



**Ambulance Service
of New South Wales**

Evaluation of the need
To extend the Operating Hours of the
Orange EMS Helicopter
& Medical Retrieval Service

November 2009

CONTENTS

Introduction	2
Current Service Profile	5
Service Profiling – ORH Review	9
Service Profiling – ASNSW Review	11
Structural and Operational Considerations	13
Clinical and Operational Need	16
Conclusions and Recommendations	17

INTRODUCTION

Background:

The Ambulance Service undertook a comprehensive review of rotary wing services in 2004. The review consisted of two phases, firstly a review of service provision and secondly a technical review of aircraft requirements. Following the review new helicopter arrangements were implemented in Sydney, Orange and Wollongong and the existing helicopter arrangements in Lismore, Tamworth, Newcastle, Canberra and for Child Flight were strengthened and modified to account for increased activity.

The implementation of these new arrangements is progressing positively; however, the full effect is yet to be established.

The 2004 review recommended that the need to extend the operating hours of the Orange EMS Helicopter and Medical Retrieval Service be reviewed in 2008 following the introduction of the new state wide helicopter arrangements and the further development of plans for future fixed wing services. The review also recommended that the need to establish a helicopter base in Coffs Harbour also be reviewed in 2008.

A comprehensive review of fixed wing services was conducted in 2007 with recommendations that included an increase in the size of the fixed wing fleet. The tender process for fixed wing services in Sydney is not due for completion before December 2009. New arrangements are planned to commence in 2012. Future arrangements for the Dubbo RFDS service are still being developed in parallel with the commercial tender process. Any new arrangement in Dubbo is expected to increase utilisation of that service.

The case for increasing the operating hours of the Orange EMS helicopter service needs to be considered in the context of the enhancements both instituted and planned for the aeromedical network.

Methodology:

ORH Ltd was engaged to update the model of Rotary Wing cover across the state developed during the 2004 review. This work was done for the combined purpose of determining the need to extend the operating hours of the Orange helicopter service and conducting an appraisal of the case for establishing an EMS Helicopter base in Coffs Harbour.

ORH were requested to use the updated state Rotary Wing model to determine the need to extend the operating hours of the Orange Helicopter incorporating the following:

- Population projections for the extended area around Orange to inform future workload.
- An analysis of P1 ambulance demand between 1800 and 0800 in the area closest to the Orange helicopter
- An analysis of known helicopter prehospital and interhospital activity between 1800 and 0800 in the area closest to the Orange helicopter.
- An analysis of fixed wing retrieval activity between 1800 and 0800 originating from hospitals within helicopter range closest to the Orange helicopter.
- An analysis of any impact on surrounding helicopter services a 24 hour deployment in Orange may have.

Following the modelling analysis two retrospective reviews of 2008 after hours activity were undertaken to confirm the conclusions of the modelling. The first involved a retrospective review of all known helicopter prehospital missions and medical retrievals conducted in 2008 that could have potentially been undertaken by the Orange helicopter between 1800 and 0800. The second involved identifying known road prehospital and interhospital transfers that may have benefited from a helicopter response.

Consultation:

The goal of the review was to establish the clinical and operational need to extend the operating hours of the Orange Helicopter based on evidence of unmet demand.

Consultation was confined to clinical and operational stakeholders best placed to identify any unmet demand. Given that a service already exists it was considered unnecessary to review the strategic plans for the Greater West Area Health Service in depth beyond that already known regarding trauma and critical care services. In particular, Orange Base Hospital is delineated as a Regional Trauma Service and as the principal facility for long stay intensive care patients.

The working group and consultation involved:

- Dr Randall Greenberg, Critical Care Network Director, GWAHS.
- Dr John Lambert, Intensive and High Dependency Care Stream Leader, GWAHS
- Dr Gary Tall, Clinical Manager, Aeromedical and Medical Retrieval Services, ASNSW
- Dr Ron Manning, Director, Aeromedical and Medical Retrieval Services, ASNSW
- Dr John Kennedy, Chair NSW Medical Retrieval Committee
- Superintendent Sue Webster, Operations Support Manager, Western Division, ASNSW
- Helicopter Intensive Care Paramedics, Orange Helicopter Base
- Mr Alan Reinten, Manager, Aeromedical Operations Centre, ASNSW

All case reviews were conducted by Drs Lambert, Greenberg, Tall and Manning with the addition of Dr Kennedy and a Helicopter IC Paramedic for the review of road prehospital and interhospital missions.

CURRENT SERVICE PROFILE

Fixed Wing Services:

NSW is serviced by four KingAir 200B fixed wing aircraft (three operational at any time) located at Mascot provided under a commercial contract with a further KingAir located at Dubbo provided by the RFDS under an NGO Agreement. These aircraft are tasked by the Aeromedical Operations Centre and conduct the transfer of interhospital critically ill, urgent and routine patients.

A RFDS traditional service is located at Broken Hill which services NSW west of the Darling River. For planning purposes this aircraft does not contribute to the general aeromedical network and will not be further considered as part of this review.

In 2008-2009 the Mascot and Dubbo aircraft undertook 3235 flights transporting 5936 patients.

A review of fixed wing services in 2007 identified the service is highly utilised (>50%) and found that because of the high utilisation the fixed wing service cannot meet the time performance and reliability requirements of Area Health Services.

A request for tender for the Mascot commercial contract and a realignment of the arrangements relating to the RFDS aircraft at Dubbo is presently underway. The results of these are not expected before the end of December 2009. However, an increase in capacity in fixed wing services is expected.

Helicopters:

The helicopter configuration and capacity as at October, 2009 is shown in the following table.

October 2009		SPEED (km/h)	RANGE (km)	Availability
Wollongong	AW 139	260	780	24/7
Hunter (Newcastle)	Bell 412 SP	222	630	24/7
Northern (Lismore)	Dauphin N	241	700	24/7
Orange	Bell 412 Classic	222	519	10/7
Sydney	AW 139/Bell 412 EP	260	780	24/7
Tamworth	BK 117	241	475	10/7
Southcare (Canberra)	Bell 412 Classic	222	520	24/7
Child Flight	Dauphin N	241	700	24/7

By early 2010 the following helicopter configuration will be achieved.

December 2009		SPEED (km/h)	RANGE (km)	Availability
Wollongong	AW 139	260	780	24/7
Hunter (Newcastle)	Bell 412 SP	222	630	24/7
Northern (Lismore)	Dauphin N	241	700	24/7
Orange	EC 145	241	686	10/7
Sydney	AW 139 / EC 145	260	780	24/7
Tamworth	BK 117	241	475	10/7
Southcare (Canberra)	Bell 412 Classic	222	520	24/7
Child Flight	Dauphin N	241	700	24/7

The helicopter activity for 2008-2009 is given below.

Helicopter Service	Prehospital Missions	Interhospital Missions
Wollongong	192	233
Hunter (Newcastle)	630	331
Northern (Lismore)	181	110
Orange	142	144
Sydney (2 helicopters)	694	513
Tamworth	123	79
Southcare (Canberra)	174	180
Child Flight	0	477

The enhanced helicopter resources in Sydney and Orange have improved aeromedical availability for critical care transfers from the Greater West Area Health Service. For emergency interhospital retrievals the time to patient performance for the GWAHS is 85% within 2 hours and 97% within 3 hours. The state wide performance is 87% within 2 hours and 96% within 3 hours.

Medical Retrieval Resources:

Adult Medical Retrieval Services for the GWAHS are provided by the Greater Sydney Retrieval Service including a base in Orange and the RFDS Medical Retrieval Service based at Dubbo. 24 hour aeromedical capacity is available in Sydney, Wollongong, Newcastle and Dubbo

The most common receiving hospitals for adults are Dubbo Base Hospital, Orange Base Hospital and Sydney Tertiary Hospitals most commonly Westmead and RPAH.

Paediatrics and neonatal retrievals are conducted by NETS to Sydney Tertiary Paediatric Hospitals.

Activity levels and referral patterns are further explored in the ORH report.

29% of interhospital retrieval transfers from the GWAHS occur between 1800 and 0800. 5% of time urgent retrievals occur between these times.

Greater West Area Health Service:

The Greater West Area Health Service extends from the Rylstone Hospital in the east to the Broken Hill Hospital in the west and from the NSW-QLD border to the north to the Balranald Hospital in the south. The Area borders with the Greater Southern Area Health Service in the south.

The large geographic area covered by the GWAHS and the location of Tertiary Hospitals in the east means that a combination of helicopter and fixed wing resources are most appropriate. The utility of helicopters west of Lake Cargelligo, south west of Grenfell or north of Coonabarabran is limited. Fixed wing utilisation is more appropriate beyond these areas.

There are 49 hospitals / Multipurpose Services in the GWAHS with principal regional hospitals located at Dubbo, Orange, Bathurst and Broken Hill. Orange Base Hospital offers level 5 services including intensive care and interventional cardiology.

The Area does not have open chest cardiothoracic, neurosurgery or super speciality tertiary paediatric and neonatal services. There is no major trauma service in the Area. Orange has been recently classified as a regional trauma service.

Ambulance:

Ambulance Services are covered by the Western Division and there are 2 ambulance sectors comprising 54 ambulance stations.

Within the Greater Western Sector, Intensive Care Paramedic (ICP) modules are located at Dubbo, Orange and Bathurst, with an ICP educator located at Gilgandra.

SERVICE PROFILING – ORH REVIEW

To assist in determining the case for an extension of the operating hours of the Orange Helicopter and Medical Retrieval Service , ORH were engaged to:

- Update the 2004 New South Wales Aeromedical Service model with contemporary data;
- Determine workload projections taking into account activity trends, population trends as well as Area Health Service and Ambulance Service of NSW plans.
- Draw conclusions regarding workload and effect on other services.

The methodology employed by ORH involved data analysis and modelling utilising data for the six months between February and July 2008 inclusive.

The Rotary Wing Model was prepared on a state wide basis and used for modelling options around the introduction of a Coffs Harbour helicopter and the extension of the operating hours of the Orange Helicopter using current and projected future primary and secondary mission demand. Population projections were considered in the analysis.

The conclusions drawn from the modelling of options are:

- Helicopter mission levels and patients carried across NSW have been increasing at the rate of about 10% per year, mostly due to increasing primary missions.
- In the 14 hour extended period the projected workload for the Orange Helicopter would be an additional 43 prehospital cases and 80 interhospital transfers.
- There is no population growth projected for the area, hence the Orange Helicopter could potentially undertake up to 123 missions in the 14 hour period between 1800 and 0800. That is, one mission every three days or 2.4 missions per week with a ratio of 2 :1 interhospital transfers to prehospital missions.

- The projected 24 hour utilisation would be 15% which is significantly lower than that of Sydney, Newcastle and Child Flight service and equivalent to Lismore, Wollongong and Canberra.
- The projected utilisation does not give evidence of a cost effective service enhancement.

SERVICE PROFILING – ASNSW OPERATIONAL REVIEW

The modelling of potential after hour's workload for the Orange Helicopter does not support the need to extend the current operating hours to 24 hours. When considering alterations to service provision it is important that operational and clinical factors are considered in addition to workload alone.

Alternative solutions such as a lesser magnitude of extended hours, or an on-call service outside existing operating hours could be considered.

To further explore the need for extended operating hours, two additional reviews were undertaken utilising retrospective data to confirm the modelling conclusions. .

Review of Known Medical Retrieval Activity:

In the first review all known helicopter and medical retrieval activity in 2008 from the GWAHS between 1800 and 0800 was reviewed to determine whether on clinical or operational grounds a helicopter at Orange would have potentially conferred an advantage.

98 cases were conducted in 2008, of these it was considered that 43 could have potentially benefited clinically from a helicopter in Orange. That is, less than one case per week.

The operational benefit of reduced utilisation of Sydney based services was not possible to evaluate.

Identification of Unknown or Unmet Demand:

Critical care clinicians from the GWAHS were confident that there was no significant level of unmet demand, that is, no significant number of patients arriving at the Area's referral hospitals by road ambulance who should have been subject to either medical retrieval or helicopter transport.

To confirm the above view, three months samples of all patients attended by ambulance crews between 1800 and 0800 in the area encompassing the response radius of the Orange Helicopter were reviewed to identify patients who potentially met the ASNSW criteria for a prehospital helicopter response or the NSW Health criteria for medical retrieval.

Those cases identified were reviewed to determine whether a helicopter at Orange would have conferred either an operational or clinical advantage.

46 cases were identified as potentially meeting helicopter or medical retrieval criteria, following review 8 were considered to potentially have benefited from a helicopter in Orange. This represents 32 cases per year. Adding the 10 prehospital cases already undertaken by helicopter within the GWAHS between 1800 and 0800 gives a potential workload of 42 cases per year. These cases are in addition to the 43 known medical retrieval cases outlined in the previous section.

Effect of GWAHS Service Planning

The GWAHS recently introduced a policy whereby long stay Intensive Care patients are transferred to Orange. This is expected to add 25 interhospital transfers per year (5 from Bathurst Hospital and 20 from Dubbo Hospital). It is anticipated that the majority of these transfers would occur between 0800 and 1800.

STRUCTURAL AND OPERATIONAL CONSIDERATIONS

In addition to determining operational and clinical need, it is also necessary to identify any resource enhancements that may be required as well as consider the feasibility of acquiring those resources.

CLINICAL CREW MODEL AND STAFFING

- A dedicated doctor/paramedic crew model is operational in Orange.
- Additional staffing would be required, however, the identification of suitably qualified staff is not considered a barrier though recruitment of medical staff would need to be timed with the usual medical recruitment of January and July each year. It would probably take one year to reach a stable medical workforce.

MANAGEMENT AND GOVERNANCE

- The current management arrangements would suffice at least initially for any extension of operating hours.
- The Greater Sydney Retrieval Service has in place a comprehensive training program covering didactic aviation and aeromedical knowledge along with simulation training. Training staff is presently a rate limiting factor and the addition of further staff would need enhancement of training resources.

MEDICAL EQUIPMENT

- The current road retrieval capability will need to be reviewed and strengthening in terms of equipment and an equipment bridge. Given the weather characteristics of the western slopes it is likely that road retrieval capability will need to be robust with any move to 24 hour medical retrieval operations.

HELICOPTER OPERATIONS

- The recent enhancements to the sleeping facilities at the hanger should suffice for 24 hour operations, though a more thorough review would be required to identify any gaps. It is understood that there would be no major gaps.

- Additional pilots and aircrew would be required; in particular additional training aircrewmen would be needed. The helicopter operator is currently experiencing difficulties with recruitment of aircrewmen. This may present a rate limiting factor for any proposed expansion of operations.

BUDGET CONSIDERATIONS

Item	Unit cost	Units	Total Cost
Helicopter Standing Charge	\$76,000 per month	12	\$912,000
Additional mission Engine hours *			\$64,000
Additional training hours			\$3000
Additional Paramedics	\$120,000	3	\$360,000
Additional Doctors	Registrars @ \$120,000 Consultants @ \$215,000	2 1	\$455,000
Additional Doctor accommodation			\$10,000
Additional Training staff	\$120,000	0.5	\$60,000
Medical Equipment Bridge	\$15,000	1	\$15,000
Medical Equipment			\$ 35,000
Total			\$1,904,000

* Based on an additional 32 prehospital missions and reduced interhospital engine hour costs:

16 prehospital missions to OBH of 1.2 hrs x \$1500/hr + 16 prehospital missions to Sydney of 2.3 hours x \$1500 per hour = \$84,000

Less an estimated reduction of \$20,000 in interhospital engine hour costs.

CLINICAL AND OPERATIONAL NEED

The modelling analysis indicates from a workload perspective that a case does not exit for a cost effective extension of operating hours to 24 hours.

The clinical and operational need for an extension of operating hours was separately examined.

RETRIEVAL OPERATIONS

- There was reasonable concordance between the volume of interhospital retrieval activity between 1800 and 0800 predicted by modelling (80 cases per year) and observed in 2008 (96 cases). The 1800 to 0800 activity is not predicted to grow significantly by virtue of either population growth or changes in clinical service delivery within the area.
- When clinical and operational factors were examined, the number of cases currently transferred by Sydney based services between 1800 and 0800 that may have clinically benefited from a helicopter at Orange fell to 43 cases.
- With current arrangements, the response time performance for Emergency critical care retrievals from the GWAHS is equal to the overall state wide performance.

PREHOSPITAL OPERATIONS

- There was good correlation between the volume of prehospital activity between 1800 and 0800 predicted by modelling (43 cases) and that predicted by case sheet review and staff consultation (32 identified in case review plus 10 existing cases = 42 cases).

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

- With current arrangements, the response time performance for Emergency critical care retrievals from the GWAHS is equal to the overall state wide performance.
- The predicted number of cases that could potentially clinically benefit from an extension of the operating hours of the Orange helicopter is 85 (42 prehospital missions and 43 interhospital missions) or 1.6 missions per week.
- Recent policy changes relating to Intensive Care Services in GWAHS are expected to add around 25 interhospital transfers per year to the existing projected load, 5 from Bathurst and 20 from Dubbo. It is expected that this activity would occur largely between 0800 and 1800.
- The total predicted caseload that would be managed by the Orange helicopter operating 24 hours would be an increase of around 148 cases per year, bringing total activity (434). to the level of the Wollongong service (425), and busier than other 24 hour services (Lismore at 291, Canberra at 354).
- The estimated additional cost of an extension to 24 hours is \$1.9 M.
- The predicted number of cases that could benefit from increased helicopter access does not support a business case for extending the operating hours of the Orange helicopter to 24 hours.
- Should an extension of operating hours be considered, there are a number of staffing, governance, training, infrastructure and operational enhancements required to ensure a robust 24 hour service. The enhancements are considered achievable though the recruitment of some staff may be a rate limiting factor.

- The current Fixed Wing tender process is likely to further improve aeromedical availability in the GWAHS

RECOMMENDATIONS

- That the comparison of the response time performance to Emergency critical care retrievals in the GWAHS to the overall state wide performance is noted.
- That there is no case for the cost effective extension of the operating hours of the Orange Helicopter to 24 hours.
- That the cost and operational implications of an after hour on call arrangement be explored through usual contract management processes as an additional resource at times of high network workload.
- That workload and any developments in GWAHS Clinical Service Planning are considered in 12 months to identify any substantial changes or implications to the current review.