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LESSONS FROM THE WATERFALL INQUIRY

On 31 January 2003 a train travelling from Sydney to Port Kembla left the track at high speed just south of Waterfall railway station. The train driver and six passengers died and another 41 passengers sustained injuries. A special commission of inquiry was formed and the final report is available on the internet\(^1\). The inquiry concluded that the train driver had suffered a sudden incapacitating heart attack and the deadman system had failed to operate as intended. The safety regulatory system, in place to prevent incidents of this type, had failed and was identified as an indirect or latent cause of the accident.

The majority of the report addresses the findings of a safety systems review using the airline industry as a model. The report is informative, illuminating and educational for anyone with responsibilities for regulation or operation in the transport industry.

Of interest to aerospace medicine practitioners is the role of periodic medical examinations addressed in chapter 13 of the final report. Medical examinations of railway critical safety workers in NSW had not been conducted to the standards accepted in the airline industry. The scope and nature of periodic medical examinations was reviewed and a number of critical safety roles were identified. By inference, flight attendants have critical aviation safety roles and hence a minimum standard for medical examination would now appear to represent best practice.

The report identified six main areas required for periodic medical examinations and these are relevant to aviation. Firstly, a predictive element will assist in determining safety critical personnel at high risk for sudden incapacitation. The point system based on cardiovascular risk used by the Civil Aviation Safety Authority (CASA) was accepted as a suitable model.

Secondly, medical practitioners conducting periodic medical examinations are required to have skills and experience in occupational health beyond those of the average general practitioner. CASA has specified the Australian Certificate of Civil Aviation Medicine\(^2\) as a minimum for appointment as a Designated Aviation Medical Examiner (DAME) as well as a requirement for ongoing professional development in aviation medicine. These requirements should now be mandatory. In addition, there must be an understanding of the nature of the duties being performed by safety critical workers. Security restrictions since the terrorist attacks on 11 September 2001 have limited access to flight decks of commercial aircraft. It is time to develop procedures to restore DAME access to flight decks without compromising security.

Thirdly, examiners require access to medical histories when conducting examinations. This is potentially available to DAMEs using the CASA online medical record system (MRS). However, MRS has been in development for six years, is slow and fraught with problems reflecting a lack of commitment, resources and expertise.

Fourthly, there is a requirement for a system for follow-up or referral of patients where there is the possibility of some significant health risk which requires assessment beyond the expertise of the examining practitioner. The current system for DAMEs meets this requirement.

Fifthly, there is a requirement for reviewing reports from medical examinations by appropriately qualified occupational physicians. CASA is deficient in this regard and has not been staffed by occupational physicians, or even practitioners with formal post graduate qualifications in aviation medicine, for over 12 months. The recent CASA advertisement for a senior medical officer does not specify a requirement for occupational medicine qualifications.

Finally, there is a requirement for monitoring of the medical histories of employees to identify trends that may indicate a deteriorating state of health. CASA does not have a record system with this functionality although this is now well within the capabilities of even modest computer systems.

The Waterfall inquiry report provides an opportunity for CASA to review its policies and processes including aviation medicine aspects. Considerable resources have been injected into aviation security in recent years to prevent terrorism, but the crucial role of the medical examination to identify psychiatrically disturbed aircrew or aircrew applicants has been overlooked. The inadequacy of staffing and resources in the Aviation Medicine section within CASA has been evident at DAME sessions at recent ASAM annual scientific meetings and reflects the low priority CASA now affords to aviation medicine. The loss of appreciation of the pivotal role of aviation medicine to flight safety is also evident from the delays in the development of MRS online, the high rate of medical officer turnover in CASA in recent years, the removal of the Director position, the failure to fill two of the only three current medical officer positions (including that of Principal Medical Officer) for over 12 months, the failure to specify appropriate qualifications for the positions as well as failure to create sufficient positions and at a level commensurate with the responsibilities. Aviation medicine within CASA no longer meets best practice requirements for the aviation transport industry. An aviation transport accident analogous to the Waterfall rail transport accident is avoidable.

Warren Harrex

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2. See page 26
The Institute of Aviation Medicine Aircrew DNA Repository – overview of a model for a voluntary DNA repository

Dr Adrian Smith, CSM BMBS DAvMed

Early in the evening of 12 June 1996, two Black Hawks from the Army’s 5th Aviation Regiment collided during a counter-terrorism training exercise, causing the Australian Defence Force’s worst military aviation accident for 24 years with the loss of 18 lives. The Board of Inquiry convened to assess the circumstances surrounding the accident highlighted the difficulties associated with disaster victim identification following a military aviation accident, and recommended the collection and central storage of deoxyribonucleic acid (DNA) from personnel involved in "high-risk" counter-terrorism-related aviation duties.

Disaster victim identification

Disaster victim identification (DVI) is the coordinated process by which human remains are identified. Accurate identification of human remains is an important coronial function in that it allows the issue of a Death Certificate, and this is essential for maintaining accurate public records, executing wills, settling estates, claiming insurance, allowing the remains to be released to family members for burial or cremation, and allowing the eventual re-marriage of the surviving spouse.

Dental identification is often the primary method of disaster victim identification due to the frequency in which dental anatomy and restorations are preserved in traumatic deaths\(^1,2\), however the degree of body fragmentation during an aircraft accident can limit the usefulness of physical identification. A British review of 33 aircraft accidents reported successful identification of human remains in only 80% of 1829 fatalities\(^3\) and Smith found that 32.4% of Australian military aircrew fatalities during the period 1945-2002 sustained injuries which were severe enough to prevent their remains from being identified to the satisfaction of modern forensic standards\(^4\).

The desire to develop a means of facilitating the identification of Australian Defence Force aircrew fatalities precedes the Black Hawk tragedy. In 1971, an aircraft accident investigation report recommended the establishment of a fingerprint and footprint database, and in 1976 a forensic pathologist recommended that "tissue types" of Australian Defence Force aircrew be pre-established to assist the identification of their remains.

The use of DNA in disaster victim identification

Modern standards of disaster victim identification encourage forensic authorities to include DNA as a tool in the identification process where dental identification has failed\(^1,2\). Successful identification of remains using DNA depends on the availability of ante-mortem references DNA profile as well as good-quality post-mortem tissue which yields viable DNA to which the ante-mortem reference can be compared. This process normally requires the involvement of family members to provide a tissue sample or to gain access to

Royal Australian Air Force Institute of Aviation Medicine

Dr Adrian Smith. Formerly, Staff Officer 3 Aviation Medicine, Australian Army.

Correspondence: Dr Adrian Smith. Aviation Medicine Specialist, BAE Systems Aeromedical Centre PO Box 98, Dhahran 31932, Kingdom of Saudi Arabia. Tel: +966 3 8827711 Ext 2701

E-mail: docamsmith@hotmail.com
personal items as a potential source of reference DNA; the involvement of family members in this process has been reported to cause additional distress to already-grieving families. In addition to the potential distress to family members, there are circumstances where aircrew may not have blood-relatives from which reference DNA can be obtained, or where biological parentage is unclear.

Modern storage techniques allow reference DNA to be extracted from a blood sample many years after being stored on cards treated with a DNA preservative (eg. FTA Card, Whatman BioScience, UK). As a result, tissue samples can be collected and stored under conditions which would allow a reference DNA profile to be generated at a later date without involving family members.

**Australian privacy legislation**

The Commonwealth Privacy Act (1988) governs the manner in which personal information is collected and used in Australia; tissue samples collected for the harvest of DNA fall under the term “personal information”. Through its 11 Information Privacy Principles, the Privacy Act defines the manner in which personal information can be collected, and the administrative responsibilities of record-keepers for the storage and security of the information once it has been obtained. The Privacy Act emphasises the general consideration that personal information should be provided voluntarily in the context of informed consent. Furthermore, record-keepers may not use or disclose personal information for any purpose other than that for which it was collected without the person’s consent unless the record-keeper reasonably believes that use of the information for the other purpose is necessary to prevent a serious and imminent threat to a person’s life, or the use of the information for the other purpose is required by law (including for the enforcement of criminal law).

**DNA repositories in the Australian Defence Force**

The Australian Defence Force has attempted to establish a DNA repository for service personnel before, however each of the attempts was abandoned due to the lack of legislation to allow the compulsory collection and storage of blood samples for inclusion in a DNA Repository. In addition, the proposed models attempted to prohibit the use of the DNA sample for non-DVI purposes. Blood samples collected as part of these repositories have been destroyed.

Acknowledging that modern military aviation is a high-risk occupation and that military aircraft accidents are associated with extensive tissue fragmentation likely to limit the usefulness of non-DNA-based identification, the Institute of Aviation Medicine reviewed legal advice from the Information and Security Law Division of the Attorney-General’s Department which concluded that “an interim voluntary [DNA repository] could be established within existing Australian Commonwealth privacy legislation”. Following further advice from the Defence Legal Services, the Institute of Aviation Medicine established a voluntary DNA Repository for aircrew. The Aircrew DNA Repository was spear-headed through Australian Army Aviation in January 2003 before being introduced to other Australian Defence Force aircrew populations. At the time of writing, the Aircrew DNA Repository remains an initiative of the Institute of Aviation Medicine and does not reflect official Australian Defence Force or Defence Health Services Branch policy.

**InterPol guidelines on the use of DNA in disaster identification**

InterPol guidelines for the use of DNA in disaster victim identification require samples to be collected, handled, and stored in a manner which prevents the sample from being tampered with or lost, contaminated with secondary sources of DNA, or experiencing decomposition. A “no-touch” collection technique with single-use items and latex gloves is required. The collector must only process one sample at a time, sealing the sample and allocating a unique identification number at the time of collection. Blood samples should be stored on a card treated with an approved DNA-preservative, and then placed in a breathable bag with a sachet of desiccant. Samples should be stored at room temperature in a secure location out of direct sunlight. The collector must record their name to assist forensic authorities to deconflict stray DNA if the sample is found to have been contaminated during the collection process.

**Military DNA repositories. American and British experience**

The US Department of Defense has a large DNA repository, accumulating almost three million samples since it was established in 1991. All US service personnel are required to have a blood sample stored at the Armed Forces Repository of Specimen Samples for the Identification Remains under the auspices of the Armed Forces Institute of Pathology. The Armed Forces Repository collection protocols require blood samples to be air-dried for up to one hour before being sealed in the storage envelope. The samples are held for a maximum of 50 years, however service personnel who have completed all compulsory reserve service can request that the samples be returned to them or destroyed. The Armed Forces Repository model allows the release of blood samples for a non-DVI purpose where the specimen sample is needed for the investigation or prosecution of a crime punishable by one year or more of confinement and
where no reasonable alternative means for obtaining a specimen for DNA profile analysis is available. In these circumstances, the Armed Forces Repository must be compelled by a judicial order to release the sample in the context of applicable law.\textsuperscript{1,2,3,14}

In the United Kingdom, the Royal Air Force maintains a voluntary DNA repository for British military aircrew.\textsuperscript{15} Blood samples are collected during initial aircrew medical examinations, and clearly-labelled sealed envelopes containing an approved storage card and desiccant are held securely at the Centre for Aviation Medicine. The samples are to be held for a maximum of 45 years and can be returned to the member after they discharge from military service or at any other time they request. Use of the samples is only approved for the identification of aircraft fatalities, however there is no formal structure in the Royal Air Force model to manage the legal intricacies of a non-DVI request.

**The Institute of Aviation Medicine’s aircrew DNA repository**

The Aircrew DNA Repository was developed by the Institute of Aviation Medicine with three principles in mind: it must be truly voluntary, with members being able to opt-in or opt-out without administrative consequences; it must comply with all existing legislation regarding the storage and handling of personal information; and members must give informed consent, acknowledging that although the intended purpose for which they have given the sample is for service-related aircraft accident DVI the law can require the samples to released for other purposes, and that this may include release to police officers for the “reasonable” investigation of crime.

**Briefing and consent**

Aircrew are invited to attend a collective brief describing the principles of DVI, the importance of DNA-based identification in military aviation fatalities, the benefits of having a blood sample stored in a DNA repository, the collection procedure, and the protocols, procedures, and safeguards designed to prevent inappropriate and unauthorised access to the repository and its samples. The voluntary nature of participation is highlighted, as is the fact that there are circumstances where the law may require the samples to be released for non-DVI purposes. The presentation and the accompanying handout are delivered in a plain-English “question-and-answer”-style format. These are summarised in Table 1. The brief can be delivered as part of a unit safety stand-down day, aviation medicine initial or refresher training, pre-deployment training, during a dedicated squadron visit, or delivered to individual aircrew during their annual medical examination.

- What is DNA?
- What is DNA used for?
- Why does the Institute of Aviation Medicine want a DNA sample from me?
- How will my DNA be collected?
- How will my blood sample be stored?
- What is a ‘DNA Repository’ and what is it used for?
- Could my body still be identified if my blood isn’t held in the DNA Repository?
- Who can have access to my DNA held in the DNA Repository?
- Do I have to participate in the DNA Repository?
- What will happen to me if I decide not to give a blood sample?
- What are the benefits to me of participating in the DNA Repository?
- Will my blood be kept by The Institute of Aviation Medicine forever?
- What legislation protects my blood from being released without my consent?
- How will my blood be released?

**Table 1. Topics covered in the plain-English Informed Consent Brief**

Following briefing, time is allocated for open-forum questions. Aircrew are then invited to have a blood sample collected for the Aircrew DNA Repository. Before providing a blood sample, aircrew are required to sign an informed consent form acknowledging that there are circumstances where access to the blood samples for other purposes may be authorised by law, even though the intended purpose of the DNA repository is restricted to service-related aircraft accident DVI. The consent form, summarised in Table 2, reinforces the voluntary nature of having a blood sample stored in the Aircrew DNA Repository.

1 (full name, date of birth, service number of donor), having read the information in this consent form, freely consent to providing a blood sample to be held in the DNA Repository until such time as:
- it is required for disaster victim identification in a service-related aircraft fatality;
- I am discharged from the Australian Defence Force;
- the sample has been stored for 50 years; or
- I withdraw my consent.

I understand that this consent enables The Institute of Aviation Medicine to release my blood sample for “service-related aircraft accident” disaster victim identification and for no other purpose except where authorised or required by law.

I understand that there are circumstances where the law authorises or requires the use or disclosure of information held in the DNA Repository for purposes other than the identification of human remains in the event of an Australian Defence Force service-related aircraft accident, and this may include disclosure to civilian or military police.

Signed and dated (by the donor).
Sample taken for DNA Repository on (date) by (name and service number of person collecting the blood sample).

**Table 2. Outline of informed consent**
Sample collection

The Aircrew DNA Repository collection kits are prepared at a per-unit cost of approximately $6.50 by a company that supplies forensic collection kits to Australian police forces. The collection kits are provided in a tamper-evident plastic bag containing an FTA-treated collection card, a sachet of desiccant, a series of barcodes, and a storage envelope (Figure 1).

The person collecting the blood sample (“the collector”) must confirm the identity of the aircrew member wanting to participate in the DNA Repository (“the donor”) by inspecting their photographic military identification card. The donor is then invited to read and sign the consent form. The collector dons latex gloves, cleans one of the donor’s finger-tips with an alcohol swab, draws blood with a single-use lancet, and then applies the blood sample onto one of the porous surfaces on the DNA collection card. The donor signs the front of the collection card and then writes their name, date of birth, and service number on the collection card (Figure 2) and the storage envelope. The collector applies a numbered barcode sticker to the card and the front of the storage envelope. The collector must then verify that the identifying details on the collection card match those on the envelope before placing it inside the storage envelope with a sachet of desiccant (Figure 3). Bar-coded stickers are then placed across all of the envelope flaps. To complete the process, bar-coded stickers are also applied to the consent form, an Outpatient Clinical Record, and a DNA Repository participant card. It is important to note that the collector must only process one person at a time, and that the donor must remain with their sample until it has been sealed inside the envelope and all documentation has been completed.

After the sample has been taken, the donor is given a DNA Repository Participant Card (containing the bar-code number for their personal records) and the Outpatient Clinical Record is filed in their medical documents. The sealed sample and the consent form are then forwarded to the Institute of Aviation Medicine using protocols established for the transport of medical-in-confidence documents. Once the sample arrives at the Institute, the repository custodian confirms that the envelope is sealed and that the name, date of birth, and barcode on the envelope match those on the accompanying consent form. The sample identifiers and the date of collection are entered into a password-protected database and the sample is then locked in a fire-resistant safe.

Storage and retrieval of DNA samples

In order to protect the integrity and physical security of Aircrew DNA Repository samples, they are stored in a fire-resistant safe in a non-public-access location within the Institute of Aviation Medicine. Sample identifiers are entered into a password-protected database. Standing Instructions restrict access to the Aircrew DNA Repository (including its samples and corresponding records) to the three military aviation medical officers posted to the Institute of Aviation Medicine - the Commanding Officer, Chief Instructor, and Staff Officer Grade 3 Aviation Medicine.

Aircrew DNA samples will be stored until one of the following circumstances arise – a) it is required for identification of a service-related aircraft fatality; b) the member withdraws consent or discharges from the Australian Defence Force; c) 50 years have elapsed since the sample was taken; or d) for a purpose required or authorised by law in accordance with the Privacy Act 1988.

If a blood sample is required for the identification of a service-related aircraft fatality, the sample will be forwarded to an authorised delegate of the Australian Defence Force’s Directorate of Flying Safety or a State Coroner by certified mail. If a request is made for access to a blood sample for a purpose unrelated to the identification of a service-related aircraft accident fatality, this request will be evaluated by the Defence Legal Services and the sample will be released only if the request is determined to be valid in the context of existing privacy legislation.

Being a voluntary system, aircrew are able to withdraw consent at their discretion. After notifying the repository custodian that consent has been withdrawn, the aircrew member is given the option of having the sample returned to them or...
having the sample destroyed. On request, the sample will be incinerated by an Aircrew DNA Repository custodian and witnessed by two other people, one of whom must be a military officer or senior non-commissioned officer. All three people sign a certificate of destruction which is forwarded to the aircrew member to confirm that the sample has been destroyed.

Discussion

The Aircrew DNA Repository model - the procedures for consent, collection, documentation, and sample security outlined in Table 3 - was endorsed by the Defence Legal Services in December 2002 and received command approval from Australian Army Aviation soon after. At the time of writing it had also received support from the Directorate of Flying Safety, Air Combat, Air Lift, Maritime Patrol, and Aerospace Operations Support Groups. The Aircrew DNA Repository model was presented at the InterPol 15th Meeting of the Standing Committee on Disaster Victim Identification, receiving support from the DNA Expert Monitoring Group and conference delegates.

In the 12 months following the introduction of the Aircrew DNA Repository, the author’s experience is that it has been well-received by aircrew, with a near-universal indication of intent to participate and approximately 85% of aircrew providing a sample following the briefing. Anecdotally, the predominant reason cited by aircrew who did not provide a DNA sample was lack of time “at the moment”; many of these aircrew, however, expressed an interest in providing a sample at a later time. The main questions raised by aircrew during the open forum question session are “Why is it only for aircraft accidents?” and “Why is it only for aircrew?”; the answers to these questions fall outside the Institute of Aviation Medicine’s sphere of influence.

The Aircrew DNA Repository model has been viewed with interest by civil and military forensic authorities who are struggling to find a means to balance the competing requirements of a large-scale DNA repository (which would assist forensic authorities in disaster victim identification) and privacy legislation (limiting access to personal information for purposes to which the person has not consented). It has demonstrated that a voluntary DNA repository is a feasible, cost-effective, and practical approach to balancing these considerations, and may be a legitimate alternative to undertaking substantial changes to privacy legislation.

The Black Hawk Board of Inquiry heard evidence that “the identification would have been expedited and less stressful for next-of-kin had the DNA profile of the deceased been known”. As this quote indicates, the spirit of the Aircrew DNA Repository is to assist the identification of aircrew without causing additional distress to already-grieving next-of-kin.

Acknowledgment

The author is grateful to Group Captain Tracy Smart for permission to submit this article after discharge from the Australian Defence Force.

Disclaimer

The views, opinions, and/or findings in this report are those of the author and should not be construed as an official policy of the Royal Australian Air Force or the Australian Defence Force. Furthermore, the Institute of Aviation Medicine’s Aircrew DNA Repository does not reflect official Defence Health Services Branch policy. Citation of trade names in this report does not constitute an official endorsement or approval of the use of such commercial items.

Table 3. Summary of Standing Orders, defining the general structure and administration of the Aircrew DNA Repository

<table>
<thead>
<tr>
<th>Security and access</th>
<th>Request for release of DNA sample from Repository for any other reason;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of the physical security requirements for the DNA Repository (including fire-resistant safe);</td>
<td>Procedures to follow if a donor:</td>
</tr>
<tr>
<td>Commanding Officer, Institute of Aviation Medicine is custodian of the DNA Repository.</td>
<td>discharges from the Australian Defence Force;</td>
</tr>
<tr>
<td>List of people to whom authority to access Aircrew DNA Repository samples can be delegated, and the circumstances in which this would be allowed; and</td>
<td>withdraws consent; or</td>
</tr>
<tr>
<td>Reasons for legitimate access to the DNA Repository.</td>
<td>requests that their sample be returned to them or destroyed.</td>
</tr>
<tr>
<td>Procedures for release of sample</td>
<td>DNA Repository Administration</td>
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<tr>
<td>Request to release a DNA sample for Australian Defence Force service-related aircraft accident Disaster Victim Identification;</td>
<td>Procedures for entering blood samples into the computerised DNA Repository Register;</td>
</tr>
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<td></td>
<td>Auditing procedures for DNA Repository;</td>
</tr>
<tr>
<td></td>
<td>Procedure for destroying a sample held in the DNA Repository; and</td>
</tr>
<tr>
<td></td>
<td>Distribution of samples in the event of disestablishment of The Institute of Aviation Medicine.</td>
</tr>
</tbody>
</table>
References

5. InterPol. Guidelines for the use of DNA in Disaster Victim Identification. Lyon: InterPol; 2003
10. Armed Forces Institute of Pathology (US). The Department of Defense DNA Registry. Downloaded 14 April 2003 from www.afip.org/Departments/oatme/dna/index
Remembering Lieutenant Merz: Australia’s military aviation medical officer pioneer

Dr. Tracy L. Smart, BMBS DAvMed

The Early Years

George Pinnock Merz was born at Prahran in Melbourne on 10 October 1891, the second child and only son of George and Annie Merz. When he was about six years old, the family moved to Ballarat where Merz began his education at the highly regarded State School No. 34 in Humffray St. Merz was dux of the school in 1905. He went on to attend Grenville College where he continued to excel, passing both junior and senior public school exams and matriculating on 31 March 1909. He also won an exhibition prize of 200 pounds towards studies at the University of Melbourne.

Merz began a medical degree at the University of Melbourne in 1909, deciding on this career because he had a genuine wish to help people. He obtained honours in Therapeutics, Diet and Hygiene, Medicine, Clinical Medicine and Obstetrics and Gynaecology. In addition to excelling in his medical studies, Merz commenced his association with the military and was commissioned as a 2nd Lieutenant in the Melbourne University Rifles (MUR) on 16 May 1913.

An Interest in Flying

As the world geared up for war in 1914, Merz was preparing for his final examinations in medicine to be held in August. He also became enthused by the idea of flying, probably fuelled by the news of the new military flying school at Point Cook, on the outskirts of Melbourne, and the first flights undertaken from the School by Lieutenants Henry Petre and Eric Harrison. His interest was further piqued by the announcement that military officers, one from the permanent staff and three from the citizens forces (of which the MUR was a component), were to be trained as aviators commencing on 17 August 1915. The three month course was to include training in a variety of aviation related subjects including the Art of Flying, engineering, navigation and identification of warships and aircraft of other nations. Merz met the criteria for selection as a pilot trainee in that he was aged between 20 and 26 years old, held the rank of Lieutenant, had been commissioned for two years, weighed less than 14 stone, and was unmarried. He was also adjudged to be fit to fly, in that he was free from organic disease, had normal vision, did not have a history of hernia (“not ruptured”), and was capable of bearing the fatigue associated with flying.

Merz was convinced that he had to take advantage of this opportunity. According to his father, Merz “…asked me to let him take up flying for 3 months as he had 5 years hard studying for Medicine. The wife and I allowed him to go.” George qualified for his degree in medicine on 21 September 1914 however, even before graduating, he was selected to begin training on the first ever flying training course at Central Flying School (CFS), Point Cook.
The First Course

On 18 August 1914, two weeks after the outbreak of war, Merz and his fellow students, Captain Thomas White and Lieutenants Richard Williams and David Manwell, began flying training at CFS. Point Cook was little more than a sheep paddock at this time with corrugated iron and canvas hangars, a barracks block, and tents for officer accommodation. Merz, the youngest of the four, was the first of his course to fly, taking off in a Bristol Boxkite at 0550 with Harrison as pilot. His first flight lasted five minutes, covered three miles, and reached an altitude of 100 feet

![Lt G.P. Merz in uniform](source: Mrs. Alice Greetham)

The Boxkite, also known as the “Beginner’s Bus”, was a light weight, biplane which had neither cockpit nor fuselage. It had a maximum speed of 65 miles per hour and its only instrument was a glass tube alongside the pilot’s seat through which oil passed. Apart from this rudimentary fuel gauge, pilots were required to use their senses to interpret flight parameters. According to White, “…one’s ears did duty as engine counters; the rush of air in the face told whether the climb or glide was at the right angle…” The student sat behind the instructor, both on wooden seats and without a harness, meaning that a bumpy landing could eject both pilot and seat from the aircraft. There were no dual controls and therefore students were required to put their hand on the instructor’s hand, which was guiding the control stick, and watch the instructor’s feet. After a few familiarisation flights, instructor and pupils swapped places and a few flights later the pupil was allowed to go solo. Once solo, according to Williams, “…the pupil received no further instruction unless he sought it, something the confident young man seldom does."

Although beaten to the honour by Manwell, Merz had his first three minute solo flight to a height of 100 feet on 4 September 1914. Instructor reports indicate that he was somewhat slow to start, however Merz soon became the literal high flyer of the group, often attaining altitudes of seven to eight hundred feet. Merz may have had somewhat of an advantage over his classmates, as at five foot seven inches and 10 stone (170 cm, 64 kg) he was the smallest and lightest of the aviators. Unlike his fellow students he also managed to avoid major mishaps. On 29 October 1914, after just under seven hours of flying in the Boxkite of which only three hours were solo, Merz became the first of the group to undertake the “A” Flight of his Brevet test. Unfortunately he missed the landing and had to retest. Williams was therefore the first pilot to gain wings in military flying in Australia while Merz followed two days later on 14 November 1914.

During the course, the students had flown as passengers in one of the School’s more advanced trainers, the BE2a. At the end of the course Merz and Williams were permitted to fly this aircraft after taking the Boxkite to 1500 feet, turning off the engine and landing it without restarting. Merz reached an altitude of 2000 feet in his 21 minute flight but later discovered that the ceiling of their trainer was only 1100 feet. Merz flew two sorties in the BE2a including a 19 minute flight to Williamstown reaching the dizzying height of 3500 feet.

The course officially finished on 28 November 1914. Merz was the outstanding student on the course gaining a distinguished mark in every subject and passing with Honours overall. He graduated from the course with a total of 10 hours and 25 minutes of flying time on the two aircraft types, of which half was solo. Overall, the reports on Merz were glowing. He “…handled his machine with skill and judgement” and “…should make a good Flying Officer, both for regimental duty or on the Staff.” This is in marked contrast to some of his fellow students. White was described as “…an unreliable flyer, wanting in judgement”, and Manwell “…showed such incompetence and want of judgement, that it is a little doubtful whether he would make a good Flying Officer.”

Merz was awarded Royal Aero Club aviation certificate number 1026 upon graduating, which was the equivalent of an international civil aviation licence. There was no formal Wings ceremony as the design for the badge had not yet been finalised. The newly graduated pilots did not receive their Wings until January 1915 when they had to purchase them at a cost of three shillings and sixpence each. By this time, the next phase of Merz’s career had already begun.

Australia’s First Military Aviation Deployment

On 27 November 1914 CFS staff were informed that air power was required in German New Guinea in support of the Australian Naval and Military Expeditionary Force. It had been decided that the emerging technology would prove invaluable in reporting on the position of German ships. Captain Harrison was selected to lead the mission and he selected Merz to accompany him as second pilot and second in command. Two aircraft were chosen
for the task – a BE2a and a Maurice Farman Hydroplane, donated by a private citizen\textsuperscript{19}. Merz and the party, which included four mechanics, the aircraft and 12 months of stores, were ready to leave the following day\textsuperscript{20} and set sail from Sydney on 29 November 1914, aboard the HMAS Unna\textsuperscript{19}. This represented the Australian military’s first operational aviation deployment.

The aviation force sailed first to Wilhelmshafen (Madang), where Merz succumbed to malaria and then on to Rabaul, arriving on 17 December 1914. On the way, the aviators and mechanics spent their time making bombs from 36 lb lyddite shells fitted with small propellers to ensure a straight descent\textsuperscript{21}. By the time Merz arrived, the strategic situation had changed. The Germans had withdrawn northwards and Australia’s mission was confined to the Southern islands of New Guinea. As a result, the aircraft were not even unpacked from their crates, a major disappointment to the small aviation task force. Merz returned to Australia on 20 January 1915.

**Student Turns Instructor**

Merz returned from New Guinea with the intention to head off to war as a Regimental Medical Officer with his friend and colleague Thomas White as he did not believe he would see action as an aviator\textsuperscript{13}. Before he was able to do so, Merz was selected by Petre and Harrison to join the instructing staff at CFS as the second course was starting in March 1915 and was to consist of eight students – a heavy workload for just the two of them. This did not sit favourably with Merz at first and he informed the Army that he was primarily a doctor and saw flying as merely a hobby. Apparently a compromise was reached and Merz agreed to remain at CFS provided he could continue his medical work at the Melbourne Hospital twice a week\textsuperscript{10}. Merz celebrated his return to Point Cook with his longest and highest flight to date - a 45 minute flight in the BE2a over Melbourne at 6000 feet\textsuperscript{22}.

Merz shoulder ed much of the workload during the early phases of the course, flying up to 16 sorties a day and over 16 hours out of a total of nearly 47 hours for the entire second course, which included student solos\textsuperscript{11}. Unlike the first course, the second course was relatively uneventful with no student mishaps. The report on the course attributed this to more thorough tuition in the early stages of the course\textsuperscript{23}, no doubt in part a reflection of Merz’s abilities. Despite his heavy workload combining flying and medicine, he found time to become engaged to a nurse, Miss Dora Rowe, during this period\textsuperscript{3}.

**Formation of the Half Flight**

Even before Merz began his work at CFS, events were unfolding that would determine his future path. The British and Indian Army campaign in Mesopotamia had begun in November 1914 and plans were underway to advance up the Euphrates and Tigris Rivers in preparation for taking Baghdad. It was considered that airborne reconnaissance could prove decisive in this campaign. On 8 February 1915, the Commonwealth Government received a request from the Indian Government to supply trained airman, flying machines, motor transport, mechanics and spares to support the campaign. Australia responded two days later, offering airmen and mechanics but not aircraft\textsuperscript{24}.

On 23 February 1915, the Minister for Defence, Senator Pearce, announced that Australia would be sending a small team under the command of Captain Petre, which would include two or more military aviators, mechanics, a travelling workshop, vehicles and horses\textsuperscript{25}. The Half Flight, a Flying Corps of 45 personnel (including four airmen), was formed shortly thereafter. Once again Merz was hand picked by his instructors for an important role and was joined by Captain White and Lieutenant Treloar, who had learnt to fly in England\textsuperscript{26}.

Merz completed his application for a Commission into the Flying Corps on 10 April 1915 in preparation for his departure to Mesopotamia. However as students on the second course had not yet gone solo, to his great disappointment, he was advised that his departure would be delayed by a month\textsuperscript{24}.

Before they departed, the officers of the Half Flight joined other members of Australia’s fledgling aviation community in attending the inaugural meeting of the Australian Aero Club, held on 9 April 15 at the Café Français. Petre was elected President of the Club, with the youthful Merz becoming a member of the committee\textsuperscript{27}. Petre sailed for Bombay as the Advance Officer on 14 April 1915, with White leading the rest of the party, with the exception of Merz, on 20 April.
Off to the Great Adventure

Merz finished his duties at Point Cook three weeks before the completion of the second course. On 12 May 1915, he undertook a farewell flight of 1 hour and 12 minutes over Broadmeadows and Bundoora, his last view of Australia from the air. He left for the front on 18 May 1915 on the P&O Mail Steamer Mooltan and was undoubtedly delighted to discover medical and nursing colleagues of the 3rd Australian General Hospital on board.

The Mooltan was a regular passenger ship and Merz was allocated a First Class Saloon ticket as were most of the other doctors on board, much to the chagrin of the nursing staff. Despite these relaxed surroundings, for the hospital personnel, life on board the ship did not resemble a cruise. Physical training sessions were organised twice a day (optional for the officers and nurses), there were frequent kit inspections and needle parades, first aid and nursing lectures were given to the medical orderlies, and military lectures to the nurses. A Medical Society, which was open to all medical officers, met every morning to discuss topics such as general medicine, surgery and pathology. The ship made calls at Port Adelaide, Fremantle, Columbo, and Bombay where Merz disembarked for final passage to Mesopotamia.

Air Operations in Mesopotamia

The majority of the Half Flight had arrived in Basra on 26 May 1915 where they became part of Indian Expeditionary Force ‘D’. The Australian airmen were joined by two officers of the Royal Flying Corps, Majors Broke-Smith and Reilly and Lieutenant William Wallace Burn, an Australian-born New Zealand Army officer who had learned to fly in England. The Half Flight was provided with two Maurice-Farman Shorthorn biplanes, known by the airmen as “Rumpeties”, which were unreliable and so underpowered that they often flew backwards in the local seasonal wind known as the shamal.

Within four days of arriving, the airmen of the Half Flight participated in their first missions as part of an advance up the Tigris River. The airmen were of great assistance in this advance, providing valuable reconnaissance information in the mostly flooded area around Amara, which was eventually taken on 2 June 1915. The aircraft had an instant impact, as an advance had not been possible for several months. Petre believed that the Arabs had been frightened by their first glimpses of flying machines and that the Turks viewed it as a sign of technological edge with which they could not compete.

Merz joined his colleagues on 13 June 1915. To avoid confusion in the multi-national force, he had been granted a commission in the Royal Flying Corps on 5 June 1915 however maintained his rank and Australian uniform. He arrived at the worst possible time of the year. The aircraft park was surrounded by flood waters yet it did not rain and temperatures were usually in excess of 110 degrees Fahrenheit (43°C). This not only caused problems for the personnel, but also for the aircraft which were constantly breaking down.

In addition to the heat, the flies were unbearable, the drying flood waters left a sea of mud and illness raged through the military personnel. Heatstroke, fever, and dysentery were prevalent and malaria posed a constant threat. A skin condition known as a “Basra sore” (probably cutaneous leishmaniasis) was common and many soldiers developed an ill-defined syndrome referred to as “Mesopotamitis”.

These problems had an effect on air operations. The personnel were required to work short hours due to the excessive heat and frequent illness took its toll. Preventative health precautions were implemented, including the use of quinine. Measures used to combat the heat and prevent heatstroke included spinal pads, solar topees, sunglasses and cholera belts. The spinal pad, which was said to protect wearers from sunstroke, and the cholera belt, which prevented a chilling of the abdomen, were pieces of cloth (often flannel) which were worn along the spine and around the waist respectively. Not surprisingly, Merz found these measures actually increased the heat load and reported that “…the sweat runs off in a steady stream.”

The poorly supplied and organized British Army medical services in Mesopotamia were overwhelmed as a consequence of the high rates of both battle and non-battle casualties. The medical support to the Mesopotamia campaign at this time is universally regarded as a total disaster. There were major shortages of medical personnel, equipment, and transport, a lack of surgical capability at the front and a complete failure of the medical evacuation system. Merz still thought of himself as a doctor as much as an airman, and went off to war intending to continue in a part time medical role. A list of his personal effects includes medical books, his certificates and degrees, medical instruments, and surgical clothing.
was no doubt welcomed by the British medical teams.

**The Nasiriyeh Campaign**

To the great relief of the airmen, two Caudron aircraft arrived on 4 July 1915 and Merz was immediately assigned to one of these machines. These aircraft, although more sturdy than the Rumpeties, were still less than satisfactory in the conditions and frequent engine problems were encountered. Merz began his operational flying career in the Basra region. However the thrust of the operations soon switched to the town of Nasiriyeh, northwest along the Euphrates River, which had to be cleared of the Turks before the main assault northwards could begin. Merz and Reilly were selected to fly the passenger, then Reilly, set off from Nasiriyeh.

Merz in a Caudron  
*(source: Australian War Memorial)*

Nasiriyeh was captured on 25 July 1915, and the value of the airmen to the campaign was noted by General Sir John Nixon, commander of the British Forces in Mesopotamia. For his contributions to the battle of Nasiriyeh, Merz was Mentioned in Dispatches on 4 April 1916.

Although the British forces were victorious, the necessity to engage in hand to hand combat meant that casualty rates on both sides were high. A makeshift hospital was established in location and it was here that George Merz was able to put his medical skills to use. According to many sources, Merz was treating patients throughout the night of the 29 July 1915 at the understaffed hospital.

**Death in the Desert**

With the battle over, Merz with Burn as his passenger, then Reilly, set off from Nasiriyeh between 0500 and 0600 hours on 30 July 1915 to return to Basra. The two pilots had agreed to keep together as much as possible due to the many engine problems being experienced. However they lost contact when Reilly succumbed to engine trouble and was forced to land near a village about 20 miles from Nasiriyeh. Fortunately the local Arab tribe offered him assistance, allowing him to fly on and meet up with Petre at a refueling station. Merz had not arrived by this time and both men thought he had continued on to Basra.

Major Reilly flew on to Basra the following day but returned to the station on 2 August to report that Merz had not arrived. With Petre, he set off in search of the two lost aviators and found the badly damaged aircraft 25 miles to the west. It appeared that the aircraft had made a normal landing but had been damaged on the ground, with fabric cut by knives and a broken tail and nacelle. There was no trace of the two airmen nor any signs of a struggle. Reilly and Petre continued westwards for another five miles but found no evidence of the fate of Merz and Burn.

An investigation was launched and local Arab tribesmen were questioned. The Court of Inquiry concluded that the aircrew had been forced to land due to engine trouble and were making repairs when they were set upon by a band of Bedouins of the Beni Malik tribe. The airmen, armed with pistols, engaged the Arabs in a running fight of about five miles towards the refuelling station, during which they killed one and wounded three adversaries. One of the airmen was wounded and could not go on but his companion remained with him and both died fighting. The bodies of the two airmen were never found. Merz was 23 years old.

On 24 August 1915, White joined an expedition to the nearby settlement of Gurmat Ali where the Bedouins had been headed. In a dawn raid, the village was searched however no evidence of the two men was found. The huts and tents of the tribe were destroyed and all weapons were confiscated. After this episode, long flights across country were banned until more reliable aircraft could be sourced.

Merz’s death was devastating to the men with whom he served. White described him as “a brilliant medico and the best of good fellows”, and wrote “In the rush mess hut at Basra, we missed them sadly, and each wondered if when his own turn came he would die as nobly.”

**The Legacy of Merz**

Although Merz’s death can probably be classified as more unlucky than heroic, and he died in what was ultimately a doomed campaign, it is symbolic as it was the first death of an Australian airman in war. In fact he was involved in many military aviation firsts during his short life. He was dux of the first course, was on the first operational
Remembering Lieutenant Merz

deployment of aircrew, was the first student to become an instructor, and was involved in Australia’s first air campaign.

His death also illustrates the tragic impact of World War One on his generation of young Australians. It is interesting to speculate as to what this talented young man may have achieved if he returned home from war. Two of those he outshone on his flying course, Williams and White, went on to have distinguished careers in military and public service and were later knighted, and several of Merz’s students performed exceptionally in the war, with fellow MUR officer, Lieutenant Eric Simonson, becoming an ace.

Importantly, Merz’s death heralds the beginning of an era in Australian warfare – the moment when military flying lost its innocence and when the legend of the heroic Australian airmen began. General Sir John Monash wrote:

“...it was in the most easterly theatre of the War that the foundations of these noble traditions of the Australian air-fighters were laid...”.

Memorials to Lt Merz

Lieutenant George Merz is remembered on the Commonwealth War Memorial in Basra. His family was devastated at not being able to recover his body. To commemorate him in Australia, Dr. George Merz’s name was added to his mother’s gravestone in St. Kilda cemetery in Melbourne when she died in 1930. There are other memorials to Merz, including the Honour Roll of the Australian War Memorial, the tree planted in his honour on the Ballarat Avenue of Honour in 1917 and the construction of Merz Road at RAAF Base Point Cook in 1938. More recently, the RAAF and RNZAF rugby teams competed for the inaugural Burn-Merz Shield in 2004 to commemorate the beginnings of the strong alliance between Australian and New Zealand airmen.

Of importance to practitioners of aviation medicine in this country, Merz was Australia’s first military aviation medical officer, a fact finally recognized in 2003 when the AMSANZ Prize, awarded annually to the dux of the Aviation Medical Officer (AVMO) Course at the RAAF Institute of Aviation Medicine, was renamed the Lieutenant George P Merz Memorial Prize. By formally remembering Lt Merz at a time when our AVMOs are again serving in the Middle East, it is hoped that his story will inspire future generations of Australian Defence Force doctors with a passion for aviation.


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Dermatitis is widely regarded as the commonest occupational disease. In the airline industry, various occupational groups, particularly manufacturing workers, as well as aircraft engineering and ground maintenance crews, may be exposed to a number of skin irritants or allergens, when constructing or servicing aircraft. Some recently reported skin irritants and allergens include dielectric fluids from electrodischarge machining, “prepreg” materials and modern sealants in aircraft manufacture, kerosene, and various jet fuel components. In a Swedish study, 16.1% of workers at an aircraft plant had occupational dermatoses. Pilots may also be exposed to skin irritants, which may produce acute exacerbations of irritant contact dermatitis. These irritants include solvents and other compounds such as ethylene glycol (used as a deicing agent), hydraulic fluid, or jet fuel, which may be encountered during routine inspections of aircraft. Contact dermatitis has been reported as a possible problem associated with use of oxygen masks, most likely from the materials in the masks, particularly in the military and for longer duration
flights. Unusual complications of atopic dermatitis have also been reported, such as decompression sickness with skin bends in a trainee following hypobaric chamber training. Textile dyes have also been implicated in some case reports of contact dermatitis amongst airline personnel.

Dermatitis symptoms, such as itching, can be distracting in flight. Low humidity on aircraft can also exacerbate atopic dermatitis. Severe exacerbations may also require systemic treatment with steroids and antihistamines. In some situations, acute exacerbation of dermatitis, particularly where systemic treatment is required, may disqualify pilots from operating aircraft.

Little is known about the prevalence of dermatitis and its possible associations amongst commercial airline pilots. This study was designed to investigate the prevalence of dermatitis and its possible associations reported in medical examinations of commercial airline pilots in the USA.

**Methods**

The US Federal Aviation Administration (FAA) maintains a centralised database of medical examinations of commercial airline pilots, which is called the Comprehensive Airmen Information System (CAIS). This database is maintained at the Civil Aerospace Medical Institute, Oklahoma City. All medical examinations of commercial airline pilots were examined for the calendar year 2002. Data were extracted for those pilots whose medical examinations reported the presence of dermatitis/allergic skin condition and/or contact dermatitis, as coded into CAIS. Information extracted included age, sex, current clinical dermatological findings, history of asthma and/or hay fever, use of medications, number of flying hours during career and during the preceding 12 months, as well as status of issuance of certification, taking into account the need for six monthly medical examinations for first class airman medical certificates in the USA.

Clearance was given by the Human Ethics Sub-committee, James Cook University. Data were analysed using the Statistical Package for the Social Sciences (SPSS).

**Results**

There were 373,454 pilot medical examinations identified for the calendar year 2002, of which 85 (0.023%) listed dermatitis as a current pathology.

The distribution of age and sex of the pilots identified with dermatitis is detailed in Table 1. The mean age of the pilots was 46.0 years (Standard Deviation (SD) = 12.4). These pilots had mean career flying hours of 4399.9 hours (SD = 5701.9) and mean flying hours in the previous 12 months of 154.8 hours (SD = 344.1). Pilots’ career flying hours were positively correlated with hours flown in the past 12 months (Kendal’s Tau B = 0.496, p = 0.000). There was no significant sex difference in age or flying hours. As expected, pilots’ career flying hours were positively correlated with age (Kendal’s Tau B = 0.322, p = 0.003). Only three pilots (3.5%) were not granted medical clearances.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>20-24</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>25-29</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>30-34</td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>35-39</td>
<td>9</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>40-44</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>45-49</td>
<td>13</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>50-54</td>
<td>12</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>55-59</td>
<td>12</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>≥60</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>77(90.6%)</td>
<td>8(9.4%)</td>
<td>85(100%)</td>
</tr>
</tbody>
</table>

Table 1. Distribution of age groups by sex for US commercial pilots with reported dermatitis

The distribution of conditions potentially associated with dermatitis is detailed in Table 2. There was no significant difference in history of allergy or asthma by sex, age or number of flying hours. Those pilots who reported allergy problems were significantly more likely to report asthmatic conditions (Chi square = 11.1, df = 1, p = 0.003). Those pilots who reported a history of allergy and asthma had flown significantly fewer hours compared with all pilots in the preceding 12 months (student t test; t = 2.0, p = 0.05; t = 2.2, p = 0.03; respectively).

The distribution of abnormal physical findings of dermatitis-related conditions by sex is also detailed in Table 2. None of these pilots reported receiving systemic treatment for dermatitis.

**Discussion**

Dermatitis was an uncommon condition reported on pilots’ medical examinations. It is suffered by pilots in all age groups and by both sexes. One of the major limitations of reviews of medical examination records was that what people report might differ from what actually happened. In addition, data collected, classified, coded and recorded for other purposes do not always provide the information required for epidemiological studies. Pilots would generally have undergone two medical examinations during the period, as they are...
required in the USA to have six-monthly medical examinations for first class airman (commercial) medical certificates. A small number of medical examinations for pilots may still be overdue from 2002 from individual aviation medical examiners, which may result in underestimation of the true prevalence of dermatitis in all US commercial pilots.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Sex (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of Allergy</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td></td>
<td>21 (24.7)</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td>History of Asthma</td>
<td>7 (8.2)</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td>Abnormal Physical Findings</td>
<td>18 (21.2)</td>
<td>1 (1.2)</td>
</tr>
</tbody>
</table>

Table 2. History of allergy and asthma and abnormal physical findings by sex amongst US commercial pilots reporting dermatitis

Although none of the pilots presenting for pilot medical examinations had current abnormal findings or systemic treatment for dermatitis, it is possible that pilots may become unfit to fly if they have severe exacerbations requiring systemic treatment with steroids and antihistamines. It does appear that ground crew, who may be more exposed to chemical irritants, may suffer more dermatitis than pilots, and pilots have previously reported suffering fewer symptoms of dry skin than cabin crew in a Scandinavian survey. Again, the finding that pilots with dermatitis may also have allergic conditions, found to be associated with asthma, indicates that medical examiners should continue to examine for dermatitis, asthma and related conditions where there is a history of dermatitis. Interestingly, the US pilots reported a slightly higher rate of atopy compared with that of the Scandinavian survey.

It is likely that a large proportion of dermatitis was not reported on pilots’ medical examinations in this study, given the prevalence of the condition in the working population. Further research may be required to confirm the true prevalence, type and severity of dermatitis suffered by pilots, as less severe dermatitis may not be reported.

It is possible that dermatitis, although not influencing issuance or reissuance of pilot licences, may have adversely affected pilots in other ways, perhaps outside their work and between medical examinations. This would require further investigation. It would also be interesting to compare the prevalence of dermatitis amongst civilian and military pilots, given that some military pilots have reported dermatitis from use of oxygen masks, and that group may be exposed to a greater number of allergens, such as insecticides from impregnated field uniforms and flight suits.

Conclusion

Dermatitis is an uncommon condition reported in medical examinations of US commercial pilots, however this study may underestimate the true prevalence of the condition in this group. In this study, having dermatitis did not affect issuance or reissuance of pilots’ licences, as it was not severe enough to require systemic treatment. It is important that pilots who have dermatitis are examined for related allergic conditions and asthmatic conditions. Pilots who have dermatitis should continue to take precautions against contact with potential agents that may precipitate or aggravate dermatitis.

Acknowledgments

The support of the Council for the International Exchange of Scholars and the Fulbright Program are gratefully acknowledged for the scholarship support of the lead author. We also wish to thank those staff of the Civil Aerospace Medical Institute who assisted with this project.

References

The President’s Logbook

Dr Gordon Cable

I AM PLEASED AT LAST TO BE ABLE TO GIVE YOU the latest news via the President’s Column in JASAM. As you probably know, there has been a significant delay between journals and for that I apologise to members. Unfortunately, with the resignation from the committee at the end of last year of Dr John Putland, our editor, unavoidable delays occurred in publication. I thank John for his hard work in establishing our very first peer reviewed journal, and for his work on the committee over the last few years. I am now delighted to announce that Dr Warren Harrex has agreed to take over the role of coordinating editor of JASAM. Brave move Warren! I know the editorial subcommittee of Drs Dave Emonson, Barney Cresswell, Tracy Smart, Dan Black and Ian Cheng, our newest committee member, will ably assist you.

You may recall that Ian Cheng nominated for election last year but was unsuccessful. He has been selected to fill the vacancy to maintain representation from NSW, as well as from the airlines, on the committee. Ian holds a Bachelor of Engineering and a Bachelor of Medicine, the Australian Certificate of Civil Aviation Medicine, a Graduate Diploma of Occupational and Environmental Medicine, and a Master of Public Health. He currently works part time for Qantas Aviation Health Services, and part time as Staff Specialist Occupational Physician at Royal North Shore Hospital. Under the Society’s Rules, a co-opted member holds office until the end of the next AGM in September, at which meeting the vacancy will be submitted to a vote. I trust that you will endorse our selection of Ian onto your committee.

The committee met last February to hold a strategic planning meeting. This followed the first such meeting three years previously, which resulted in major changes and development in the Society. It was interesting to look back on the past three years and the plans that were made, to see what we had achieved in that time. The obvious change was to the name and image of the Society, but the transformation of the journal, the rebuilding of the website, and the growing success of conferences were all improvements which directly benefit the membership. At the planning meeting we identified many strengths of the Society, particularly its continuing financial strength. But the stability of the membership and the enthusiasm of the members also contribute to keep the Society strong. Nevertheless, there are still opportunities to build on that strength and to improve support for members. Education in aerospace medicine is an important role that I believe the Society should continue to provide in new and improved ways, and this was clearly identified as core business of the Society in the recent members’ survey. I intend to explore further improvement in education and promotion of the science of aerospace medicine. The journal, the website and scientific meetings will be key components.

The recent planning meeting reviewed membership categories of the Society. Establishment of a retired members’ category has been suggested, so that retiring members can continue to enjoy the benefits of membership without the yearly burden of full subscription fees. It is intended that a motion be put at the 2005 Annual General Meeting to amend the constitution to create a new category of membership, that of “Retired Members”. The proposal is that members about to retire will have the option of paying a single fee equivalent to 7 years’ subscriptions in the year of their retirement. For already retired members, there will be a fee of 50% of the annual fee per annum, with the minimum age for eligibility for “Retired Membership” to be 65 years.

Discussions were also held regarding activation of a “Student Membership” category, realising that a role of the Society is to encourage study in the specialty and foster an interest in it among junior colleagues. It was suggested that this membership could be offered at a reduced subscription. However, a clear definition of ‘student’ will be required. Your thoughts and comments on this idea would be welcome.

More controversially, the committee again discussed the question of Associate Membership, recognising that only 20 of our present 840 members are Associates. There may be an opportunity to attract new members and broaden the aerospace expertise in the society by abolishing this category, thus encouraging other classes of people interested in aerospace medicine to join the Society as full members. Since the Society’s inception, full membership has been restricted to qualified medical practitioners, who alone have full voting rights in the Society. Associate members, who are not medically qualified, do not have voting rights. Other societies (such as the Aerospace Medical Association) do not make this distinction. Their membership includes human factors specialists, physiologists, psychologists, engineers, scientists, aerospace nurses and aircrew. At previous AGMs, this topic has been hotly debated and at times vehemently opposed. If you have a view on this issue, please contact the Secretariat or any of the committee members. The Society is a
dynamic entity, so it is worthwhile to revisit such questions from time to time.

From 15 to 18 September 2005, ASAM will co-host an international scientific meeting, together with the Asia Pacific Federation of Aviation and Space Medicine (APFAMA) and the Aviation Medical Society of Australia and New Zealand (NZ Inc.). The 5th Asia Pacific Congress of Aviation and Space Medicine will be held at the Gold Coast International Hotel, Queensland. The major theme for the conference will be “Asleep in the Sun”, focussing on fatigue in aerospace operations. We expect several internationally recognised speakers in this field to present plenary sessions, including Dr John Caldwell, who will deliver the John Lane Oration. John Caldwell obtained his Master’s degree in Experimental Psychology from the University of South Alabama in 1979 and his Ph.D. in Experimental Psychology from the University of Southern Mississippi in 1984. He is currently the Principal Research Psychologist and Senior Scientist for the U.S. Air Force’s Warfighter Fatigue Countermeasures Program. He has conducted a variety of studies on the effects of sleep deprivation and fatigue in pilots, using specially-instrumented simulators and aircraft. A call for papers has recently been distributed, and the conference registration brochures are available on the website at www.asam.org.au. I encourage you to attend what promises to be the biggest regional aerospace medicine event since ICASM 2002 in Sydney.

Looking even further ahead, the Society’s Annual Scientific Meeting for 2006 will be held in Launceston Tasmania from 14-17 September. Put these dates in your diary now, and keep an eye out for more information soon.

I hope to see many of you on the Gold Coast in September.

Regards

Gordon Cable
President, ASAM

Congratulations

Dr Michael Hugh Ryan (Melbourne) has been awarded the honour Member of the Order of Australia (AM) for his service to medicine, particularly in the field of ophthalmology as a practitioner and researcher. Dr Ryan has been a member of ASAM since 1960.

Dr Tony Austin (Canberra) has been promoted to Air Vice Marshal and appointed the Head Defence Health Services of the Australian Defence Force.

Dr Graeme Maclarn (Sydney) has been presented with the John A Tamasiea award by the Aerospace Medical Association for his service to civil and general aviation medicine in Australia and overseas for the past 23 years. Graeme is the President of the Aviation Medical Society of NSW.
Dr Tommy Thompson - Vale

Arthur Trevor (Tommy) Thompson died on 7 January 2005, aged 80 years. He was a pillar of the Aviation Medical Society of Australia and was for many years the editor and producer of the Aviation Medicine Newsletter which has evolved into the Journal we have today.

He was born on 12 July 1925 in the UK and joined the RN Fleet Air Arm in 1943. He flew Barracudas, Swordfish and Sea Otter aircraft before the end of World War II. He graduated in Medicine from Manchester University and continued flying with the Royal Navy volunteer reserve in Harvards, Fireflies, Avengers, Balliols and Vampires. He joined the RAN as a medical officer and was able to continue flying, including carrier landings on HMAS Melbourne. He was a keen glider and chief flying instructor of the Navy gliding club at HMAS Albatross.

He was employed as a medical officer with Qantas from 1969 until 1984. He subsequently worked under contract in the Qantas Medical Department from August 1986 to July 1989.

He was President of the Aviation Medical Society of Australia and New Zealand (1978 – 1981) and the Honorary Medical Advisor to the Australian Branch of the Guild of Air Pilots and Air Navigators.

He continued his interest in gliding and managed the Australian gliding team at the world championships in Poland and the USA.

He will be sadly missed by those privileged to have known him.

Eric Donaldson

Dr Ron Wambeek - Vale

Dr Ron Wambeek died on 23 May 2005 aged 83. Ron won his Distinguished Flying Cross during WW2 flying Beaufighters, Hurricanes and Mosquito Fighter Bombers in the UK, Africa and India.

Following the war Ron graduated as a doctor in London then rejoined the Royal Air Force as a medical officer pilot based at the Institute of Aviation Medicine at Farnborough. At Farnborough, Ron flew the Meteor, Javelin, Hunter and Canberra aircraft whilst researching oxygen systems, restraint and anti G equipment.

Following his departure from the RAF, Ron remained in civilian aviation medical practice initially in the UK, and, since 1972, in Perth Australia.

Earlier this year Ron received a special commendation from the Royal Australian Air Force for his contribution to the medical services of the RAAF as a civilian medical officer until December 2004.

Before he died Ron (who was always nature’s gentleman) insisted that no one was to feel sad at his passing, as he had had an excellent life, never expecting to survive the war let alone live to 83 years, and he wished to thank his friends for their friendship over the years and to wish them well in the years ahead.

Rob Liddell

Dr Paul McCarthy - Vale

Squadron Leader Paul McCarthy was one of nine defence personnel tragically killed in a Sea King helicopter accident on Nias Island, Indonesia, on 2 April 2005 while providing humanitarian assistance following an earthquake.

He joined the Air Force in 1995 as an officer cadet medical undergraduate and graduated from the University of Queensland in 1997. He undertook residency training at Nambour General Hospital then in early 2000 took leave to train and participate in the Australian championships for surf boat rowing, resulting in an A-grade surf boat title.

He spent most of his short defence service at RAAF Base Williamtown. His training and experience with the Air Force gave him skills in aeromedical evacuation, rotary-wing aeromedical evacuation and early management of severe trauma.

In late 2003 he was promoted to squadron leader and posted to Health Services Flight at RAAF Base Pearce. He participated in a number of deployments including Timor Leste, Kyrgyzstan, the Middle East and Indonesia (in response to both the December 2004 tsunami and the Nias earthquake). Squadron Leader McCarthy was 30 and single.
ASAM Committee

President
Dr Gordon Cable
PO Box 235
MARDEN SA 5070
Tel: (W) 08 8393 3173
Mobile: 0412 658 240
Fax: 08 8393 3158
gcable@bigpond.net.au

Vice-President
Dr Warren Harrex
22 Drevermann Street
FARRER ACT 2607
Tel: (W) 0409 466 632
Fax: (02) 62902785
Mobile: 0409 466 632
wharrex@pcug.org.au

Secretary
Dr Jeanette Linn
31B Brunswick Street
WALKERVILLE SA 5081
Fax: 08 8344 9510

Treasurer
Dr Greig Chaffey
287 Cavendish Road
COORPAROO QLD 4151
Tel: (W) 07 3398 8177
Mobile: 0409 189 491
Fax: 07 3843 0055
gchaffey@aviationmedical.com.au

Public Officer
Dr Peter Wilkins
P O Box 718
MAWSON ACT 2697
Tel: 0408 428 831
Peter.Wilkins3@defence.gov.au

Dr Bernard Cresswell
P O Box 244
WEMBLEY WA 6014
Tel: (W) 08 9388 1223
Fax: 08 9385 5369
cresswell@bekkers.com.au

Dr Dave Emonson
5 Pinewood Drive
SAMFORD QLD 4520
Tel: 0419 145 983
demo1@bigpond.net.au

Dr Dan Black
1 Bellthorpe West Road
Bellthorpe QLD 4514
Tel: 0411 852 268
hornet@esat.net.au

Dr Tracy Smart
12 Mukine Street
Jindalee QLD 4074
Tel: 0419 648 871
Tracy.smart1@defence.gov.au

Dr Ian Cheng
P O Box 218
OATLEY NSW 2223
Tel: 0419 207111
icheng@qantas.com.au

ASAM SECRETARIAT
Anne Fleming
P O Box 4022
BALWYN VIC 3103
Tel: 03 9899 1686
Fax: 03 9890 2353
Mobile: 0418 890 641
fleminga@bigpond.net.au
## Calendar of Events

<table>
<thead>
<tr>
<th>Date</th>
<th>Conference</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 - 18 September 2005</td>
<td>The 2005 Annual Scientific Meeting of the Australasian Society of Aerospace Medicine and the 5th Asia Pacific Congress of Aerospace Medicine hosted by The Australasian Society of Aerospace Medicine in collaboration with the Asia Pacific Federation of Aerospace Medicine Association and the Aviation Medical Society of Australia &amp; New Zealand (NZ).</td>
<td>Gold Coast International Hotel, Surfers Paradise, Queensland</td>
</tr>
<tr>
<td>12 - 13 November 2005</td>
<td>Aviation Medicine NSW Scientific Meeting</td>
<td>Dubbo, NSW</td>
</tr>
<tr>
<td>14 - 17 April 2006</td>
<td>AMSVIC Scientific Meeting at “Warbirds over Wanaka” Airshow</td>
<td>Queenstown, New Zealand</td>
</tr>
<tr>
<td>14 - 18 May 2006</td>
<td>Aerospace Medical Association</td>
<td>Orlando, Florida, USA</td>
</tr>
<tr>
<td>10 - 14 September 2006</td>
<td>International Academy of Aviation and Space Medicine</td>
<td>Bangalore, India</td>
</tr>
<tr>
<td>13 - 17 May 2007</td>
<td>Aerospace Medical Association</td>
<td>New Orleans, Louisiana, USA</td>
</tr>
</tbody>
</table>

Details of relevant scientific meetings may be forwarded to the Secretariat for inclusion in subsequent editions.
Aviation Medicine Courses in Australia and New Zealand

**Edith Cowan University, Perth, Australia**

Courses offered:
- Postgraduate Certificate in Aviation Medicine (PGCAvMed)


Convenor: Not stated

Comments: External or Distance Learning program

**Monash University, Melbourne, Australia**

Courses offered include:
- Australian Certificate in Civil Aviation Medicine

Reference:

Convenor: Dr David Newman

Comments: On campus block course

**Griffith University, Brisbane, Australia**

Courses offered include:
- Certificate of Aerospace Medicine
- Graduate Certificate of Aerospace Medicine
- Masters in Aerospace Medicine
- Masters in Aerospace Medicine with Honours


Convenor: Professor Eric Donaldson

Comments: Internet based distance learning

**University of Otago, Wellington, New Zealand**

Courses offered include:
- Postgraduate Diploma in Aviation Medicine
- Postgraduate Certificate in Civil Aviation Medicine
- Postgraduate Certificate in Aeromedical Evacuation
- Master of Health Science (Aviation Medicine)
- Doctor of Philosophy

Reference:
http://www.otago.ac.nz/Aviation_Medicine/

Convenor: Dr Rob Griffith

Comments: Internet based distance learning, teleconferences, and “summer schools”.

Travel Medicine Courses in Australia and New Zealand

**James Cook University, Townsville, Australia**

Courses offered include:
- Postgraduate Certificate of Travel Medicine

Reference: http://www.jcu.edu.au

Convenor: Dr Peter Leggat

Comments: External studies or distance learning with block attendance and Internet support

**University of Otago, Wellington, New Zealand**

Courses offered include:
- Postgraduate Certificate of Travel and Migrant Medicine
- Postgraduate Diploma in General Practice (Travel and Migrant Medicine)
- Master of General Practice (Travel and Migrant Medicine)

Reference: http://www.otago.ac.nz

Convenor: Dr Jenny Visser

Comments: External studies or distance learning with block attendance
POSTGRADUATE QUALIFICATIONS IN AEROSPACE MEDICINE

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- Master of Aerospace Medicine with Honours

 Contact the School Administrative Officer

 School of Aviation
 Griffth University, Nathan
 (07) 3875 5097
 email aviation@griffith.edu.au
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Short Course Administrator
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Facsimile: (61) 3 9903 0556
E-mail: shortcrs@med.monash.edu.au
Web address: www.med.monash.edu.au/epidemiology/accam
Course Convenor: Dr. David Newman

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- Aircrew and Performance
- Airport and Travel Health
- Clinical Aviation Medicine
- Occupational Medicine (2 papers)
- Research options (1 or 2 papers)

For further information, for a prospectus and application form, contact Maureen Gordon, AvMed Administration, at the Department of Medicine, Wellington School of Medicine, New Zealand, at:

Fax: 64-4-3895427
Ph: 64-4-3855590
Email: deptmed@wnmeds.ac.nz
Post: PO Box 7343, Wellington South, New Zealand

or

Dr Robin Griffiths, Senior Lecturer in Aviation Medicine
Fax: 64-4-4962050
Ph: 64-021 620 148
Email: rfgriff@attglobal.net

for further information:

Home page - http://www.otago.ac.nz/Web_menus/Dept_Homepages/aviation/
Information for authors

NEXT ISSUE OF JASAM
(Volume 2, No 2)

Due for Publication: 10 December 2005
Deadline for submissions: 10 October 2005

JASAM welcomes contributions including letters to the Editor on all aspects of aerospace medicine. Manuscripts must be offered exclusively to JASAM unless the manuscript is accompanied by a copyright exemption. All manuscripts are subject to peer review and to editing.

Contributions should be sent to:
The Editor
JASAM
Australasian Society of Aerospace Medicine
P O Box 4022
BALWYN VIC 3103
or E-mail to: wharrex@bigpond.net.au

Requirements for manuscripts
JASAM follows the agreed conventions for medical journals. Full details of the requirements for manuscript preparation are available on the internet at the site http://www.icmje.org.

An electronic copy (on disc or sent by email) should be submitted. The copy should be able to be read in MS Word and formatted to A4 paper, using Arial or Times New Roman 10 font. Reviewers will be provided with a copy with authors’ names, affiliations and acknowledgements removed.

The title page should contain the title, list the names and qualifications of all authors as well as the position and institutional address at the time of submission. One author should be identified as the correspondent along with his or her postal address, telephone number and email address.

An abstract of not more than 250 words should be included with headings for background, methods, results and conclusions.

Abbreviations should be avoided and if used only after they have appeared in brackets after the completed expression - eg, Journal of the Australasian Society of Aerospace Medicine (JASAM).

Figures and Tables are encouraged and should be entered on separate pages and numbered sequentially underneath eg Figure 1 or Table 1 with an appropriate self-explanatory legend. Their preferred location should be indicated in the manuscript.

References should be presented in the “Vancouver” style. References should be numbered consecutively as they appear in the text as superscript numbers (eg, text1). Automatic numbering references generated by word processors must be removed. An example of the format for journals and books is given below:

Cable GG. In-flight hypoxia incidents in military aircraft: Causes and implications for training. Aviat Space and Environ Med 2003; 74(2): 169-72.

Permission to reprint articles will be granted by the Editor, subject to the author’s agreement, provided that an acknowledgement giving the original date of publication in JASAM is printed with the article.

Reviewers
All articles will be subject to blind review by at least two reviewers. Members with expertise who are willing to join the panel to review articles for publication are invited to contact the Editor.

Editors’ contact details for inquiries
Dr Warren Harrex
Tel: (W) 0409 466 632
Tel: (AH): 02 6286 6632
Mobile: 0409 466 632
Email: wharrex@bigpond.net.au
What is Aerospace Medicine?

Aerospace medicine is the medical specialty, which is concerned with the interaction between the aviation and space environment and human physiology, psychology and pathology.

WHO NEEDS TO KNOW ABOUT AEROSPACE MEDICINE?

All medical practitioners who deal with patients who fly, either as pilots or as passengers, need to know about aerospace medicine. They should have a basic knowledge of the impact of the aerospace environment on a patient’s medical condition.

Physicians should also be aware of implications on flight safety arising from medical conditions affecting pilots or air traffic controllers. Such knowledge is of particular importance to Designated Medical Examiners appointed by the CASA (Aust) or CAA (NZ).

Aerospace medicine may also be of special interest to doctors who themselves fly aircraft and to medical students keen to pursue a career in the aerospace field.

BACKGROUND

The Society was founded in 1949 and has its origins as a Special Group in Aviation Medicine within the British Medical Association (Australian Branch). It subsequently became the Aviation Medical Society of Australia and in 1972 became amalgamated with its New Zealand equivalent. It became an Incorporated Society in 1978. In 1996 the New Zealand Branch became a separate incorporated identity. In 2003 the members voted to change the name of the Society to the Australasian Society of Aerospace Medicine.

THE AIMS OF THE SOCIETY ARE:

• To cultivate and promote aerospace medicine and related sciences.
• To provide an authoritative body of opinion on matters of aerospace medical significance.
• To increase the awareness of the aerospace industry, government and the general public of the importance of aerospace medicine to flying safety.

TO FURTHER THESE AIMS THE SOCIETY:

• Holds annual scientific meetings. Internationally renowned speakers in the field of aerospace medicine, both civil and military, are invited to speak at each meeting and are sponsored by the Society through established trust funds.
• Publishes the journal “JASAM”
• Sponsors awards for excellence in aerospace medicine at postgraduate and undergraduate level.

Full membership of the society is open to all registered medical practitioners with an interest in aerospace medicine.

Associate membership is available to medical students and to other professionals with an involvement in aerospace activities who support the aims of the Society.