Airways as a health service: the continuing role of the RFDS in emergency evacuation

Duncan Grant, Susan Markwell, Royal Flying Doctor Service of Australia Queensland Section, Cairns

INTRODUCTION

The Royal Flying Doctor Service of Australia (RFDS) was established by the Reverend John Flynn in Cloncurry, Queensland in 1928. Today it is an Australian icon, highly regarded by the community in general and specifically by those who have been assisted through the health services it provides.

The Service is a national, not-for-profit organisation consisting of four operational sections; Queensland, South-Eastern, Central and Western Operations. Each section functions autonomously with oversight from the national body, The Australian Council of the Royal Flying Doctor Service.

Across Australia there are 21 operational Bases, seven in Queensland, five in South-Eastern, four in Central and five in Western Operations. In total, the Service employs 511 full and part-time health, aviation, public relations and administrative personnel, operates a fleet of 40 aircraft and services an area of 7 150 000 square kilometres. All sections provide a comprehensive range of health services incorporating aeromedical retrievals and primary health care clinics consisting of general practice, child and family health, mental health, women’s health and health promotion. From July 2001 to June 2002, the Service collectively conducted 25 977 aeromedical retrievals, 8861 clinics and attended to an overall 196 996 patients. These figures illustrate the significant level of service provision provided by the RFDS to rural and remote Australia and the vital role it plays in supporting and contributing to the sustainability of outback communities.

To illustrate the challenges faced in providing this vital service, this paper will focus on issues relating to RFDS Queensland Section. The paper will highlight some of the challenges faced in the areas of health, aviation and communication and how one section of the RFDS meets those challenges.

RFDS QUEENSLAND SECTION

In Queensland the seven bases are located in Cairns, Mt Isa, Charleville, Townsville, Brisbane, Rockhampton, and Bundaberg. The service has undergone significant expansion with the Brisbane, Rockhampton, Townsville and Bundaberg bases all established since 1995. RFDS Queensland employs over 120 full and part-time staff, including 18 doctors, 38 nurses, four allied health staff and 22 pilots. Services provided include both primary health care clinics and aero-medical retrievals. Queensland operates a fleet of ten aircraft, three located in Cairns, two in Mt Isa, and one at each of the remaining five bases.
ENVIRONMENT

Physical

Queensland is the second largest Australian state covering 1 727 200 square kilometres. By comparison, Tasmania covers 67 800 square kilometres, illustrating that Queensland is approximately 25 times the size of our most southern state. Queensland has a population of around three million and of all states has the largest rural population residing outside metropolitan centres.

The Great Dividing Range extends along the east coast of Australia and separates the majority of the Queensland’s population who live along the state’s coastline from those who choose to live inland. This mountain range defines the state’s diverse topography and climate. The coastal fringe is green and lush with tropical and sub-tropical rainforests. West of the range the land is flat and dry. The deep sandy soil in the north lacks nutrients and has scrubby bush. Further south the arid channel country merges with the Simpson Desert with the great artesian basin underlying this vast area.

The land and its people are at the mercy of climatic extremes. The winter months are dry with drought and extensive bushfires being common. During the wet season rain in the tropics is measured in metres per year. Tropical cyclones are common often resulting in destructive winds crossing the coastal strip destroying properties and lives. As the cyclones move inland and disintegrate, they cause further flooding to western areas, sometimes cutting off whole townships.

Though there have been great improvements in roads, four wheel drive vehicles and communication systems in rural areas in the last forty years, major problems remain. For example, the major road connecting communities in Cape York Peninsula to Cairns is an 800 kilometre unsealed road that becomes impassable in the wet season and is a minimum two day trek to the northernmost point. For most of the wet season communities and cattle stations are isolated. Some coastal communities get supplies by barge, however the majority of centres are only accessible by air and this can result in a steep rise in food prices during the wet season. A head of lettuce for example, can cost up to ten dollars and the quality is often poor. Birdsville, in the south west of the state, is at the end of a mostly unsealed road several hundred kilometres west of Charleville. It is in fact closer to Adelaide than it is to Brisbane.

Social

For several decades, rural and remote Australia has been witnessing the steady degradation of its once lively and viable communities. The continuous withdrawal of services such as hospitals, schools, banks and industries has led to decreased employment opportunities and the resultant move of the population from the country to regional and metropolitan centres. The social effects of drought and the economic downturn have wreaked havoc on family life increasing the incidence of stress and mental illness within communities. In addition, poor roads and inadequate communication systems have led to greater isolation and a further reduction in social and cultural activities that are essential to the sustainability of any community.
CHALLENGES

The Royal Flying Doctor Service was born with the amalgamation of aviation, radio and medicine. The organisation’s original logo incorporated these three aspects: the wings of aviation, radio waves of communication and the staff and serpents of medicine.

Aviation

With its aircraft fleet, RFDS Queensland meets the challenge of providing a comprehensive aeromedical service across the vast expanse of the state. There is one aircraft in Cairns to cover the whole of far north Queensland, an area the size of Japan. If this aircraft is dealing with a patient in the west of the region and another emergency occurs in the north, coverage is provided by the Townsville or Mt Isa aircraft. There can therefore be some delay in response time. However, co-ordination with adjacent bases ensures that every attempt is made to get care to patients as soon as possible.

Extreme isolation and the lack of good roads means there are few alternatives for transporting patients other than by air. To give a case example, a pregnant woman from a remote community in the Torres Strait Islands sustained severe burns. This patient was initially transferred by boat to Thursday Island, where after admission to hospital, she was intubated. Once stabilised, she was flown by helicopter to nearby Horn Island where there is a fixed-wing airstrip. There she was collected by the Cairns RFDS aircraft and transported to Cairns Base Hospital. Here she underwent escharotomy to her limbs and was observed in intensive care overnight. The following day the Brisbane RFDS aircraft transported her to the burns unit at the Royal Brisbane Hospital. Had this patient lived in a Brisbane suburb, she would have received definitive care within five hours. Instead, she underwent a hazardous journey spanning five days, developed acute renal failure and sadly had a spontaneous abortion.

Communication

In 1929, Alfred Traeger invented the pedal wireless. Since then there have been huge advances in communication within the RFDS and the wider community. Today, communication within the organisation is done primarily by telephone with the occasional back-up use of HF radio. The harsh environment can, however, sometimes interfere with communication systems. For example, humidity corrodes the connections, floods wash away lines, cyclones blow over poles, and monsoons create static. Just last year a marsupial ate its way through an underground cable near Mareeba in far north Queensland causing all telephones and computers in Cape York Peninsula to stop working for 48 hours.

The introduction of analogue telephones into RFDS aircraft in the early 1990s was a big step forward from HF and UHF radio. Often medical consultations conducted by radio afforded little privacy for the patient. To a large extent the use of the telephone has overcome this. Whilst overall an improvement, the analogue system gave reliable but limited range along the coastal fringe and an area radiating out from larger centres. However west of the dividing range, large dead spots remained for much of
the state. Initially the digital telephone system provided little improvement in communication between aircraft and ground and worked with varying degrees of success around the state. Mt Isa and Charleville bases experienced the greatest improvements while Brisbane and Rockhampton experienced overloads.

Satellite phones were installed to support the digital system yet they too resulted in some initial problems such as voice delay, distortion and dropouts. The fitting of external aerials to the aircraft has since markedly improved satellite telephone reception providing a reliable form of communication with the aircraft.

**Medical**

The major challenge facing the provision of medical services to those living in the outback is of course isolation. As previously highlighted, vast distances, poor road access and difficult communications place a large burden on those trying to gain access to good, affordable health care.

Country people tend to be stoical and many will tolerate pain and symptoms that would cause city people to consult a doctor much earlier. They are often resilient and may try home remedies before eventually seeking medical advice. An example of such stoicism was an elderly man who presented to an RFDS clinic with a squamous cell carcinoma on his ear. He had been persisting with home dressings and only came to see the doctor when his ear had badly ulcerated and maggots were dropping from the canal.

Working with Indigenous people has different challenges. Their health beliefs are unique and need to be recognised. The use of traditional healers is a major aspect in the management of disease and illness and may interfere with that prescribed by RFDS medical officers or other visiting health professionals. Paradoxically, there is an increased belief in the power of western medicine. Thus patients can present almost moribund believing western medicine is strong enough to quickly restore them to normal health.

The importance of family and traditional rites of passage should not be underestimated. A recent case illustrates this point. A young man had several presentations over the course of a few weeks to the local health clinic. He had signs and symptoms of deteriorating respiratory function that were later shown to be as a result of melioidosis. He had been the victim of a curse and had first consulted with the traditional healer and tried bush remedies. Later he was given antibiotics by the resident health staff but had stopped taking them when he began to feel better. Offers of transfer to Cairns Base Hospital for investigation and treatment were refused because of a family funeral and other business. Finally, in a critically ill state, he acknowledged his need for more comprehensive care and agreed to be transferred to Cairns by the RFDS, only to pass away while in flight.

Rural and remote communities have witnessed significant changes in the access and availability of health care. Over the last few decades there has been a gradual downgrading of country hospitals with fewer staff and beds. Conversely, city hospitals have become super-specialised institutions offering incredibly sophisticated treatments. With this has come an increased expectation of health care.
In Queensland there is only one specialised tertiary burns unit which is located in Brisbane. Neurosurgery is only available in Townsville, Rockhampton and Brisbane. Where once patients with coronary artery disease were treated at regional hospitals, today they are routinely transported to tertiary centres where they undergo angiography often proceeding to stenting or coronary artery bypass grafts. From July 2001 to June 2002, 1397 patients (almost 20% of the total patients transported in Queensland by the RFDS) had cardiac or circulatory system disease documented as the reason for transport. Increasingly, the RFDS is being used for inter-hospital transfers taking patients from secondary to tertiary health centres for higher level care.

Another challenge facing health providers is professional isolation. As a result, they lack the ability to quickly obtain a second opinion about a presenting condition or test result. Professional development opportunities are limited due to cost and the difficulty in accessing suitable locum relief. The downgrading of clinics and hospitals also results in the loss of procedural skills and the ability to undertake only the most minor operations. It is recognised, however, that significant efforts are being made by governments to utilise new technologies to bring quality professional development activities to health professionals in the field and this is to be applauded.

With the increasing sophistication of patient treatments, the challenge for RFDS medical officers is to operate within the constraints of a budget and this can place considerable stress on those making decisions on the co-ordination of aeromedical flights. As the health dollar continues to be stretched, the need to deliver a patient-centred, cost-effective aeromedical service is paramount and requires considerable planning, co-ordination and education.

RFDS medical officers make great effort when co-ordinating flights to find the most effective way to get all patients in the right priority to their destinations with the right crew mix. Time is also taken to work with staff of rural and regional health centres to better understand the role of the RFDS and the requirements for patient transports to ensure a more efficient and ultimately cost-effective service.

**CHANGES FOR FUTURE**

**Aviation**

RFDS Queensland operates two aircraft types, the Beechcraft 200 and Pilatus PC12. All aircraft are pressurised, enabling patients to be flown at the equivalent of sea level, an essential requirement for several medical conditions.

The Beechcraft 200 has a range of four hours and 1000 nautical miles (1850 kilometres) and has an average speed of 260 knots per hour. This aircraft has capability for two stretchers and three seats and is predominantly used for the emergency evacuation and inter-hospital transfer of patients.

The PC12 is a Swiss designed single engine aircraft with a range of five hours and 1500 nautical miles (2750 kilometres) and has an average speed of 240 knots per hour. It has capability for one stretcher and five seats or two stretchers and four seats. In Queensland, the aircraft is predominantly used in the clinic role but does undertake a
dual role at the Charleville base where it is used as both the evacuation and clinic aircraft.

Over the past two years five new aircraft have been purchased for the Queensland fleet (2 B200s and 3 PC12s) to keep abreast of aviation developments. An exciting possibility for the future would be the purchase of a jet aircraft enabling faster and more economical performance over long distances. This would be particularly useful for those patients requiring specialist treatment at distant tertiary centres.

Communication

Current telephone communication systems using a combination of satellite and the improved digital system of Code Division Multiple Access (CDMA) provide sufficient coverage and enable RFDS staff to attend isolated patients at accident sites and still have contact. At a recent rollover on a cattle property the manager was able to consult with the RFDS doctor directly, instead of transmitting via radio or needing to send a runner back to the homestead.

In August 2002, the after-hours answering service of the RFDS was contracted to the Queensland Ambulance Service aeromedical desk in Brisbane. The centre co-ordination is a very streamlined and efficient service. The centre takes over-flow telephone consultations from the RFDS bases when the doctor is busy, and refers them to doctors at other bases. A possible future direction is to establish a dedicated call centre staffed by RFDS medical officers who would handle the bulk of the consultations. If an emergency evacuation was needed, these doctors would liaise with the closest RFDS base and on-call nurse, doctor, and pilot. Although costly to set up, it would limit delays when country people need medical advice.

Medical

Remote consultations

To thousands of people living in isolated parts of Queensland, the RFDS is their primary health care provider. At any time of the day or night, rural and remote residents are able to consult with an RFDS medical officer by telephone or HF radio and receive immediate attention and advise. From July 2001 to June 2002, 16 679 remote telephone and radio consultations were undertaken.

An important appendage to remote consultations is the RFDS medical chest. As the nearest pharmacy can often be several hundred kilometres from a person’s residence, the need for accessible pharmaceuticals is met through the distribution of over 1000 medical chests across rural and remote Queensland. The chests contain over ninety medical items including antibiotics, narcotics, dressings, instruments, and instruction manuals and their use is monitored to ensure that appropriate controls are in place.

Aircraft equipment

The emergency response aircraft of the RFDS are fully equipped to provide for the care of the most critically ill patient. Each aircraft is fitted with a range of emergency drugs and equipment including Lifepak 10 for cardiac monitoring, pacing, and defibrillating, Propaqs for monitoring vital signs, Oxylog ventilator for ventilating patients, vacuum mattress, scoop stretcher, Donway splint and medical equipment for
intubation, insertion of a chest drain and the delivery of babies. A regular review of
drugs and equipment is undertaken to ensure currency with recommended
guidelines.

Recent developments within hospitals are adapted for use in the confines of the
aircraft. The new Oxylog 2000 is being incorporated as the standard ventilator for use
in the aircraft. Transfer of neonates is becoming more common with specially adapted
transport cots such as the John Grant Thompson cot developed at the University of
Southern Queensland. The aortic balloon pump provides lifesaving interim treatment
while the patient is being transferred to a hospital with facilities for cardiac surgery.
ISTAT machines provide for blood tests at the roadside or in the aircraft with the
luxury of having results within minutes. With the snapshot of information provided
by these diagnostic machines, the management of the critically ill patient becomes
more defined.

To ensure the continuous improvement in services provided, staff at each base
undertake a fortnightly quality assurance meeting to critique the retrievals done. In
the last financial year (July 2001 – June 2002), RFDS retrievals in Queensland totalled
6861, a daily average of 18.8 patients.

Remote staff support
Apart from providing health services, the RFDS also plays a crucial role in supporting
other remote practitioners through supervision and conducting in-services. An
exciting development in Queensland has been the publication of the Primary Clinical
Care Manual (PCCM) which was developed in partnership with Queensland Health.
The PCCM provides clear and concise clinical care guidelines and protocols for rural
and isolated practice endorsed registered nurses and authorised Indigenous health
workers. The interventions in the PCCM are based on the available evidence for best
practice and provide a legal framework in which to work. At the same time the PCCM
recommends when consultation with a medical officer should be made. The
introduction of the manual has been a major contribution to ensuring a consistent
standard of care within rural and remote health practice across Queensland.

Recruitment
Recruitment of RFDS personnel is a major focus of the organisation. Multi-skilled
health professionals are becoming a rare breed, yet are the type that are needed for the
diverse work which the Service undertakes. Flight nurses require experience in child
health, midwifery, emergency and intensive care, while medical officers require
experience in general practice, anaesthetics, paediatrics, obstetrics, and emergency
medicine. A comprehensive orientation program ensures that new recruits are well
prepared for the diverse role they will be performing.

Professional development
Ongoing professional development is considered important and provided for through
regular in-service sessions organised by each individual Base. Speakers from local
hospitals, other external health services and community groups are invited to present
to staff which provides an excellent opportunity for the updating of skills and
knowledge. Formal study leave is provided for recognised training courses such as the
Early Management of Severe Trauma, the Pre-hospital Trauma Life Support and
Advanced Paediatric Life Support courses. In addition, closer links are being
established with tertiary institutions such as the James Cook University of North Queensland’s medical and nursing schools to provide student placements and foster a greater appreciation and knowledge of what it is to undertake rural and remote health practice.

CONCLUSION

The Royal Flying Doctor Service of Australia continues to play a crucial role in ensuring reliable and affordable access to quality health care for rural and remote Australians. From its very beginnings, the organisation’s mandate has been to provide a “mantle of safety” for those who choose to live and work in the country’s vast and uniquely beautiful outback. Today the Service strives through a dedicated staff, to remain the pre-eminent provider of aeromedical services. The RFDS continues on a daily basis to embrace the challenges encompassed in this old but laudable mandate. In so doing, the RFDS eases some of the hardships often associated with living in isolated areas and continues to contribute to the ongoing viability of outback communities, ultimately ensuring the vitality of the Australian community as a whole.

POLICY RECOMMENDATION

It is recommended that a patient-centred, cost-effective and comprehensive aeromedical service be maintained and further developed for the health and well-being of Australians living in rural and remote communities.

PRESENTERS

**Duncan Grant** has been a medical officer at the RFDS Cairns base for the past 18 months. Prior to this he had several years experience working in emergency medicine, paediatrics, obstetrics, anaesthetics and oncology in Alice Springs, Goulburn, Canberra and Cairns. Before he started medicine Duncan worked as a psychologist for four years in the Sydney AIDS clinic. His main areas of interest are medical education and training and decision making under stressful conditions.

**Susan Markwell** has been employed by the RFDS as Senior Flight Nurse, Cairns base since 1991. Prior to this she was seconded from Queensland Division of Child Health to the RFDS and worked for two years at the Charleville RFDS base. Her experience includes midwifery, child health and accident and emergency and she has been a key part of the growth and expansion that the RFDS has undergone over the last 15 years. Her main areas of interest are Indigenous child health and aviation nursing.