HipFest 2018.
Timing to OT for #NOF.
Interhospital transfer and contribution of RFDS.

Dr. Luke Pritchard
Oct 2018
• Overview of the RFDS
• How retrieval works in WA
• Aspects of aeromedical transport
• Challenges of remote areas
• Hip fracture data
• Questions
The RFDS began back in 1928 when this man Rev John Flynn, a minister with the Presbyterian Church was posted to a mission in outback SA.

His vision was to provide a ‘mantle of safety’ for pioneers living in remote areas in Western Queensland and Northern SA and his dream became a reality with the opening of the Australian Inland Mission Aerial Medical Service (later renamed the Royal Flying Doctor Service) in Cloncurry, Queensland.

Over the next few years, the RFDS began to expand across the country.

The Western Australian Section was officially registered in 1936.

The Section’s first base at Port Hedland

Interestingly in the Kalgoorlie area aircraft were flown on medical missions as far back as the early 1930s - before they were used for this purpose in most other parts of Australia.

At that time the Goldfields Flying Doctor Service provided a medical service for people in the outback. Earliest records of the Service go back to 1931 or 1932.
DH Fox Moth - Port
Hedland 1935

This is the first RFDS plane a de Havilland Fox Moth Aircraft
Today it is one of the largest if not the largest and most comprehensive aeromedical organisations in the world.

While supported by the Commonwealth, State and Territory Governments, the RFDS relies heavily on fundraising and donations from the community to purchase and medically-equip its aircraft, and to finance other initiatives.

- Not-for-profit charitable organization – not government
- National Federation – separate State entities
- Every State except ACT and top of NT
- Free service for individuals

Nationally the RFDS has a fleet of 63 aircraft operating from 21 bases located across the country
• Made up of seven legal entities, roughly corresponding to the seven states/territories and each of these seven entities has its own Board and Management.
• Each autonomous legal entity operates independently, both financially and operationally.
Population of Australia – outside cities and towns
Aeromedical

17 x Pilatus PC12

1 x Hawker 800 Jet

1 x Bell 412

Coordination Centre (Perth)

2 New Pilatus PC24 jets in 2018

- RFDS Western Operations has 5 bases
- Operates 17 aircraft
- Employs about 250 staff
- Assists close to 100000 patients per year
Pilatus PC-12

- Swiss made
- Single engine turboprop
- Single pilot
- Range 2800 km
- Cruise speed 500km/hr
- Ceiling 30000 ft
- Rugged
- Pressurised
- Cost ~ $6-7m each.

• Swiss made
• Single engine turboprop
• One or two pilots
• Range 2804 km
• Cruise speed 500km/hr
• Ceiling 30000 ft
• rugged design,
• capability to operate from short unprepared landing strips and highways
• Pressurised: The cabin is pressurised to 5.75 PSI differential, which gives a cabin altitude of 10,000 feet when cruising at FL300. It is also capable of holding a sea-level cabin altitude up to a cruise altitude of 13,000 feet. This is the sort of capability that the RFDS looks for in being able to transport patients with medical problems that could be exasperated by altitude.
• Cost of each new aircraft about $6million each
• Configured for aeromedical retrieval
• Large cabin and easy access through two cabin doors.
• The rear door needed no modification—unlike the Beech King Air—to allow the loading of stretcher patients.
• Pilatus PC12 pressurized turboprop (17 aircraft)
• Two stretchers + three seats
• Flies at 450kph and 25,000ft

_Pilatus PC12 pressurized turboprop - the workhorse of the fleet._
PC 12 - Loading system

- Loading system – each has a designated weight limit of around 160kg – that’s the weight the hydraulic motor can push up against so some extra manual uplift may be required for heavier patient loads.
- Stretcher narrow – girth limit is more of a factor than the weight limit.
- Stretches not compatible with SJA necessitates frequent patient movement between stretchers at both ends – single patient journey move patients between stretchers a minimum of 5 times.
- Occasional malfunction but an improvement on older systems.
Relatively Spacious PC12 cabin – 2 stretchers, end-to-end.
PC12 – cabin configuration

• Respiratory support equipment
  • Airways
  • O2 supply ~ 7000L total fully loaded
  • Bag-Valve mask
  • Suction
  • Ventilator – oxylog
  • Intubation equipment – King Vision
  • Surgical airway set
  • Pleural drainage equipment
  • O2 supply
• Circulatory support equipment
  • Monitors – Propaq and Zoll
  • Sphygmo
  • Cannulae
  • Fluids
  • Infusion pumps
  • Arterial cannulae
  • Syringes and needles ets.
  • ABG ISTAT
• Splints – CT6 traction splint
• Vac mats
• Collars
• PPE
• Dressing
• Shears and first aid
• Maintenance
• Regular servicing and inspection mandatory requirement for Safety of patients and staff
• Not just engine, fuselage and landing gear but
• Power, avionics
• Lighting and climate control
• Communications systems
• Medical equipment such as suction, O2 supply
• Hawker 800XP (based at Perth Airport)
• Fast 1,000kph
• Long range Perth-Kununurra 2,000km in 3 hrs
• Two stretcher + five seated
• Three stretcher + two seated
• Major centres and airstrips

• We also intermittently have at our disposal The Rio Tinto Life Flight jet
  • Which first took to the skies in October 2009, thanks to the help of Rio Tinto, who initially contributed $5 million to the project over three years, and more recently committing a further $6 million for another four years.
  • Hawker 800XP² aircraft
  • Purchased in the USA
  • rebadged and outfitted with a customised Lifeport PLUS aeromedical configuration.
  • It is the only permanently configured aeromedical jet anywhere in Australia with the capacity to carry three stretcher patients and up to three clinical staff at once,
  • can fly non-stop from any location in Western Australia to Perth within three hours and it can undertake interstate transfers without refuelling stops in most circumstances
  • can also undertake faster retrievals from offshore locations, such as Cocos and Christmas Islands
- Also used for long distance neonatal retrievals and interstate transfer of neonates – with Mansell neocot
- Because of it’s weight and size, it is based as perth airport, rather than Jandakot, Maroomba airlines
- Longer response time
- Suitable runways
RIO cabin configuration

Carry 3 stretcher patients at once – space for three clinical staff
2 pilots
Issues with loading and unloading
Familiarity with storage of equipment and securing equipment.
Aeromedical - Other

- Rescue Helicopter
- Charter jets
- Charter fixed wing aircraft
Flexibility and adaptability
Medivac using Cessna Caravan with floats from remote part of the Kimberley coast.
RFDS Western Operations:
Jandakot base

RFDS jandakot base
Corporate headquarters
Hangar – maintenance of aircraft
Training
Orientation
Co-ordination centre / Ops

- Initiation & Response
  - Single Phone call
  - Assessment
  - Prioritisation
  - Allocation & tasking
- Communication
- Confidentiality
- Recording

1800 625800

Also the location for the Operations centre or Co-ordination centre – when you dial the 1800 RFDS number – you get through to one of 2 or 3 operators in this room
This is where flight and consultation requests are initially received
Transferred to a duty doctor who will assess and prioritise the flight
Coordinate the transfer movement of aircraft
Tasking of crews
Pre-flight Assessment

- Assess
- Prioritise
- Advise
- Crew mix
- Special requirements

This is the pre-flight assessment form –
Gather required clinical information
Based on patients complaint, diagnosis, condition, location and need for intervention
- assigned a priority
Clinical advice can be provided to help ready the patient for transfer
This is a phase where ETS can really help – picture tells a thousand words – helps with prioritisation and response
Clinical record
Audit
Quality Improvement
RFDS Clinical Coordination

- Clinical advice
- Supervision
- Liaison with referring and receiving hospitals
- Consultation
- Planning of complex tasking
- Co-located
- Centralized 9417 6382

• Clinical coordinator – senior RFDS medical officer whose roles is I think really important but probably under-utilised
• Provide clinical advice to referral staff
• Provide some degree of supervision
• Liaison with referring and receiving hospitals
• Consultation from specialist receiving hospital teams
• Planning of complex retrievals
• On site from 0700 till 2300

• Need to have an understanding of:
  • referring hospital capabilities and
  • in depth knowledge of receiving hospital capabilities.
  • intimate knowledge of the benefits and limitations of the transport frames at their disposal and the management capabilities of the retrieval team.

• To best understand this, coordinating clinicians should be suitably trained in prehospital and retrieval medicine and have ongoing operational experience relevant to the type of transport undertaken and an understanding of remote area practice.
Designated resus room at JT used to reassess, stabilise or perform critical interventions on pt’s before next phase of transfer
Storage of equipment, monitoring
Drugs
Fluids
Blood products
Most importantly tea and coffee
Remote medical consultations are provided to patients in remote settings, far from medical care, through our telehealth service.

In the early years these were conducted by HF radio, whereas today they are almost exclusively by telephone or satellite phone.

We also have the capacity to conduct internet-based video-conferencing.

The numbers of patients or remote health workers receiving advice are shown in the table.

Telephone calls are received through our Statewide 1800 number 24 hours a day and switched to one or more RFDS doctors on duty in the region where the patient is calling from.

The consultation proceeds in a similar manner to a GP consultation except that the patient can’t be seen or examined. The consultation outcome may result in reassurance, prescription of pharmaceutical items from the RFDS Medical Chest, advice to travel to another location for a clinical service, or a full-on aeromedical evacuation.
Clinics

- Small communities - no doctor
- Traditional RFDS flying clinics
- Specialists and allied health
- Primary health care nurses
- Dental program

<table>
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<tr>
<th>Clinic Conducted 2014/15</th>
<th>RFDS Provider</th>
<th>Npr-RFDS Provider</th>
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<tr>
<td>Western Operations</td>
<td>10,600</td>
<td>7,900</td>
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<tr>
<td>RFDS Nationally</td>
<td>112,000</td>
<td>22,800</td>
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</table>

Traditional clinics are where an RFDS doctor flies out to a country or series of remote communities to provide medical services. These are usually locations with a resident remote area nurse but can range from government and private nursing posts, aboriginal communities, mine sites or a series of stations and roadhouses.

Whilst in the past doctors visited in RFDS branded aircraft, since the late 1990’s clinics have used private charter companies. These are more cost-effective and it frees up larger, specially outfitted and more expensive aeromedical aircraft for the aeromedical evacuation role. Some clinics are travelled to by road. A large number of GP services are also provided to the town of Meekatharra and surrounding area through clinics at the hospital as there are no other doctors in the town.

In addition to clinics using RFDS doctors, we facilitate a variety of flying clinic services using doctors from government hospitals and Aboriginal medical services, using chartered aircraft from locations where we do not have bases, for example, Kununurra, Broome, Exmouth, Carnarvon.

We also take specialists on scheduled visits to remote communities in the regions in which we work, for example, paediatricians from Port Hedland hospital.

Over the past decade a number of additional clinic services have commenced. These include the RWGP (Rural Women’s GP) program, ROTR (RFDS on the Road) program, primary health care nurses and a Dental program which commenced in 2012.
Emergency Transport
Annual workload

- All diagnostic categories
- ~ 40000 medical advice calls
- ~ 10000 flight requests
- ~ 9000 aeromedical transfers
- ~ 18000 co-ord road transfers
- ~ 25000 flying hrs (8.4 million kms)

- Medical team (doctor & flight nurse) approx. 60%
- 25-30 retrievals a day, often 10-15 waiting
- ~ $1.5 million flying per week

<table>
<thead>
<tr>
<th>Aeromedical transfers 2014/15</th>
<th>Patients</th>
<th>Kms flown</th>
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</thead>
<tbody>
<tr>
<td>Western Operations</td>
<td>9,132</td>
<td>8,455,000</td>
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<tr>
<td>RFDS Nationally</td>
<td>37,307</td>
<td>26,118,000</td>
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Funding—
Commonwealth (Primary Evacs)

State & Private
(Interhospital)
### RFDS Western Ops # NOF data

**Patients transferred with any #NOF, 3 years to FY2017/2018**

Excludes returning patients/repatriations

Source: Hermes

Run on 06/09/2018

Note: includes NOF in any diagnosis, not only principal diagnosis

<table>
<thead>
<tr>
<th>Source region</th>
<th>Number of patients</th>
<th>2015/2016</th>
<th>2016/2017</th>
<th>2017/2018</th>
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<tr>
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<td>24</td>
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<tr>
<td>Pilbara</td>
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<td>20</td>
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<tr>
<td>Midwest</td>
<td>52</td>
<td>38</td>
<td>23</td>
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<tr>
<td>Goldfields</td>
<td>29</td>
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<tr>
<td>Wheatbelt</td>
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<td>17</td>
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<td>South West</td>
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<td>Great Southern</td>
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<td>4</td>
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<tr>
<td>Indian Ocean</td>
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<tr>
<td>Other</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>185</strong></td>
<td><strong>153</strong></td>
<td><strong>144</strong></td>
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**Number of patients**

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<tr>
<td>05-09</td>
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<td>3</td>
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<td>10-14</td>
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<tr>
<td>15-19</td>
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<td>20-24</td>
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<td>2</td>
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<td>25-29</td>
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<td>35-39</td>
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<td>45-49</td>
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<td>50-54</td>
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<td>7</td>
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<td>55-59</td>
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<td>60-64</td>
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<td>65-69</td>
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<td>70-74</td>
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<td>75-79</td>
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<tr>
<td>80-84</td>
<td>27</td>
<td>24</td>
<td>19</td>
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<tr>
<td>85+</td>
<td>10</td>
<td>20</td>
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</table>

**Total** | 185 | 153 | 144
NICE : The Management of Hip Fracture in Adults (2011)

Research recommendations on timing of surgery

Early and appropriate surgery for hip fractures is the most effective form of pain relief, potentially quickening the rehabilitation and reducing complications. Within the current literature no specific time interval threshold has been identified (up to 24hr) below which a reduction in delay has shown no benefit. In addition to the evidence of the cost effectiveness below 48hr, pragmatic, organisational and humanitarian considerations have been utilised to arrive at the recommendation to operate not later than the day after admission. A formal study within the NHS based on an arbitrary but realistic 36hr threshold would provide additional important data to that already available, in order to inform more precisely the forward clinical and cost-effectiveness of the strategy. For ethical reasons, the research design would be an observational cohort study, correcting for confounding variables, possibly set in the context of the National Hip Fracture Database and examining the effect of the time to surgery and its cost on key outcomes, including mortality, complications, length of stay, time taken to rehabilitate and qualitative aspects of the experiences of patients.

The majority of patients with a hip fracture will be offered, and elect to undergo, surgical repair of the fracture. Timely access to surgical intervention once the patient is considered to be medically optimised is important both to the individual and to the efficient running of a service. Traditionally, hip fracture patients have not always been considered a priority group in accessing theatres and the injury itself is rarely life threatening. However, older people with a hip fracture frequently have multiple co-morbidities, limited physiological reserve and are prone to an increase in complications from prolonged bed rest. Periods of prolonged or repeated fasting are also not in the best interests of this population. Effective pain management contributes to the challenge of caring for hip fracture patients and surgery is one of the most effective forms of pain management in this population.
The changed wording reflects the fact that a number of people with a hip fracture in Australia, and to a lesser extent New Zealand, present to a hospital that does not perform surgery for hip fracture, which will therefore necessitate transfer to an operating hospital. The Committee felt that it was important, particularly from a humane perspective, to ensure that the recommendation and any standard of care that arose from the recommendation include the time spent at a referring hospital. Clear processes should exist to ensure safe and timely transfer of patients to a hospital able to perform surgery so as to ensure rural and remote populations are not disadvantaged in terms of equitable access to surgery.

The Committee was of the view that timing of surgery also needed to take into account the availability of an appropriately skilled clinical team to undertake the procedure (see Section 4.2 on surgeon seniority).
4 A patient presenting to hospital with a hip fracture, or sustaining a hip fracture while in hospital, receives surgery within 48 hours, if no clinical contraindication exists and the patient prefers surgery.

- **For patients.** If you go to hospital with a hip fracture or sustain a hip fracture while in hospital, you have surgery within 48 hours. The exceptions are if you do not want to have surgery, or if your doctor advises you that it is better for you to wait or not have surgery at all. If you are in a remote location, you are transferred and receive surgery in a timely manner.

- **For health services.** Ensure systems are in place for clinicians to perform hip fracture surgery within 48 hours of presentation. Surgery within 48 hours of presentation may not be feasible for health services covering some remote areas, however, networks and systems should be in place to ensure coordinated transfer and timely surgery of patients who sustain a hip fracture in these areas.
<table>
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</tr>
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<tr>
<td>N patients</td>
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<tr>
<td>Maximum:</td>
<td>3.9</td>
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<td>Minimum:</td>
<td>1.26</td>
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<tr>
<td><strong>P2</strong></td>
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<tr>
<td>N patients</td>
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<tr>
<td>Maximum:</td>
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<td>3.9</td>
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<td>Minimum:</td>
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<td>1.96</td>
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<td>Maximum:</td>
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<td>6.9</td>
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<tr>
<td>Minimum:</td>
<td>0.94</td>
<td>4.9</td>
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</table>

**Notes**

- **Response time definition**: used is time in hours from initial flight request call to arrival of the physician on board.
- **Response time distribution**: skewed to the right, with a long tail of longer response times. **PSD (median)** is a better indicator of average waiting times than mean.
- **50th percentile**: 50% of the patients had response times equal to or less than this value.
References

