

The Western Front pilgrimage for World War I veterans, 1993

Health care planning for a successful outcome

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IN 1990, ON THE 75TH ANNIVERSARY of the Gallipoli landings, the Australian Government sponsored a successful pilgrimage of 60 Gallipoli veterans, nine war widows, 24 carers and five medical practitioners to the Gallipoli Peninsula. Remembrance ceremonies were held at Anzac Cove and the important battlegrounds inland. All returned to Australia without any major medical event.

Although most Australians are aware of the importance of Gallipoli and the yearly commemoration on Anzac Day, our country's efforts and sacrifices on the Western Front are probably less well known. Of 324000 soldiers sailing from Australia during World War I, 46000 died on the Western Front (about 18000 with no known graves), while 152000 sustained wounds.

In 1993, the Australian Government, in association with the Department of Veterans' Affairs (DVA) and the RAAF, sponsored another 75th anniversary pilgrimage, this time for Western Front veterans. To do this, a selection process was needed to ensure that all veterans had fair access to the trip and that those who went were fit for the extensive travel by air and road that would be required.

Health reconnaissance and planning

Before the trip, health information was gathered in relation to health risks, health support and services in France, and a reconnaissance mission was sent to the pilgrimage locations to assess transport facilities, accommodation, local hospital and ambulance support, and appropriate locations for breaks and toileting. At the conclusion of this trip a comprehensive health visit plan was prepared.

There was limited practical information in the literature to guide a mission of this type. In a review by Cummins et al of 577 deaths in flight in 120 airlines over the period 1977 to 1984,¹ 56% of deaths appeared to be cardiac-related, but there were also cerebrovascular events and pulmonary emboli. Most deaths (63%) were in people with no reported illness.

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Synopsis

- ◆ Preparing for a major overseas pilgrimage by World War I veterans requires special consideration because of their advanced old age.
- ◆ Selecting veterans or other aged people for the trip was guided by their current medical and physical condition, special needs, and ability to manage flight and travel by road.
- ◆ An altitude chamber was used to assess the physiological response to mild hypoxia expected in aircraft, and the response to oxygen.
- ◆ Oxygen supplementation was available to the veterans during flight, but was little used.
- ◆ The veterans travelled and returned safely.

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Two-thirds of deaths were in men, with an average age of nearly 54 years. The veterans travelling on the Western Front pilgrimage would all be over 90 years old.

Our best guide was the medical experience of the 1990 Gallipoli mission, which served as a starting point for our assessments.²

The selection process

When the pilgrimage was being planned in 1993 there were 920 World War I survivors (numbers have since dwindled to 21). A letter was sent to all eligible veterans at the time and 200 indicated an interest. A shortlist of 42 (28 veterans and 14 war widows) was compiled. In addition to known health problems, this shortlisting took account of service on the Western Front and the requirement for representation from the five AIF divisions and from each State and Territory of the Commonwealth.

The formal medical selection process began with an initial medical assessment by the veteran's general practitioner (GP), followed by a series of investigations and a final assessment, when required, by a geriatrician. The medical assessment itself was functionally oriented and aimed to screen out individuals with cognitive problems or unstable physical or mental disorders. The investigations conducted included a mental status questionnaire, complete blood examination and electrolytes, electrocardiogram, chest x-ray, respiratory function tests and arterial blood gas measurements.

The health criteria for selection were:

- ◆ independent mobility (a walking stick was a permissible aid, but not a walking frame)
- ◆ intact cognition, with no history of confusional states
- ◆ no breathlessness on minimal exertion
- ◆ continent of bladder and bowel
- ◆ absence of unstable medical disorders

When the completed health assessment proformas were received, the veterans' GPs were contacted to verify the information provided and the fitness-to-travel assessment. Despite doctors being given an extensive briefing on the potential health hazards of the trip for these older veterans, some had difficulty assessing veterans' fitness for travel. For this reason contact was made with each of the individual examining doctors.

For two of the veterans, further investigations were aimed at assessing the potential for hypoxia in a rising cabin altitude, and to help predict the oxygen requirements for the total group on the longest leg (non-stop Singapore to Paris). These investigations were performed in the altitude chamber at RAAF Edinburgh, with the help of Wing Commander Suresh Babu.

The final number selected for our mission was 14 veterans (average age, 95; age range, 92–98) and seven war widows (average age 83).

The chamber run

Two veterans were selected for monitoring during a five-step rise to 8000ft, stopping at 2000, 4000, 6000, and 7000ft. Climb rate was at 2000ft per minute. Both veterans were monitored with oximetry during quiet breathing and talking, and finally during a slow walk around the chamber. Oxygen via nasal prongs was added in the latter stage at 8000ft before return to sea level.

First subject: A 95-year-old veteran described as "fit", suffering from mild Paget's disease and dyspepsia. He was

Blood oxygen saturation in two World War I veterans undergoing simulated ascent to altitude in an altitude chamber

Altitude	Veteran 1	Veteran 2
Ground level (1022hPa)	97%	96%
2000ft	96%	96%
4000ft	93%–94%	92%–95%
6000ft	90%–92%	92%–95%
7000ft	88%–91%	87%–91%
8000ft—sitting	86%–90%	87%–90%
8000ft—walking	82%	82%
8000ft, with oxygen—sitting	93%*	94%†
8000ft, with oxygen—walking	98%*	95%†

*Oxygen via nasal prongs at 2L/min.

†Oxygen via nasal prongs, initially at 4L/min, then 2L/min.



Western Front pilgrims: War veteran Ted Smout (right), veteran's widow Gwen Serviss and Robert Healey, Department of Veterans' Affairs, in the Tyne Cot Cemetery.

obviously kyphotic and clinically appeared to have restrictive lung disease. He had an arterial PO₂ of 78mmHg at rest, with a forced expiratory volume in one second (FEV₁) of 1.9L.

Second subject: A 93-year-old veteran with a history of angina now described as "stable" with antianginal therapy (isosorbide and glyceryl trinitrate as required). Average of two anginal episodes per month. Arterial gases, PO₂ 83mmHg.

The blood oxygen saturation for the two subjects over the course of the chamber run is shown in Box 1. Although oxygen saturation fell away with increasing altitude, especially with walking, the use of oxygen via nasal prongs quickly restored oxygen saturation levels. Neither man experienced discomfort or illness during the test.

Assembly before departure

All travellers gathered at Lady Davidson Hospital, Sydney, two days before departure for final medical and equipment checks, formal departure ceremonies, and final administrative arrangements.

On the flight from Adelaide to Sydney for this gathering, we flew on an A320 Airbus and used the opportunity to gather more data on our two test subjects. On interstate flights, the A320 cruises at 31000–37000ft, reaching a cabin altitude of 8000ft.

Blood oxygen saturation fell to 87%–90% in Veteran 1 and 90% in Veteran 2 — both as predicted in the chamber run. Neither received supplemental oxygen for this short flight (90 minutes), and no angina was provoked in Veteran 2.

This was Veteran 1's first ever flight, and he spent the last 20 minutes, including the landing, in the cockpit.

Roll call for the mission party of veterans and war widows



Back row (left to right): Pat Graham (NSW), Peter Casserly (WA), Erica Weller (ACT), Ted Field (Qld), Winifred Shand (Qld), Ted Smout (Qld), Zoe Hall (WA), Hugh O'Donnell (SA), Howard Pope (SA), Gwen Serviss (SA), Alfred Evans (Tas), Margaret Burns (Vic). Front row (left to right): Alex Griffiths (NSW), Robert Comb (ACT), John Poulton (Vic), Augie Band (Qld), Stan Graham (NSW), Merv Lewis (Tas), Bill Davies (NSW), Bruce Heathcote (SA), Florence Carr (Tas).

Overseas aircraft preparations

The 1990 Gallipoli pilgrimage used a chartered Boeing 747-300 for the full mission, but the Western Front pilgrimage travelled on a routine commercial B747-300 flight via Singapore without stopover in Paris. The first leg of the flight was 8 hours, and the last leg was 12 hours overnight. However, the first and business class sections of the aircraft were dedicated to our mission and could be configured to suit our purposes.

The medical flight plan was to intervene as necessary according to the veterans' wishes. We were fully equipped for intensive therapy, including resuscitation and ventilation, in an area set aside with a stretcher in the main level business class area. The less fit travellers were seated in the first class cabin where access was easy, while the upper deck catered for the fittest.

Oxygen availability

We planned for sufficient oxygen to ventilate at least one person for the duration of the longest leg, and to provide oxygen therapy for all others if needed (ie, in case of distress or oxygen saturation below 90%). Six E-sized cylinders (volume 3800 L) were distributed and tied down in the first class and business class cabin on the main deck. Two C-sized

cylinders (volume 440 L) and six airline Scott cylinders (volume 1000 L) were available for mobile use as required. Oxygen tubing was provided from the fixed cylinders to strategically nominated seats as needed.

Oxygen saturation was measured in all travellers at least once during the trip at initial cruise level, and then again if altitude was increased. Further measurements were taken in travellers with oxygen saturation near 90%, those who were sleeping with or without sedative (alcohol or prescribed), or those who displayed confusion.

Pressurisation

The Boeing 747-300 (and 400) aircraft have good cabin pressurisation characteristics compared with the B-737 and A320. At a cruising level of 33000ft, the cabin altitudes are 4700ft for the B747-300 or 400, 5500ft for the B737 400, and 5900ft for the A320.

The maximum cabin altitude reached on all of our flights was 5200ft at a cruising level of 38000ft.

Medications

All regular medications were given on originating airport time, rather than aircraft time, as we were travelling through several time zones.

Air travel outcomes

The long flights to and from Paris were accomplished without serious medical incidents.

The maximum cabin altitude reached during the journey was 5200ft. Few travellers needed oxygen supplementation. We found that at altitudes below 3700ft there was no significant change in blood oxygen saturation in any of the travellers.

Selected histories

Veteran 1 (from the altitude chamber test)

At no stage did the flights reach a cabin altitude of 7000ft, the level at which, in the chamber run, Veteran 1 experienced falls in oxygen saturation below 90%. No oxygen was offered and he had a trouble-free trip.

Veteran 2 (from the altitude chamber test)

Veteran 2 maintained adequate oxygenation on the outgoing flight. From the second day in Paris, and from then on, he sustained regular attacks of angina in spite of several modifications of medication. He had one hospital casualty assessment after a longer attack, but there was no evidence of infarct.

During the flight home he started coughing infected sputum and was given antibiotics and oxygen (although his blood oxygen saturation always remained above 90%). On arrival in Sydney, he was admitted to hospital for continued treatment of pneumonia. He sustained a myocardial infarct five days later from which he died a further two days later.

Veteran 3

This man was a 97-year-old “fit and active” veteran who had lived with his daughter and son-in-law since his wife’s death 33 years before. He reported being “able to put my socks on by standing on one leg”! He was of quite short stature and had basal crepitations on examination. Investigations showed a PO₂ of 72 on air with a serum haemoglobin level of 111 g/L (normal range, 140–180 g/L). A comment in the initial examination (but not accurately reflecting normal physiology) stated that “the low PO₂ is of concern — probably associated with his low haemoglobin — if we fix that, he should be OK”.

On the first leg of the flight out, his initial blood oxygen saturation measured 93%. After the cabin altitude climbed to 5200 ft, he ate a meal, which was rapidly followed by a fall in blood oxygen saturation to 82%. It was postulated that this drop following eating may have been associated with his short stature, the sitting position, and diaphragmatic restriction with a full stomach. Oxygen at 2 L/min rapidly restored his oxygen saturation.

A similar drop in oxygen saturation on the return flight was noted — again, immediately after eating (this time with no

alteration of cabin pressure). He was electively offered oxygen for all subsequent meals and during sleep.

Veteran’s widow

An 84-year-old woman described as fit, with no reported history of disorientation, and an initial blood oxygen saturation of 97%, became disoriented during the flight, thinking she was on a train to Hong Kong. Her oxygen saturation at this time was 94% and there was no benefit with added oxygen. Reassurance and a short period with no further intervention led to an uneventful recovery.

Veteran 5

This 94-year-old veteran with obstructive airway disease lived independently, did his own shopping, had good exercise tolerance and looked after his 66-year-old son. His regular medications were salbutamol, ipratropium, and beclomethasone. During sleep on the first overnight flight, he was reported as having “sleep apnoea”, with blood oxygen saturation (previously 92%) falling to 81%. He was rapidly woken and given nebulised medication. No further treatment was needed for the remainder of the night. On the ground he was well with regular medications and had no restriction of his activities during the trip.

Veteran 6

This 95-year-old man had stable emphysema and a measured PO₂ on air reported as 74 mmHg. Our expectation was that he was likely to need oxygen at some time, but his oxygen saturation remained above 90% at all times.

Discussion

Since 1990, DVA has conducted 10 major veteran pilgrimages to battlefields in many parts of the world, including some where there is little medical or logistic support. Careful and detailed health planning is essential to reduce the health risks associated with taking veterans to these locations. Health screening of veterans is required to exclude those with unstable health problems, or health conditions that would be severely compromised by travel, hypoxia or climate change. Additionally, because of logistical problems in some locations, screening is important to exclude those with major degrees of physical disability.

Using the altitude chamber as part of screening and assessment helped predict the potential for oxygen desaturation at high cabin altitude. The two veterans who underwent the chamber run showed the predicted levels of oxygen saturation during the actual flight. The chamber run, however, did not help predict the onset of angina which affected Veteran 2.

Well-screened older veterans can be included in these pilgrimages, but most require high levels of personal care and

support. The nature of the medical support required depends on the health of the veterans and local health facilities that are available. In general, doctors and nurses travelling with the veterans should have knowledge of aviation and travel medicine, and experience and empathy in providing geriatric care.

To date there have been no deaths of veterans on any of the official pilgrimages. We would like to suggest this is a result of good proactive planning and management, but we would certainly acknowledge there may be also an element of good luck.

Acknowledgements

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2. Heath D, Williams DR. Man at high altitude, 2nd ed. Edinburgh: Churchill Livingstone, 1981: 56-65.

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