

## Training the physician for deployment

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**TO THE EDITOR:** I wish to congratulate Captain Timothy Humphery for his excellent article, "Training the physician for deployment", recently published in *ADF Health*.<sup>1</sup> I wish to take the opportunity to expand slightly on the section dealing with tropical medicine training. Two programs were specifically mentioned, which were the "six-month course on tropical medicine conducted by the Mahidol University in Thailand" and the "shorter tropical medicine course being offered by James Cook University". Both of these programs lead to the classically named postgraduate Diploma of Tropical Medicine and Hygiene (DTM&H).

A few years ago, there were more than 100 academic programs in tropical medicine and related areas catalogued from around the world in the major directories of training in tropical medicine.<sup>2,3</sup> These programs ranged from short courses to doctoral degrees in tropical medicine. Among these were two Diploma of Tropical Medicine (DTM) courses and five DTM&H courses conducted in Australia, Ireland, Japan, South Africa, Thailand and the United Kingdom. All of these programs are stated to be by coursework, although there may be limited opportunities for clinical work in some programs.

The DTM&H offered at Mahidol University, Bangkok, is a six-month, whole-of-time course, equivalent to one year of full-time study in Australia. This course has traditionally had an emphasis on the scientific basis of tropical medicine, with extensive laboratory work on a range of parasitic, entomological and microbiological specimens.<sup>4</sup> This program articulates to a unique Master of Clinical Tropical Medicine (MCTM) course, a further six-month full-time course, which includes clinical tropical medicine and research experience, as well as some coursework.<sup>4</sup>

The DTM&H offered at James Cook University, Townsville, is a two-semester course of eight subjects, equivalent to one year of full-time study, which can be accelerated by the completion of block courses on campus. This program articulates to a Master of Public Health and Tropical Medicine (MPH&TM), which provides expanded opportunities for DTM&H graduates. Readers may not be aware that the first DTM&H course in Australia was offered in Townsville in 1925–1926 at the then Australian Institute of Tropical Medicine, the first medical research institute established in the country.<sup>5</sup> The heritage building still remains today, now named after the first director of the Institute, Dr Anton Breinl, and preserved by the National Trust.

1. Humphery TJ. Training the physician for deployment. *ADF Health* 2002; 3: 9-12.
2. The Australasian College of Tropical Medicine. International directory of training in tropical medicine 1995-96. Townsville: ACTM Publications, 1995.
3. The American Society of Tropical Medicine and Hygiene. International training programs in tropical medicine and health in the Annual Directory of International Opportunities. *Am J Trop Med Hyg* 1994; 51 Suppl: 23S-29S.
4. Leggat PA. Tour of duty: studying tropical diseases in Thailand. *Med J Aust* 1991; 155: 801-802.
5. Baldwin AH. The first course for the Australian Diploma in Tropical Medicine and Hygiene. *Health* 1926; Nov: 163-165. □

## 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 in flight 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.

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**IN REPLY:** Lieutenant Colonel Allen, referring to sleep apnoea, recommends that "the subject undergo a case-specific assessment". Among the veterans we were assessing there

were none whose histories suggested the likelihood of sleep apnoea, hence there was no indication for undertaking sleep studies before final selection.

In our article, we did mention sleep apnoea, as this was considered a possibility in Veteran 5 during the flight. His temporary desaturation was readily reversed with his normal bronchoactive medication. There were no further desaturation events, making the diagnosis of sleep apnoea less than convincing. No other veterans were flagged as potential sufferers of sleep apnoea, and all were monitored at regular intervals visually, and by oximetry at least once during sleep. Cheyne–Stokes breathing was not mentioned in our article, as there was none among the veterans during assessment or while travelling.

I agree that a high altitude simulation test is easier and cheaper. Even though it would be absurd to suggest that all patients with cardiac or respiratory disease need to be tested in an altitude chamber, I would challenge the assertion that use of an altitude chamber is problematic. The chamber accurately and with ease provides the stepped rise in cabin altitude that could be expected on the flight, without adding nitrogen, a non-physiologically representative step suggested in Allen's recipe to achieve hypoxic conditions. The chamber allowed the easy addition and assessment of the effects of adding nasal oxygen prongs with variable oxygen flow rates, in the way we planned for the trip. The problem with a high altitude simulation test as described is that there is a single step to a less than accurate cabin altitude. The addition of nasal prongs to the high altitude simulation test mask as described would be impractical, if not impossible, and less accurate.

I challenge the assertion that the chamber run is potentially litigious. The run took the veterans to an easily controllable environment no more dangerous or challenging than they would experience on the flight. Indeed, it was safer, in that we had the ability to provide easily controllable simulated 1000ft or 2000ft steps to 8000ft. Each step was for as long as we wanted and was accompanied by full objective and subjective assessments. We did not go straight to "assigned altitude", as is the situation with the high altitude simulation test. The run could be aborted at any stage with ease.

Perhaps if Allen were to visit an altitude chamber, he would feel more comfortable with its safety.

In summary, I believe we provided an unusual but an accurate and safe environment in which we could assess the effects of altitude on a large group of aged veterans and predict their in-flight oxygen requirements. □

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