low ambient oxygen tension (eg, low cabin pressure)
2. Hypoventilation (eg, sleep apnoea and too much wine)
3. Ventilation/perfusion mismatch (eg, chronic obstructive airway disease)
4. Diffusion block (eg, emphysema)
5. Shunt (eg, intracardiac and intrapulmonary).

The alveolar–arterial oxygen gradient is normal in 1 and 2, but widened in 3, 4 or 5. Rebreathing 100% oxygen solves 5. Diffusing capacity (KCO) is lowered in 4, but not in 3.

Hypercapnoea is caused by only one thing: hypoventilation.

A high altitude simulation test is easier and cheaper than a barochamber test and less problematic. An E-sized gas cylinder (volume 3800 L) costs about \$500 and is sufficient to test a battalion of aged veterans.

*Ingredients.* (1) a wooden step, two steps high; (2) a Hudson mask; (3) an air cylinder containing 17% oxygen, instead of the normal 20.95% (this simulates the cabin

pressure in a jetliner, which is usually about 5000–7000 ft); (4) a finger oximeter; (5) an observer; (6) a veteran or other test subject; (7) a testing room near to sea level.

*Recipe.* Mix all together gently for five minutes, observing the subject's oximetry, pulse and general appearance.

As a cost-saving measure, the wooden step can be skipped, and the subject can be invited to walk on the level, as if going to the bathroom on a plane. The step is really for first class passengers only, who may have to negotiate a spiral staircase in flight. An ECG lead can be added to taste.

*Result.* A large desaturation (eg, to 75%) during the test, with hyperventilation and ECG changes, should make the ears prick up.

This is a safe, cheap, reliable test with minimal risk, even for claustrophobic subjects. In our current litigious climate it may prove difficult to justify the use of a hypobaric chamber should any adverse event occur.

Finally, a diagnostic sleep study in suspects may avert in-flight surprises. Please consider ...

1. Capps RA, Killer GT. The Western Front pilgrimage for World War I veterans, 1993. Health care planning for a successful outcome. *ADF Health* 2002; 3: 31-35. <Full text>

→Read the reply by Air  
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