PIPER

Paediatric Infant Perinatal Emergency Retrieval Service

Annual Report 2014–15

Authorship

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Acknowledgements

We gratefully acknowledge the support of the paediatric, neonatal and perinatal staff of PIPER, Ambulance Victoria and associated stakeholders.

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PIPER Perinatal:

Perinatal Emergency Referral Service — Annual Report 2014-2015

Paediatric Infant Perinatal Emergency Retrieval (PIPER) Service

Introduction and Overview

Welcome to the PIPER Annual Report. This report covers Perinatal, Neonatal and Paediatric emergency referral and retrieval activity for 2014-2015.

During 2014/15 the Piper coordination centre received 18,707 calls of which 11,817 were to the 1300 Emergency line.

PIPER	Calls	%
Emergency	11817	63
Non-Emergency	6890	37

PIPER	Consult	%
Paediatric	1290	32
Neonatal	1623	39
Perinatal	1208	29

We provided 4,121 specialist consultations and 1,791 emergency transports. Behind this service we coordinated neonatal critical care bed access across four level three and 34 public/private level 2 special care nurseries.

The 1300 Non-emergency line received 6,890 calls and 1,664 return transfers were undertaken.

Our Achievements

I want to acknowledge the hard work and dedication of the PIPER team which has enabled us to provide specialist retrieval and referral services to support and care for the sickest children of Victoria. On top of our retrievals and consults we have achieved a great deal to improve what we do:

- Delivered services under budget.
- Developed and installed an electronic activities log and resource map for the coordination centre.
- Appointed Donna Miller as the Nurse Unit Manager (NUM) of PIPER.
- Completed Neonatal nurse cross-training to improve retrieval team flexibility for infants <1 year.
- Replaced 2 aging Neonatal fitted Ambulances with new long wheel based multipurpose Ambulances.

- Established onsite AV Paramedic "Return to Work" trial 0700 to 2230 hrs in partnership with Ambulance Victoria. This is an innovative collaboration with Ambulance Victoria (AV) to decrease response times. It has increased flexibility for case logistics. At the same time we are providing paramedics with meaningful return to work roles that also assist in avoiding the use of Ambulance Victoria Emergency resources.

- Approved 24hr onsite driver capability to replace the on-call arrangement that often meant delayed responses. It has been a long term goal to improve response times by having driver's onsite. In collaboration with AV, the new contract to deliver this will start July 2015.
- Delivered 527 hours Neonatal resuscitation education across Victoria and 99 hours Paediatric resuscitation.
- Became the point of access for Paediatric trauma referrals.
- Catherine Fox, the inaugural PIPER Nurse Practitioner, was awarded the Dame Elizabeth Murdoch Scholarship, a most prestigious nursing award at RCH.
- Dr Rose Boland, PIPER Nurse Educator, was awarded her PhD in September 2014.

Ian Patrick ASM
Director PIPER

PIPER Paediatric 2014-2015

Acknowledgements

PIPER Paediatric operates as an integral part of the Paediatric Intensive Care Unit of the Royal Children's Hospital Melbourne and is continuing the process of working towards amalgamation with the Newborn Emergency Transport Services (NETS) and the Perinatal Emergency Referral Service (PERS) as PIPER, the Paediatric Infant Perinatal Emergency Retrieval Service. We gratefully acknowledge the support of hospital management as well as of the Intensive Care Unit and the leadership of PIPER:

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1. Introduction

PIPER Paediatric (PP) retrieves critically ill children from hospitals throughout Victoria, Tasmania, and southern New South Wales to the Royal Children's Hospital and to Monash Medical Centre in Melbourne.

Operating out of the Paediatric Intensive Care Unit of the Royal Children's Hospital Melbourne, PIPER Paediatric brings the highly specialized, world-class resources of paediatric intensive care to critically ill children in Victoria and beyond providing safe, expert, emergency inter-hospital retrieval to a paediatric intensive care unit.

An equally important role of PIPER Paediatric activity is the provision of specialist telephone advice to doctors, nurses, and ambulance personnel on the resuscitation of severely ill children thus making a unique resource available to healthcare workers throughout Victoria. PIPER Paediatric clinical operations are directed through the PIPER clinical coordination centre and are overseen by a medical director and a senior nurse clinician. All calls are handled through PIPER 1300 137 650.

Retrievals are performed by a PICU doctor and a PIPER Paediatric nurse. Medical staff are either experienced registrars (>4 years training in paediatrics, intensive care, anaesthesia or emergency medicine) with extra training in retrieval medicine or, in some highly complex retrievals such as transport on extracorporeal life-support (ECMO), they are senior ICU specialists from the RCH PICU.

PIPER Paediatric nurses are experienced nursing staff with a background in looking after critically ill children as well as in retrieval nursing. They have undertaken a 1 year post-graduate specialist course in PICU nursing, attended a PIPER Paediatric Workshop, Air Ambulance Orientation, and completed a Competency Package. Many nurses have also completed the Introduction to Aeromedical Retrieval Course through Monash University and the Advanced Paediatric Life Support (APLS) Course.

The financial year 2014/2015 was the busiest year for paediatric referrals and retrievals to date. PIPER Paediatric handled 1,290 referred cases and retrieved 610 patients. The challenges of high demand and advancing paediatric retrieval medicine are addressed through improved procedures and through developing efficiencies in the process of working towards full amalgamation within PIPER.

The PIPER Paediatric team will continue to provide world-class paediatric intensive care to critically ill children in Victoria and beyond during the coming year.

2. PIPER Paediatric Clinical Activity

2.1 Referral and retrieval trends

In 2014/15, PIPER Paediatric received 1290 referrals and retrieved 610 patients.

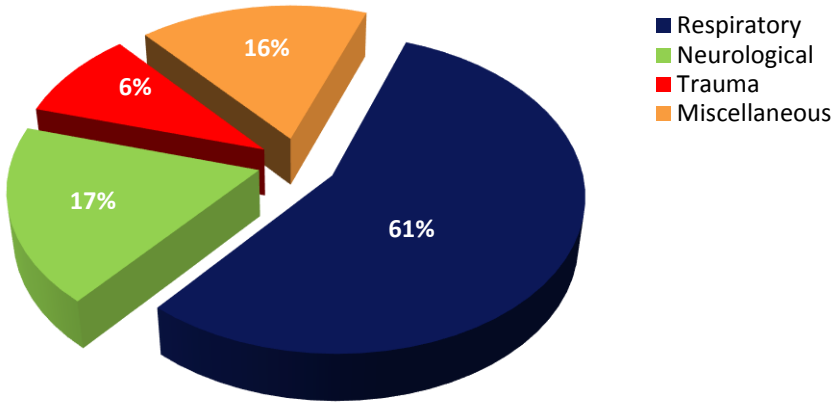
	2010	2011	2011/12	2012/13	2013/14	2014/15
Total Referrals	903	1024	1039	1021	1117	1290
PIPER Paediatric	410	475	461	469	507	610
PIPER Neonatal	68	80	62	9	8	9
Advice only	130	150	157	129	191	199
MICA/AAV	138 (MICA:94 AAV: 44)	133 (MICA:93 AAV: 41)	149 (MICA:119 AAV: 30)	170 (MICA:116 AAV: 54)	172 (MICA:129 AAV:43)	170 (MICA:120 AAV:50)
Regular Ambulance	132	157	175	206	210	272
Referring doctor	4	11	13	12	9	9
Other*	21	16	21	26	20	21

***Other**: refers to different transport services used to retrieve patients to hospitals throughout Australia. These services include the Tasmanian Retrieval Service, MedSTAR Kids (South Australia), and Adult Retrieval Victoria (ARV).It also includes patients who died or stayed at the referring hospital.

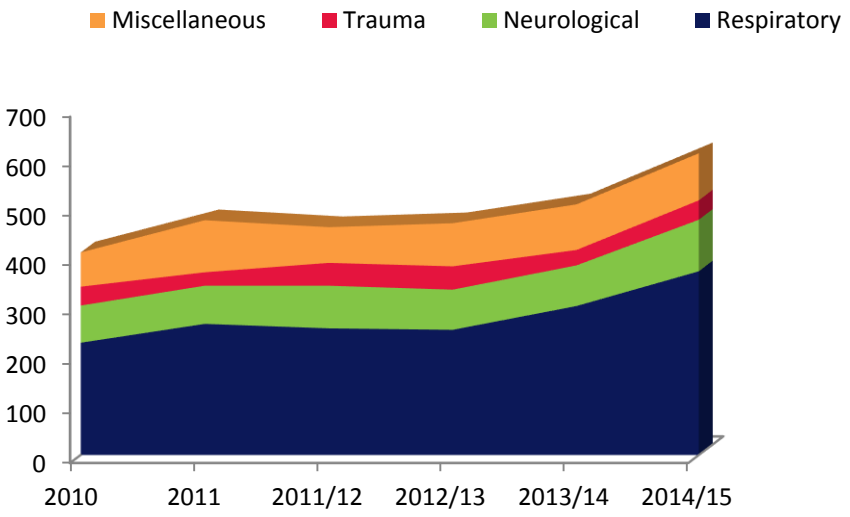
2.2 Diagnostic categories of patients retrieved by PIPER Paediatric

	2010	2011	2011/12	2012/13	2013/14	2014/15
Respiratory	228 (56%)	266 (56%)	257 (56%)	254 (54%)	302 (60%)	372 (61%)
Neurological	75 (18%)	77 (16%)	86 (19%)	81 (17%)	82 (16%)	104 (17%)
Trauma	38 (9%)	27 (6%)	46 (10%)	47 (10%)	31 (6%)	39 (6%)
Miscellaneous (Cardiac, Gastro, Renal)	69 (17%)	105 (22%)	72 (15%)	87 (19%)	92 (18%)	95 (16%)

Diagnostic categories of patients retrieved by PIPER Paediatric 2014/15



Diagnostic categories – Trends



2.3 ECLS Retrievals

Transport of critically ill children on extracorporeal life-support (ECLS) - "heart-lung machines" - is a challenging undertaking of extreme complexity and only performed by a few selected centres worldwide. PIPER Paediatric, in cooperation with the RCH PICU and the RCH Department of Cardiac Surgery, have been able to offer this service to eligible patients in Victoria and throughout Australia. PIPER Paediatric is the only paediatric emergency retrieval service in Australia routinely offering ECMO capability.

A PIPER Paediatric ECLS team consists of a senior PIPER Paediatric nurse and a senior PIPER Paediatric doctor, a paediatric cardiac surgeon and a paediatric cardiac perfusionist. They travel to critically ill children, place them on mobile extracorporeal life support equipment and retrieve them to the RCH PICU. ECLS transports are resource intensive and require a high level of medical, nursing and logistic expertise.

In 2014/15, 3 children were transported on ECLS and retrieved from Royal Darwin Hospital, Westmead Children's Hospital and Monash Medical Centre. Patient diagnoses were pneumonia, cardiomyopathy, and pulmonary hypertension. Two patients survived to discharge from hospital.

In total, 42 patients have been retrieved by PIPER Paediatric on ECLS since 2000.

3. Consumer Feedback

Karen O'Sullivan August 14, 2014, 6:00 pm Photos: 7News

Excerpts from: Mercy mission to save sick Kayla - Yahoo7

The parents of a teenager say they owe their daughter's life to doctors from the Royal Children's Hospital who flew to Darwin to save her. Kayla, 14, is almost fully recovered now, but a lung infection left her close to death and on life support just weeks ago in a Darwin Hospital.

Doctors from the Royal Children's Hospital made a mercy dash to save her life. The 24-hour critical care retrieval team travels to remote and less populated regions about half a dozen times a year, bringing some of Australia's sickest children for life-saving treatment at the Royal Children's Hospital.

Kayla was on the brink of death when doctors at the Royal Children's Hospital made a mercy dash to Darwin to save her.

facebook Timeline Photos

The Royal Children's Hospital, Melbourne

PIPER has a brand new ambulance, designed especially for critically ill babies and children. Two year old Jaxon Hach, pictured with his dad Khon, has travelled in the ambulance many times between the RCH and other facilities for treatment.

The ambulance allows babies and young children to be transported in cots, and it can accommodate twins.

The ambulance was kindly donated by Chain Reaction. Photo courtesy of the Herald Sun.

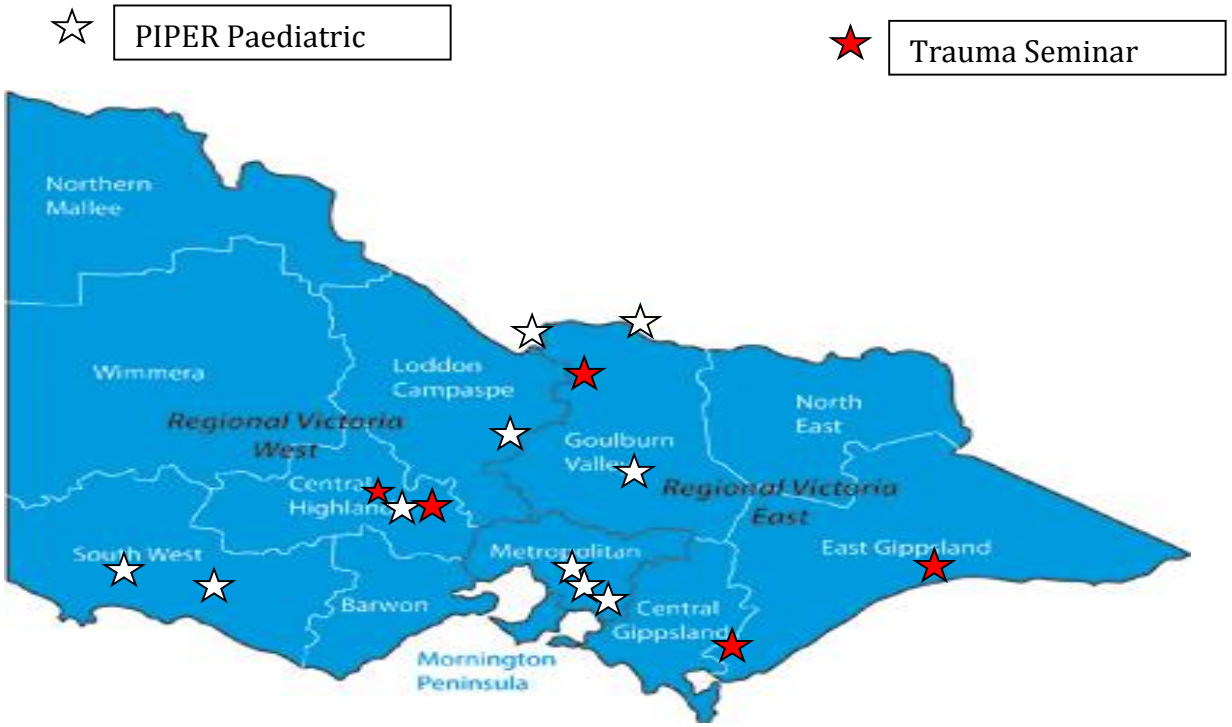
4. Outreach Education

The successful and sought-after PIPER Paediatric Outreach Education program, organised by the PIPER Paediatric senior nurse clinician, continued in 2014/15. The programme is available to hospitals throughout Victoria, Tasmania and southern New South Wales.

In 2014/15, 14 full day seminars were attended by 385 medical and nursing staff at the following hospitals: John Fawkner (x3), The Royal Children's, Alfred, Goulburn Valley, Northern, Echuca, Bendigo, Albury (x2), Terang/Mortlake, Hamilton and Maryborough. PIPER Paediatric nurses were facilitators for several Trauma Outreach Seminars which in 2014/15 were conducted in Maryborough, Ararat, Bairnsdale, Benalla, and Wonthaggi.

PIPER Paediatric have also provided education sessions to The Royal Children's Deteriorating Child Workshops, Melbourne University's Paediatric Intensive Care Nursing Course, and Latrobe regional Hospital.

Regularly recurring education events include PIPER Paediatric orientation and workshops for new PICU registrars and PICU nurses conducted each February and August. This also involves orientation to Air Ambulance, including tutorials and training sessions at Essendon airport. Full day update sessions were conducted for all PIPER Paediatric nurses.



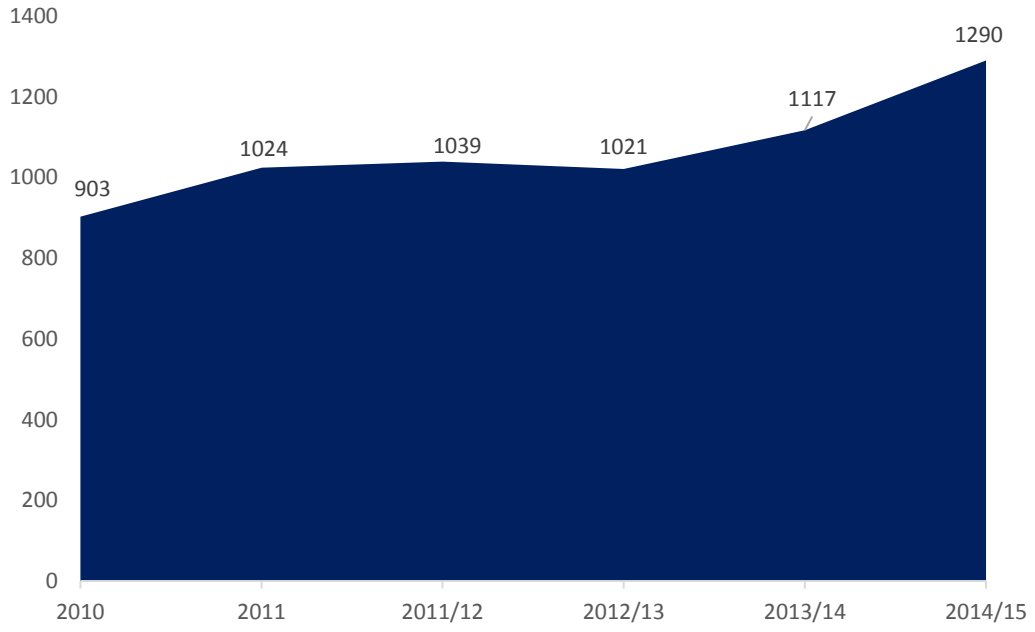
5. Innovation and Initiatives

The use of high flow nasal prong (HFNP) oxygen therapy in the management of children with respiratory conditions has developed over recent years. This is now a common form of respiratory support. PIPER Paediatric transferred 128 patients (21% of all retrievals) on HFNP oxygen in 2014-15.

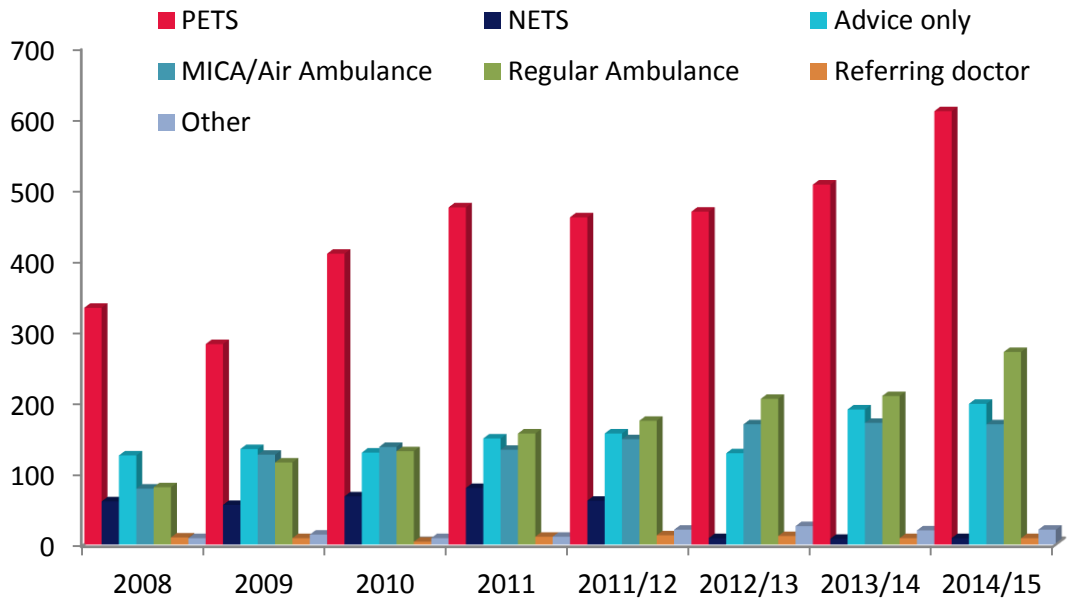
APPENDIX 1

Detailed Clinical Activity

PIPER Paediatric Referrals 2010 to FY 2014/15



Teams retrieving patients following PIPER Paediatric referral



Timeframes for patient retrieval

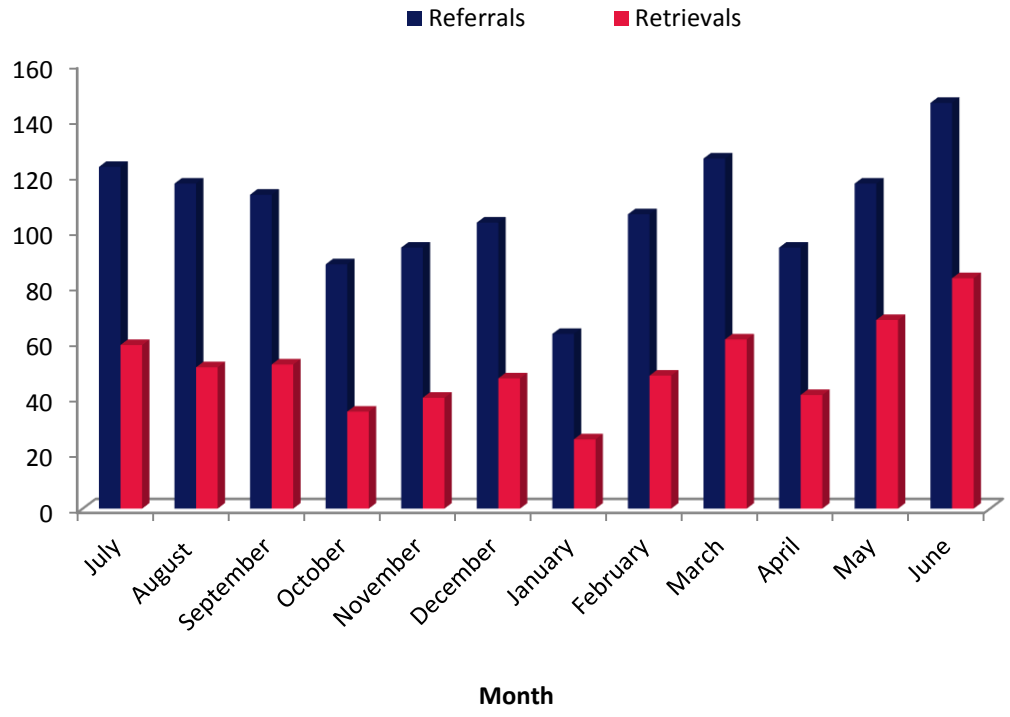
Median Activation Time **- hours -** (median time from referral phone call to departure from RCH)	**Median Response Time** **- hours -** (median time from referral call to arrival at referring hospital)
2010: 0.9 2011: 1.0 2011/12: 1.0 2012/13: 0.9 2013/14: 0.7 2014/15: 0.7	2010: 2.0 2011: 1.8 2011/12: 2.1 2012/13: 2.0 2013/14: 1.4 2014/15: 2.1

Median Retrieval Time
- hours -
(median time from referral to arrival of PIPER PAEDIATRIC team at receiving hospital)

2010: 2.9
2011: 3.0
2011/12: 2.7
2012/13: 3.2
2013/14: 3.2
2014/15: 3.1

PIPER Paediatric Referrals and Retrievals by Month 2014/15

Month	Referrals	Retrievals
July	123	59
August	117	51
September	113	52
October	88	35
November	94	40
December	103	47
January	63	25
February	106	48
March	126	61
April	94	41
May	117	68
June	146	83
Total	**1290**	**610**



PIPER Paediatric Referrals and Retrievals by Time 2014/15

Time	Referrals	Retrievals (by time of referral)	Retrievals (by time of departure)
Nursing Shifts			
07:00-19:30	752	372	329
13:30-22:00	593	275	275
19:00-07:30	606	276	297
Medical Shifts			
08:00-20:30	800	389	375
20:00-08:30	557	256	263

Staff Used for PIPER Paediatric Retrievals 2014/15

ICU Registrar	599
ICU Consultant	3
ICU Nurse*	592
MICA Paramedic	0
Air Ambulance Paramedic	0
No ICU Nurse or Air Ambulance/MICA Paramedic	15

*ICU Nurse includes 8 Elective with no ICU Registrar/Consultant

Mode of transport used by PIPER Paediatric to reach referring hospital

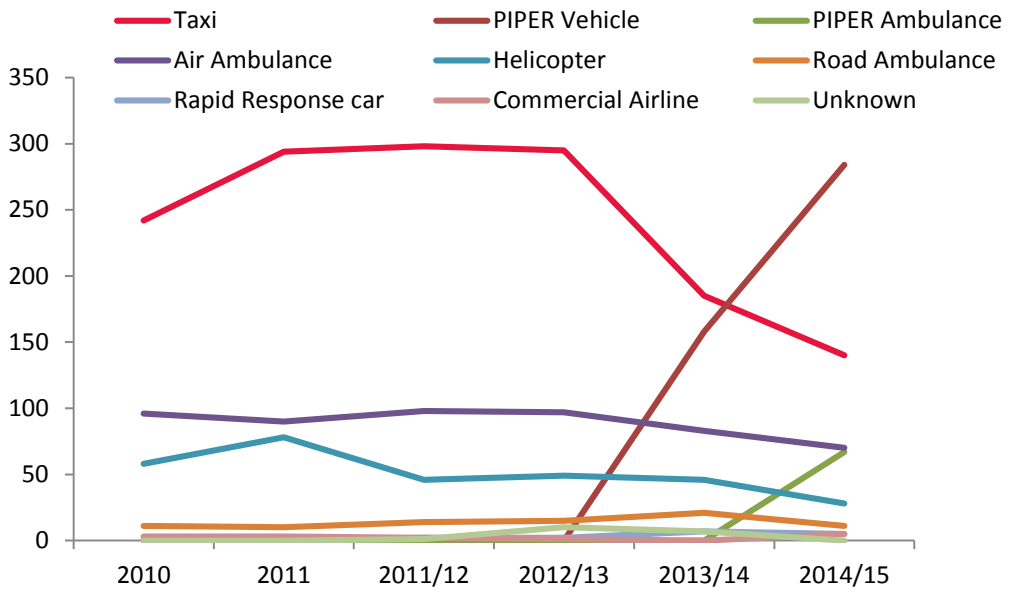
	2010	2011	2011/12	2012/13	2013/14	2014/15
Taxi	242	294	298	295	185	140
PIPER Vehicle	n/a	n/a	n/a	n/a	158	284
PIPER Ambulance	n/a	n/a	n/a	n/a	n/a	67
Air Ambulance	96	90	98	97	83	70
Helicopter	58	78	46	49	46	28
MICA	n/a	n/a	n/a	n/a	n/a	1
Road Ambulance	11	10	14	15	21	11
Rapid Response car	0	0	2	2	7	4
Commercial Airline	3	3	2	1	0	5
Unknown	0	0	1	10	7	0
Total	410	475	461	469	507	610

Mode of transport used by PIPER Paediatric to retrieve patient to the Royal Children's Hospital or Monash Medical Centre

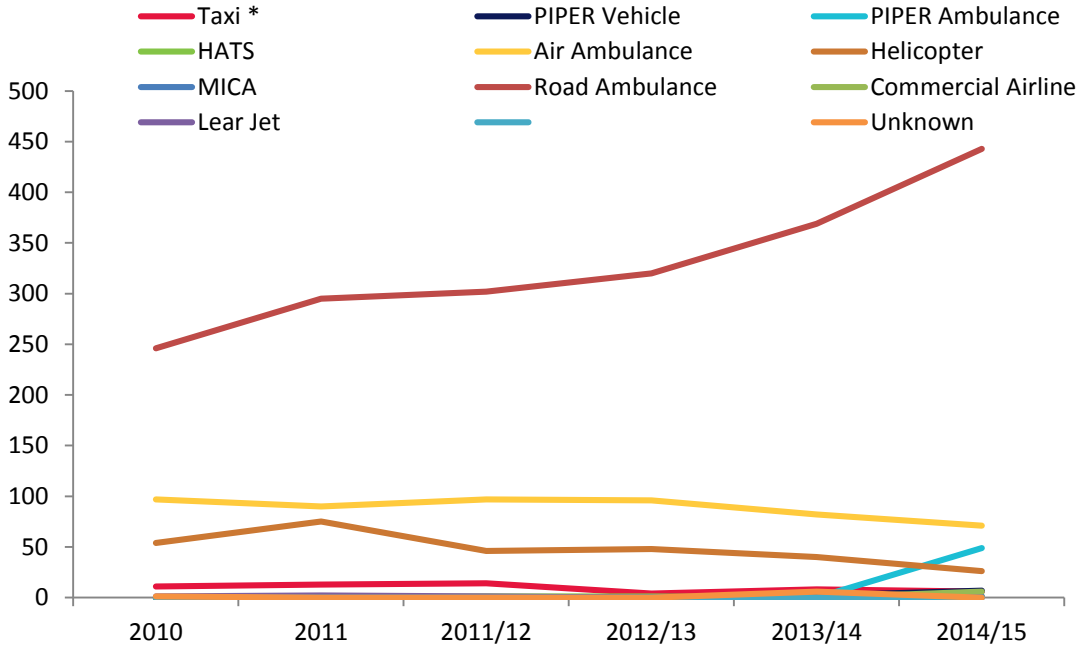
	2010	2011	2011/12	2012/13	2013/14	2014/15
Taxi *	11	13	14	4	8	6
PIPER Vehicle	n/a	n/a	n/a	n/a	2	7
PIPER Ambulance	n/a	n/a	n/a	n/a	n/a	49
HATS	0	0	1	1	0	1
Air Ambulance	97	90	97	96	82	71
Helicopter	54	75	46	48	40	26
MICA	n/a	n/a	n/a	n/a	n/a	1
Road Ambulance	246	295	302	320	369	443
Commercial Airline	n/a	n/a	n/a	n/a	n/a	6
Lear Jet	1	2	1	0	0	0
Unknown	1	0	0	0	6	0
Total	**410**	**475**	**461**	**469**	**507**	**610**

*Taxi is recorded for patients that have remained at the referring hospital because they have improved or have died.

Transport Out – Trends



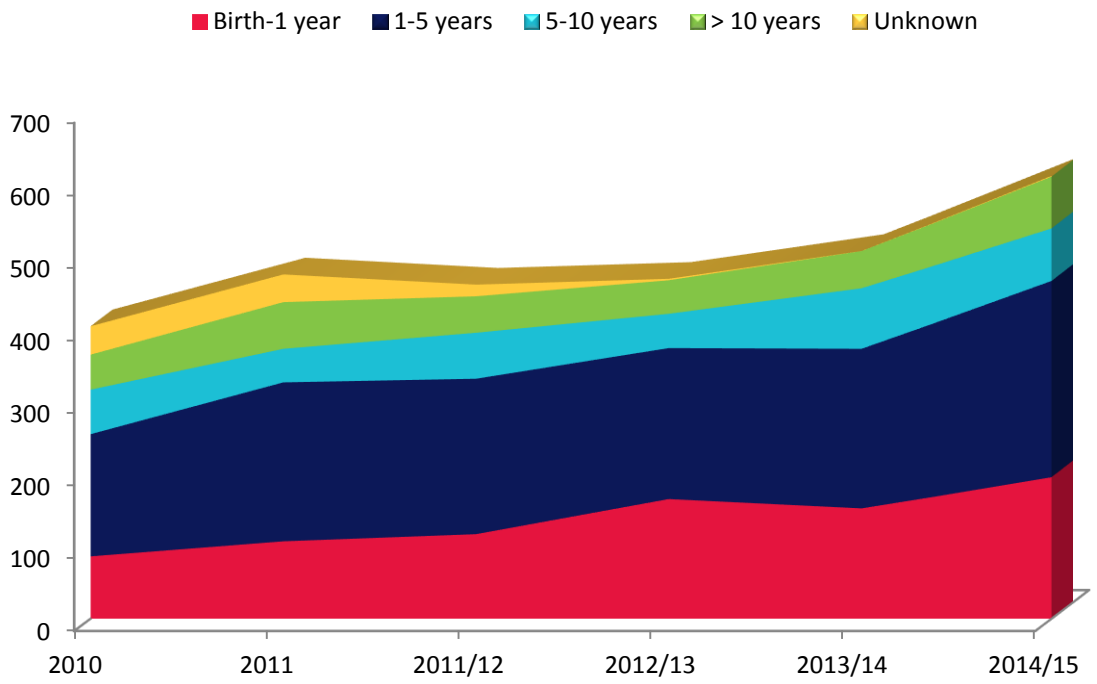
Transport Return – Trends



*see footnote on previous page

Age Distribution of Patients Retrieved

	2010	2011	2011/12	2012/13	2013/14	2014/15
Birth-1 year	87 (22%)	108 (23%)	118 (26%)	167 (36%)	154 (30%)	197 (32%)
1-5 years	169 (41%)	219 (46%)	214 (46%)	207 (44%)	219 (43%)	269 (44%)
5-10 years	61 (15%)	46 (10%)	63 (14%)	47 (10%)	83 (16%)	72 (12%)
> 10 year	48 (12%)	64 (13%)	50 (11%)	46 (9.5%)	51 (10%)	71 (11.8%)
Unknown	39 (10%)	38 (8%)	16 (3%)	2 (0.5%)	0 (0%)	1 (0.2%)

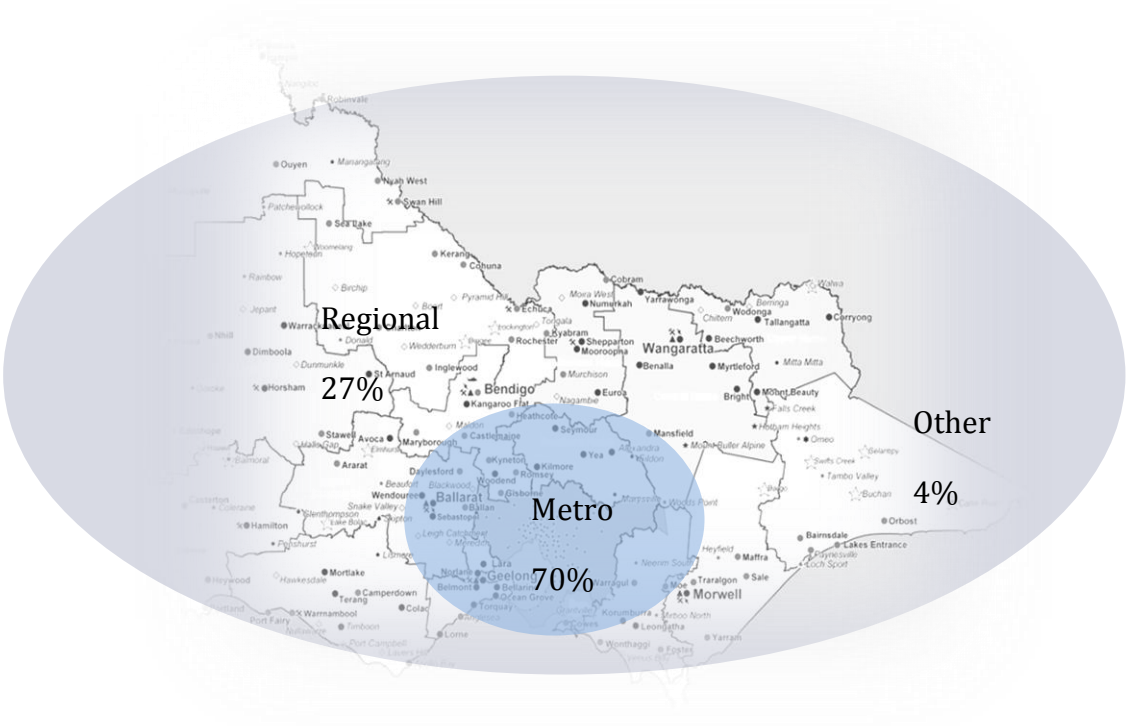


Activity by Victorian Health Care Region

Region	Number of PIPER Paediatric referrals 2014/15	%	Number of PIPER Paediatric retrievals 2014/15	%
Metropolitan	706	55	429	70
Barwon South West	135	10	43	7
Gippsland	105	8	31	5
Grampians	75	6	34	5.5
Hume	134	10	34	5.5
Loddon Mallee	78	6.5	18	3
Other*	57	4.5	21	4
Total	**1290**	**100**	**610**	**100**

*Please see interstate table in next section.

Referrals - Metropolitan and Regional



Referring Hospitals – Victoria

Hospital	Number of PIPER Paediatric cases 2014/15	Number of PIPER Paediatric retrievals 2014/15
Air Ambulance Victoria	4	0
Alexandra District Hospital	2	0
Alpine Health - Bright, Mt Beauty, Myrtleford	1	0
Angliss Hospital	25	14
Austin Health - Austin Hospital	74	47
AV Clinician	2	0
Bairnsdale Regional Health Service	9	1
Ballarat Health Services – Ballarat Base Hospital	44	23
Barwon Health - The Geelong Hospital/University Hospital	81	32
Beechworth Health Service	1	0
Bendigo Health Care Group	23	9
Boort District Hospital	2	0
Box Hill Hospital	51	39
Cabrini	15	5
Casey Hospital	64	41
Casterton Memorial Hospital	1	0
Castlemaine	4	1
Central Gippsland Health Service - Sale	7	3
Cobram District Hospital	7	0
Colac Area Health– Colac	8	1
Corowa	1	0
Cotham Private Kew	1	1
Dandenong Hospital	61	38
Djerriwarrh Health Service - Bacchus Marsh	4	0
East Grampians Health Service – Ararat	2	1
East Wimmera Health Service - Birchip	1	0
East Wimmera Health Service - Donald	1	0
Echuca Regional Health	23	4
Edenhope and District Hospital	2	0
Falls Creek Medical Centre	2	0
Frankston Hospital	48	29
Gippsland Southern Health Service - Korumburra	1	0
Gippsland Southern Health Service - Leongatha	8	2

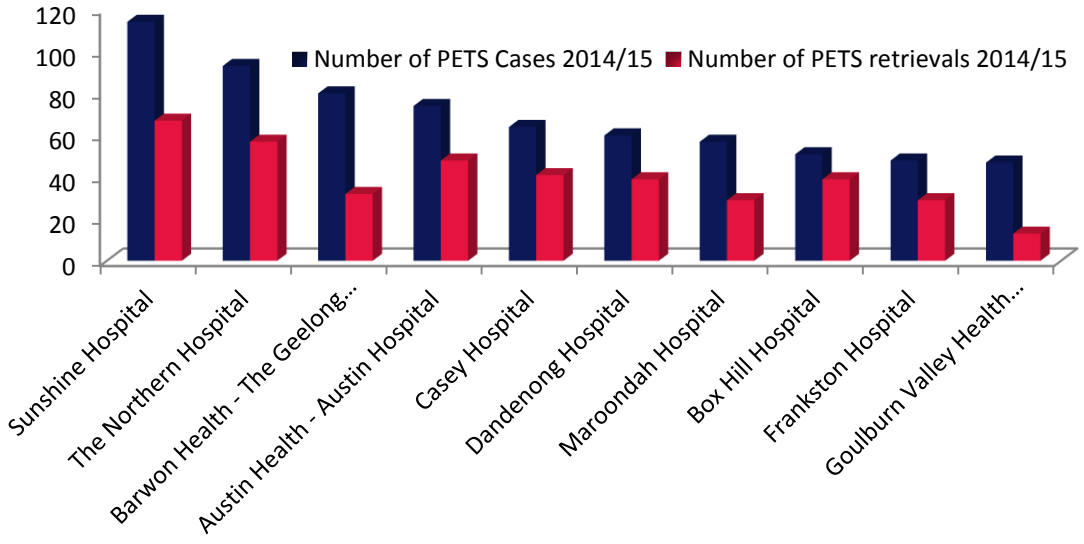
Referring Hospitals – Victoria (cont'd)

Hospital	Number of PIPER Paediatric cases 2014/15	Number of PIPER Paediatric retrievals 2014/15
Goulburn Valley Health (GVBH) Shepparton	47	13
Hepburn Health Service - Daylesford	1	0
Heyfield Hospital	1	0
Kaniva hospital	1	0
Kerang and District Hospital	2	0
Kilmore and District Hospital	5	2
Knox Private	13	7
Kyneton District Health Service	4	0
Latrobe Regional Hospital	18	6
Lincare Private	1	1
Lorne Community Hospital	3	0
Maffra Ambulance Victoria	1	0
Mallacoota Medical Centre	1	0
Mansfield District Hospital	5	0
Maroondah Hospital	57	29
Maryborough District Health Service	4	1
Melton Acute Care	1	0
Mitcham Private	1	0
Monash Medical Centre, Clayton Campus	19	16
Mt Buller Medical Centre	4	0
Nathalia District Hospital	2	0
New Mildura Base Hospital	16	8
Northeast Health Wangaratta	19	7
Northern	95	57
Omeo District Hospital	2	0
Orbost Regional Health	11	3
Otway Health and Community Service - Apollo Bay	1	1
Portland and District Hospital	7	2
Rosebud Hospital	4	1
Royal Children's Hospital	24	21
Royal Melbourne Hospital - City Campus	3	2
Rural North West Health - Warracknabeal	1	0
Sandringham and District Memorial Hospital	10	5

Referring Hospitals – Victoria (cont'd)

Hospital	Number of PIPER Paediatric cases 2014/15	Number of PIPER Paediatric retrievals 2014/15
Seymour District Memorial Hospital	8	3
South Gippsland Hospital - Foster	6	0
South West Health Care – Camperdown	2	0
South West Health Care - Warrnambool	17	5
St John of God Hospital -Geelong	2	1
St Vincent's Private Hospital	4	1
Stawell Regional Health	4	0
Sunshine Hospital	114	67
Swan Hill District Hospital	10	3
Terang and Mortlake Health Service	1	0
The Alfred	2	0
Upper Murray Health and Community Service - Corryong	1	0
Werribee Mercy Hospital	8	3
West Gippsland Health Care Group - Warragul	21	14
West Wimmera Health Service - Nhill	4	1
Western District Health Service – Hamilton	10	3
Western General Hospital	2	1
Williamstown Hospital	3	2
Wimmera Health Care Group - Wimmera Base Hospital	15	5
Wodonga Regional Health Service	3	1
Wonthaggi and District Hospital	29	6
Yarram and District Health Service	1	0
Yarrawonga District Health Service	1	0
Yea and District Memorial Hospital	1	0

Referring Hospitals Victoria – Trends



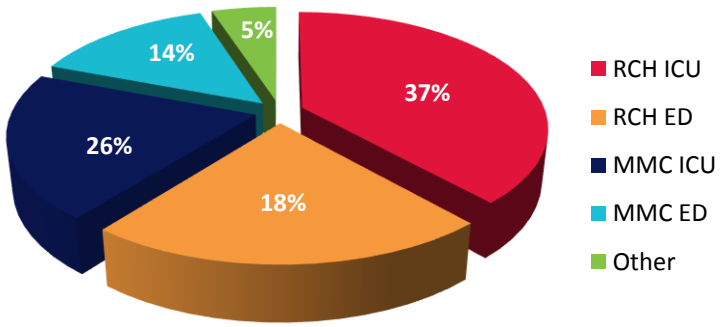
PIPER Paediatric Activity – Interstate Hospitals

Region	Hospital	Number of PIPER Paediatric referrals 2014/15	Number of PIPER Paediatric retrievals 2014/15
New South Wales	Albury Base*	32	13
	Barham	1	0
	Deniliquin	5	1
	Dubbo	1	1
	Westmead	1	1
Tasmania	Royal Hobart	2	2
	Launceston	1	0
	North Western Regional- Burnie	4	0
Others	Queensland	1	0
	Northern Territory	8	3
	Pacific	1	0

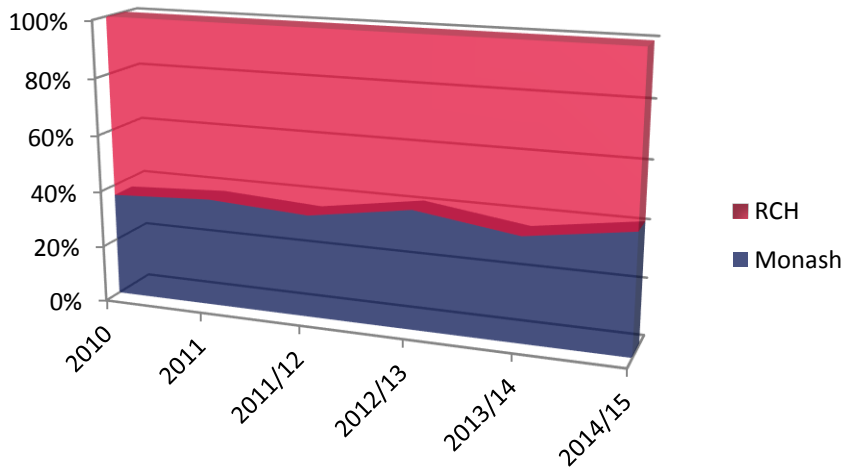
*Albury Base Hospital is located within the Victoria Hume Healthcare region

PIPER Paediatric Patient Disposition 2014/15

Patient Disposition	Total	%
RCH ICU	223	37
RCH ED	113	18
Monash ICU	158	26
Monash Emergency	84	14
Other	32	5
Retrievals	610	100



PIPER Paediatric Patient Disposition – Trends



List of Acronyms

AAV	Air Ambulance Victoria
APLS	Advanced Paediatric Life Support
ARV	Adult Retrieval Victoria
ECLS	Extracorporeal Life-Support
ED	Emergency Department
ICU	Intensive Care Unit
MICA	Mobile Intensive Care Ambulance
MMC	Monash Medical Centre, Melbourne
NETS	Newborn Emergency Transport Service, Victoria
NSW	New South Wales
PERS	Perinatal Emergency Referral Service
PP	PIPER Paediatric
PICU	Paediatric Intensive Care Unit
PIPER	Paediatric Infant Perinatal Emergency Retrieval
RCH	The Royal Children's Hospital Melbourne
TAS	Tasmania
VIC	Victoria
WA	Western Australia

PIPER Neonatal 2014-2015

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List of Acronyms

PIPER Neonatal

1. Introduction and Overview

As another busy year passes it is a privilege once again to introduce the Neonatal section of the PIPER Annual Report. It is often stated that the one constant in Health is change and that has certainly been true of our Service over recent years.

The past 12 months has seen the commencement of extensive cross training for the neonatal transport nurses, the introduction of a new PIPER nursing management structure, the use of high frequency oscillatory ventilation (HFOV)in neonatal transport, partnering with Victorian Paediatricians and Nurses to undertake an audit of the use of nasal CPAP in non-tertiary special care nurseries, the development of a formal reporting process for perinatal deaths, moving to an onsite driver model for emergency road retrievals, and a number of other initiatives. These comprise a mix of structural and functional changes but as always have as their focus improving the safety and quality of the care of our patients.

We have been fortunate to secure the services of Donna Miller as Nurse Unit Manager (NUM) of PIPER. Donna has a wealth of retrieval experience as well as management experience as the NUM on Butterfly Ward at RCH. Donna is well placed not only to lead our Nursing team but also to make a substantial contribution to the overall leadership of PIPER.

The introduction of HFOV into retrieval further narrows the gap between the level of care that can be provided within a NICU compared to the "NICU on wheels" environment. With our PIPER Paediatric colleagues combining with RCH PICU to provide extracorporeal membrane oxygenation (ECMO) in transport, the boundary between hospital ICU capability and retrieval is becoming increasingly blurred.

There is little doubt that the introduction of onsite drivers will have a significant impact on our mobilisation and response times and we look forward to reporting these in next year's report. The support of Ambulance Victoria in making this model possible is acknowledged and appreciated.

In 2015/16 we will have point of care ultrasound available for our neonatal and paediatric teams. From a neonatal perspective we plan to use this diagnostic modality, which is standard of care in hospitals, to enhance the care of the most critically ill babies we manage in retrieval – the hypoxic and acidotic baby who may have transposition of the great arteries and intact ventricular septum. Being able to confirm this diagnosis directly impacts on the stabilisation plan – moving it from a "stay and play" to a "swoop and scoop" approach. This exciting initiative requires close collaboration between neonatal ultrasound experts at the Women's, Cardiology and PICU at RCH and the PIPER retrieval clinicians. State of the art transport-friendly ultrasound linked to innovative WiFi technology will enable capture and transmission of a small number of critical cardiac ultrasound images to our RCH Cardiologists for their diagnostic opinion.

While we embrace change it consumes much time and energy in a workplace that is already time poor. The challenge for us is to find ways to work more effectively and efficiently. The initiatives referred to above, as well as a number of others, are focused on these objectives. We are strengthening our clinical governance processes through initiatives such as

perinatal mortality reporting and with RCH IT have developed a new and improved database.

PIPER Neonatal and Perinatal relies on key partners to ensure it can effectively manage the 4000 neonatal/perinatal referrals it receives each year. Access to tertiary perinatal and neonatal services remains the single biggest challenge to manage on a day to day basis. We are confident a recently commissioned, time-limited collaborative between PIPER, the Department of Health and Human Services and tertiary hospitals will lead to improvement in this important Quality domain.

Victoria's regionalised perinatal system is held in high regard around the world. Marta Thio, Rose Boland and I recently presented 6 talks related to our Service at the joint European Neonatal Societies Meeting in Budapest. We also heard about a number of other retrieval and perinatal systems. We were humbled by the feedback we received and struck by how privileged we are to be able to carry on the legacy of the visionary pioneers who initiated and developed our system of perinatal care. It is only with the commitment and expertise of the PIPER staff, working closely with all perinatal clinicians in Victoria as well as Ambulance, DHHS and tertiary and non-tertiary hospitals that we can ensure the very best care is provided to sick babies and their families.

Dr Michael Stewart FRACP MHlth Serv Mt
Deputy Director, PIPER
Medical Director, PIPER Neonatal

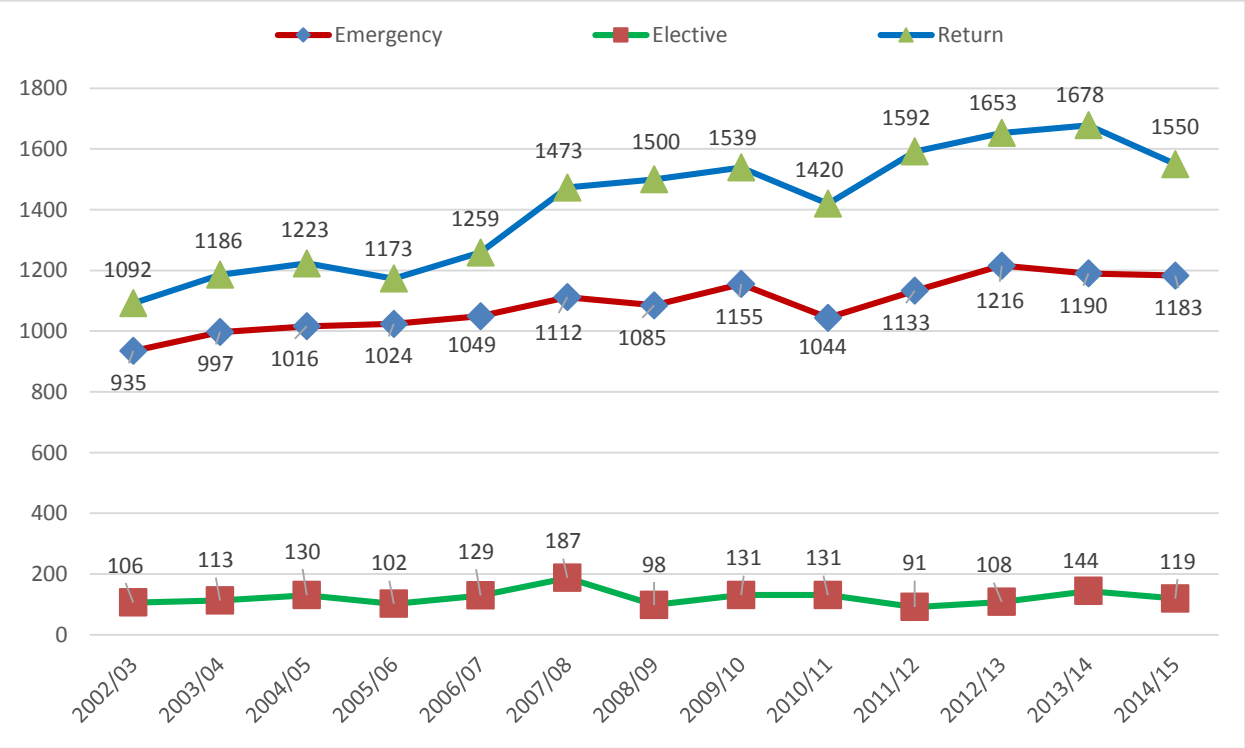
2. Clinical Activity

Comment regarding the Data Source:

Numeric data in the following sections are sourced from the PIPER Neonatal/Perinatal database. While there have been extensive efforts to clean and confirm the accuracy of the data there are issues with the current data management systems that produce some discrepancies. The data discrepancies are not of a magnitude that preclude their use for analysing trends in workload but those of you inclined to cross check data and compare totals will note there are some discrepancies.

In 2013/14, PIPER Neonatal received 3293 referrals and transferred 2852 babies.

PIPER Neonatal Transfers from 2002/03 to 2014/15



Overview—Emergency, Elective and Return Transfers

Emergency Transfers

	2011/12	2012/13	2013/14	2014/15
Metropolitan				
Road	783	825	785	830
Fixed Wing	0	0	0	0
Rotary Wing	1	2	1	0
Country				
Road	169	189	221	180
Fixed Wing	127	155	146	141
Rotary Wing	44	45	35	29
Interstate				
Road	1	0	0	0
Fixed Wing	8	0	2	3
Rotary Wing	0	0	0	0
Sub Total	1133	1216	1190	1183

Elective Transfers

	2011/12	2012/13	2013/14	2014/15
Metropolitan				
Road	82	93	128	109
Fixed Wing	0	0	1	0
Rotary Wing	0	0	0	0
Country				
Road	6	8	7	4
Fixed Wing	2	6	5	2
Rotary Wing	0	0	0	0
Interstate				
Road	1	1	2	3
Rotary Wing	0	0	1	1
Sub Total	91	108	144	119

Return Transfers

	2011/12	2012/13	2013/14	2014/15
Road	1477	1530	1565	1464
Fixed Wing	115	123	113	86
Rotary Wing	0	0	0	0
Sub Total	1592	1653	1678	1550
Total	2816	2977	3012	2852

PIPER Neonatal Consultations

	2011/2012	2012/2013	2013/14	2014/15
Neonatal	313	331	385	441

Emergency Transfers – Main Diagnoses

		2011/12	2012/13	2013/14	2014/15
1	Respiratory Distress	158	164	148	171
2	Bowel Obstruction	102	81	72	80
3	Prematurity	86	74	138	71
4	Bronchiolitis	53	66	71	76
5	Sepsis	42	58	51	54
6	Congenital Heart Disease	53	52	102	104
7	Hypoxic Ischaemic Encephalopathy	29	50	38	49
8	Meconium Aspiration Syndrome	15	32	25	26
9	Convulsions	33	32	20	31
10	Jaundice	11	25	14	14
11	Pneumothorax	9	22	23	16
12	Hypoglycaemia	25	21	38	13
13	Apnoea	15	19	24	11
14	Gastroschisis	12	16	12	7
15	Oesophageal atresia +/- fistula	15	15	9	18
16	Necrotising enterocolitis	15	15	14	9
17	Congenital Diaphragmatic Hernia	12	12	13	5
18	Upper airway Obstruction	14	9	7	21
19	Exomphalos	5	5	7	4

* For further retrieval activity statistics, please refer to Appendix 2

3. PIPER Neonatal Return Transport Service

"Moving babies closer to home"

The PIPER Return Transport Service enables babies still requiring hospital care to be moved safely to a special care nursery closer to home.

The PIPER Return Service plays a vital role in assisting tertiary and non-tertiary nurseries to optimise neonatal cot management throughout Victoria.

Babies are moved by qualified and experienced neonatal nurses who care for the baby throughout the transport process. Babies are continually monitored throughout the transfer. All babies are transported in transport incubators to ensure an optimal thermal environment and to enable compliance with restraint standards through the use of a 3 point harness.

To ensure continuity of clinical care, babies who require intravenous fluids, oxygen therapy and phototherapy are able to have these treatments continued while being transported between hospitals.

In 2014-2015, 1,550 babies were transported by the PIPER Return Service*.

The Service is staffed by 3.0EFT of qualified nursing staff and 3.0EFT of drivers. There are 2 teams working Monday-Friday and 1 team Saturday and Sunday 0800-1830 hrs to ensure the Return Service is able to best assist hospitals in moving patients to assist patient flow.

*Please see Appendix 2 for further activity.

4. PIPER Neonatal Indicators

4.1 Logistics

Emergency Transfers

Mobilisation Median Time (mins)

		2011/12	2012/13	2013/14	2014/15
Road	Time Critical	37	39	35	35
	Urgent	47	53	51	47
Fixed Wing	Time Critical	31	30	32	29
	Urgent	49	60	52	50
Rotary Wing	Time Critical	24	23	24	28
	Urgent	43	60	32	33
Average		39	44	38	37

Mobilisation Time: Time from decision to retrieve to departure on mission.

- Overall mobilisation times remain static. The commencement of onsite drivers in July 2015 is expected to lead to a significant improvement in mobilization times.
- We continue to monitor time to arrive at Air Ambulance for retrievals undertaken by air in an effort to improve efficiency. Air Ambulance and PIPER have targeted this parameter as a priority as reserving an aircraft for >1hour can encroach on other AAV demand.

Response Median Time (mins)

		2011/12	2012/13	2013/14	2014/15
Road	Time Critical	68	67	64	67
	Urgent	89	95	95	87
Fixed Wing	Time Critical	142	145	153	144
	Urgent	170	183	180	170
Rotary Wing	Time Critical	101	123	107	114
	Urgent	132	148	125	134
Average		117	127	121	119

Response Time: Time from decision to retrieve to arrival at referring hospital.

- Response times for our most common retrieval type (Urgent Road) have improved
- The onsite driver initiative should have a favourable impact on response times in 2015/16.
- Response times need to be interpreted with an understanding of the distribution of referring hospital location for any given time period.

Stabilisation Median Time (mins)					
		2011/12	2012/13	2013/14	2014/15
Road	Time Critical	83	103	102	94
	Urgent	67	74	72	71
Fixed Wing	Time Critical	170	156	121	127
	Urgent	88	80	93	89
Rotary Wing	Time Critical	128	100	112	85
	Urgent	78	87	66	81
Average		102	100	94	91
Stabilisation Time: Time from first look to departure from referring hospital.					

- Stabilisation time closely tracks patient acuity and the need for intensive care procedures.
- The service has a focus on stabilisation time and it strives to achieve a balance between time spent in the mobile NICU environment preparing the baby for a safe transfer versus delays in accessing the better resourced tertiary NICU environment.

Total Mission Duration Median Time (min)					
		2011/12	2012/13	2013/14	2014/15
Road	Time Critical	261	281	265	249
	Urgent	260	272	281	251
Fixed Wing	Time Critical	494	480	416	463
	Urgent	440	460	471	442
Rotary Wing	Time Critical	380	365	361	367
	Urgent	388	352	322	350
Average		371	368	353	354
Mission Duration: Time from decision to retrieve to arrival at receiving hospital.					

4.2 Clinical

A. Proportion of high risk babies who meet the agreed temperature target.

Rationale: Hypo and hyperthermia are associated with increased mortality and morbidity in extremely low birthweight babies. Effective temperature management is one of cornerstones of high quality neonatal care.

Patient group: Babies transferred by PIPER Neonatal who are <7 days of age and <1500g birthweight.

Measure: Patients have a temperature at the end of the transport ≥ to 36° and ≤37.5°

Target: 100%

Reporting format: Annual; percentage and raw numbers

	2011	2012	2013	2014	Target
Total Number	38	67	76	80	
Missing data	1	4	10	2	0
Temperature ≥36	33/37	58/63	57 / 66	76	
	89%	92%	86%	97%	100%

Comment

The 2014 result of 97% is outstanding and a reflection of the vigilance and expertise of our retrieval team and in particular our nurses.

The decrease in missing data for this important indicator reflects the efforts of our team to improve data integrity.

Benchmarking

Benchmarking performance against similar retrieval services is an important quality improvement tool. PIPER Neonatal is working with Australian retrieval services to collaboratively develop a suite of indicators for benchmarking purposes. We thank NETS WA for providing their data for the first time and MedSTAR South Australia who continue to collaborate.

The table below shows results for the temperature indicator for the 3 neonatal retrieval services.

	MedSTAR	PIPER Neonatal	NETS WA
2011	75% (12/19)	89% (33/37)	76%(13/17)
2012	88% (15/18)	92% (58/63)	76%(19/25)
2013	73% (16/25)	86% (57/66)	94%(34/36)
2014	100% (19/19)	97% (76/78)	75%(18/24)

Proportion of babies who meet the agreed blood glucose management target

Rationale: Hypoglycaemia is common in the sick newborn and is associated with significant adverse outcomes if not effectively managed.

Patient group: All PIPER Neonatal retrievals where the initial blood glucose is ≤ 2.6

Measure: Percentage of these babies where a subsequent blood glucose is > the initial measurement

Target: 100%

Reporting format: Annual; percentage and raw numbers

	2011	2012	2013	2014	Target
Total Number:	1161	1324	1285	1328	
Glucose less than 2.6 at First Assessment:	43	62	78	68	
Subsequent Glucose not recorded (where initial <2.6)	7	12	15	12	0%
Subsequent Glucose increased:	34/36	41/50	52 / 63	51/56	
	94%	82%	83%	91%	100%

Comment

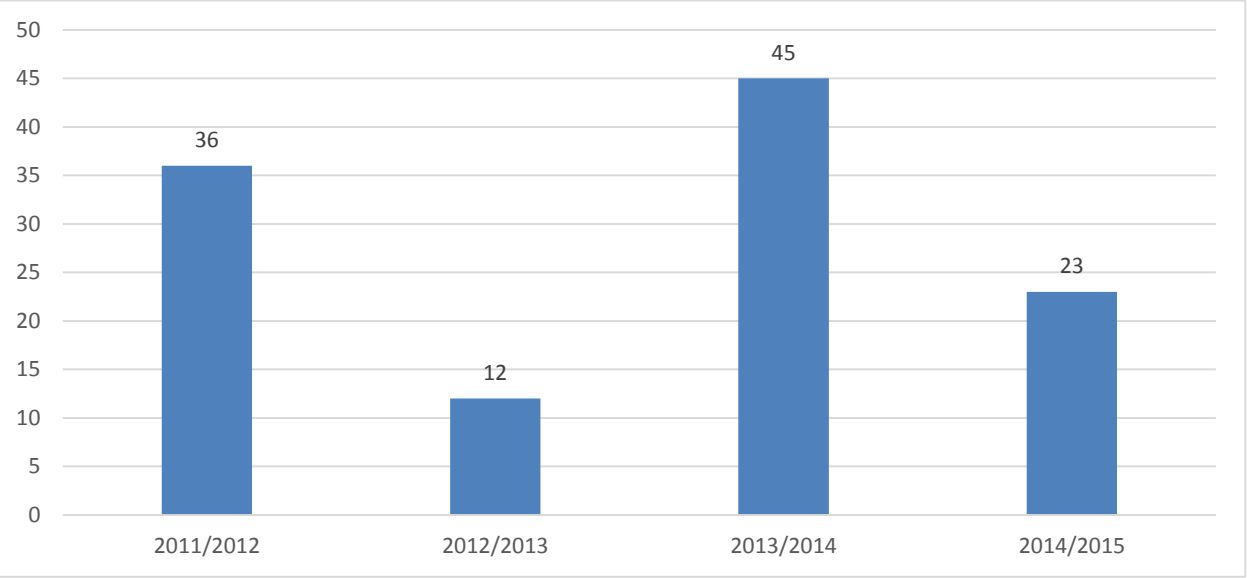
These data reflect the low incidence of hypoglycaemia at referral, indicative of the high quality of care provided by the referring team.

PIPER Neonatal's performance in effectively managing hypoglycaemia in terms of this indicator has improved to 91%. A new hypoglycaemia management guideline specifically relevant to retrieval has been implemented as part of the hypoglycaemia quality improvement initiative.

4.3 System

Historically, the indicators below have been reported quarterly at the Perinatal Services Advisory Committee meeting (PSAC). The reporting mechanism is currently under review. PSAC reports directly to the Minister for Health on various aspects of the State's Perinatal System.

PIPER Neonatal Overflow Inter-tertiary Transfers – Target = 0



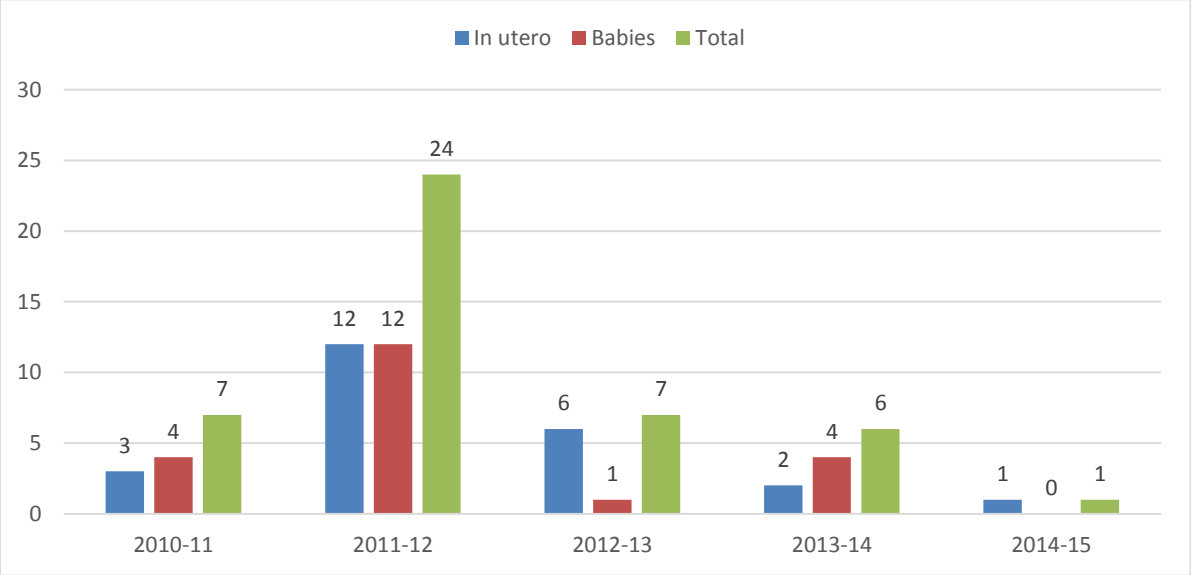
"Overflow" transfers are defined as the inter-hospital transfer of babies due to the referring hospital having inadequate resources to provide continuing care for the baby. It does not include transfers undertaken to access a level of care (e.g. surgery) that is not usually available at the referring hospital.

Overflow transfer numbers directly mirror system demand for neonatal intensive care.

Given the effect on continuity of care, effectiveness of care and patient centred care the target for overflow transfers is zero.

Overflow transfer data should be incorporated into system planning for perinatal services.

PIPER Neonatal/Perinatal Interstate Transfers



The transfer of a high acuity baby or high risk pregnant woman to an interstate perinatal hospital is undertaken to assist with demand management in extreme circumstances.

The 2014/15 result of 1 in utero transfer is the best result since systematic measurement commenced in 2002.

5. Consumer Feedback

Determining the level of parent satisfaction is critical to providing patient and family centred care consistent with the National Standard around consumer involvement. In June 2015 a targeted survey was undertaken of parents whose baby was transferred by PIPER to Butterfly ward (NICU) or Rosella ward (PICU) at RCH. The survey was conducted with the assistance of a UK medical student on an elective placement with PIPER.

Key outcomes:

- 32 surveys related to neonatal retrievals but by chance only 3 children retrieval by PIPER Paediatric were transferred to RCH PICU in the 3 week survey period therefore further analysis of Paediatric responses was not undertaken.
- Response rate for completed surveys 72% (23/32).
- 75% of parents found the parent information booklet useful
- 100% of parents reported the PIPER Neonatal team told them what was happening to their baby in a way they could understand.
- 95% of parents reported they were given the opportunity to ask questions about their baby.
- 62% of parents travelled with their baby, a pleasing increase from the 38% result of 2013/14.
- Free text comments were overwhelmingly positive and in particular parents commented on the professional and caring nature of the team and were expressed gratitude that such a service was available to care for their baby.

Conclusions

- Overall the results are encouraging.
- A Parent Portfolio has been established to focus on increasing total survey numbers, engaging parents whose children are transferred by our Paediatric team, and including parents whose babies/children are transferred to hospitals other than RCH. Consumer representation is being sought for this group as we strive to improve the parent experience during this stressful time.

Our son Vivian was born in 2014 in country Victoria. It was only the hours after his birth … that his breathing became laboured. … As soon as you arrived, my terror simultaneously increased and evaporated. I knew that something incredibly serious was happening, but also as soon as Trisha, Victoria and Richard arrived, that Vivian was in the safest hands he could possibly be.

Trisha and Victoria's ability to do their work, while at the same time remain calm and be empathetic to the blubbering mess that I was, was outstanding. Explaining each process to my husband and I, so that we had as much information as possible. They were kind, patient, efficient and sensible.

I would like to send my sincere thanks to you all, for what you did for my baby, and my family. I am hoping that it is never too late to show sincere gratitude, and while it has taken me a long time to get in touch, I would like it known that not a day goes by that I thank my lucky stars that we are fortunate enough to have a service like PIPER where we live.

Lucy

On the 20th of June 2015 … my daughter was born at a large metropolitan Hospital with some life threatening respiratory issues.

The 2 NETS staff … turned up very quickly in the early hours of the morning and took over. They did an amazing job and saved my daughter's life.

I could not be more grateful to these two people. They are just amazing at their jobs.

From grateful parents

6. PIPER Neonatal Education

The mission of PIPER Neonatal Education is to provide a diverse range of learning resources for clinicians involved in the care of the newborn, particularly for clinicians in non-tertiary hospitals. We are committed to continuous adaptation and improvement to ensure we meet the needs of our stakeholders.

Outreach Education is a core business for any regional retrieval service. Provided effectively, it improves the emergency care of babies prior to the retrieval team's arrival and in many cases will obviate the need for a baby to be retrieved.

Highlights of 2014/15 include:

- More than 2,180 clinicians utilised our learning resources.
- Our staff travelled 15,800 km throughout Victoria to facilitate metropolitan and country programs.
- Our commitment to support the smaller maternity services was evidenced by the provision of 35 programs in 19 Level 1 hospitals in Victoria. These programs focused on resuscitation and stabilisation of the newborn.
- We introduced new preterm mannequins and new intubatable term mannequins as well as mini iPads running software that turned the display into a vital signs monitor. This provides an inexpensive, mobile, medium fidelity learning environment and was well received by participants.

NeoResus – State of the Art in evidence-based Newborn Resuscitation Training

- The neoResus First Response Program and the neoResus Advanced Resuscitation program have been well attended in 2014/15. These multidisciplinary programs, anchored by the guidelines of the Australian and NZ Resuscitation Council, cover the principles of resuscitation of the newly born infant using web-based learning, scenario-based hands-on learning and opportunities to become familiar with newborn resuscitation equipment.
- We continued to encourage junior and senior medical staff participation with midwives and nurses to better simulate the multidisciplinary team that would attend a "real" neonatal resuscitation. The success of this initiative is evidenced by the fact that more than 350 medical staff participated in our programs in 2014/15, an increase of 7% compared with 2013/14.
- The Health Departments in Queensland and Tasmania have identified neoResus as their preferred state-wide program for newborn resuscitation training in public hospitals. Our staff have facilitated Facilitator Induction programs for key stakeholders to enable the roll-out of the neoResus program across both States. More than 500 medical, nursing and midwifery staff in Queensland and 270 from Tasmania have attended a NeoResus program over the past 2 years.

- Similar interest in the Program has been expressed by both the tertiary and non-tertiary sectors in NSW and is currently being explored. The success of this Program is a testament to the initiative, expertise and efforts of all the education team, led by Rosemarie Boland and Marta Thio.

Promoting learning across disciplines – Maternity and Newborn

- Nursing and Medical staff from PIPER Neonatal Education joined with the Maternity Services Education Program (MSEP) to facilitate combined, multidisciplinary workshops in Victorian rural hospitals (Seymour, Myrtleford, Benalla and Echuca). These workshops focus on the continuum of care from the management of the pregnant woman during the intrapartum period to the newly born baby, emphasising crisis resource management principles. The 2 day workshops involve maternal obstetric care and neonatal resuscitation, combining high fidelity simulation (actress, paramedics) with mid to low fidelity simulation (neonatal manikins). A multidisciplinary team, including local paramedics, attend these programs.

Award winning initiative—promoting culturally sensitive learning – working with our indigenous colleagues

- In 2014 and 2015 MSEP, the Victorian Aboriginal Community Controlled Health Organisation (VACCHO), Njernda and GEGAC (Gippsland & East Gippsland Aboriginal Cooperative), Koori Maternity Services, PIPER Neonatal Education and Ambulance Victoria in collaboration with Echuca and Bairnsdale Regional health Services, continued to facilitate "Cultural safety in maternity care" workshops to enhance outcomes for Aboriginal families and build cultural safety on individual, organizational and inter-organisational levels.

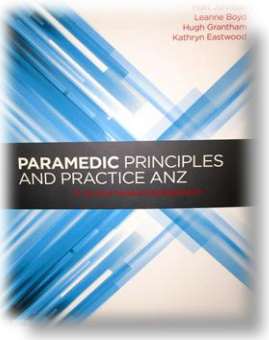
Supporting University students

- The team supports Undergraduate and Postgraduate Midwifery student learning with the provision of newborn resuscitation theoretical and practical components, stabilization of the unwell neonate and highlighting the role of PIPER in the care of the high risk pregnant woman and the compromised newborn.

Supporting pre-hospital care of the newborn – Partnering in Paramedic Education

- An important collaborative initiative has seen PIPER Neonatal Education provide Neonatal Resuscitation education programs for undergraduate student paramedics studying at Monash University, as well as paramedics undertaking the MICA post graduate program at Monash. These programs are based on the 2013 Ambulance Victoria Newborn Clinical Practice Guidelines that were co-authored by PIPER Neonatal Education staff.

- In May, *Paramedic Principles and Practice: Australian and New Zealand: A Clinical Reasoning Approach* was published. The chapter on neonatal resuscitation following out-of-hospital birth was written by Rosemarie Boland and the forward to the book by A/Professor Ian Patrick. This is the first text book specifically written for Australian and New Zealand Paramedics.



PIPER Neonatal Education Activity Report 2014-2015

From 1st July 2014 until 30th June 2015, PIPER Neonatal Education staff provided 562 contact hours of education for Victorian and interstate healthcare professionals involved with perinatal care.

Education formats – Supporting Diversity in Learning

Format	Contact hours
Continuing education programs	515
PIPER Education Continuing Education Program in Newborn Nursing Care (CEPNNC)	36
Neonatal competency assessments*	11
TOTAL:	**562**

Education Programs

128 programs (including 2 PIPER Education CEPNNC and 3 competency assessment sessions) were conducted in 2014/2015.

- 77 programs hosted by 31 Public Hospitals
- 23 programs hosted by 10 Private Hospitals
- 10 programs hosted by 8 Universities or other health care providers or stakeholders
- 12 programs were hosted by PIPER at RCH

A total of 46 country study days were held during 2014/15.

Participant Profile – Supporting Multidisciplinary Learning

Status	No. of participants
Nursing	1464
Medical	353
Student Paramedics/MICA Paramedics	125
Other	39
Not recorded	199
TOTAL:	**2180**

* It is not always possible to determine exact numbers or status of those attending programs, particularly those coordinated by other providers.

Nursing staff include Midwives, Registered Nurses, Graduate Diploma of Midwifery students, Bachelor of Midwifery students, Divisional 2 Nurses and Mothercraft Nurses. Midwives are the predominant group, with more than 963 attending sessions.

PIPER Neonatal Education Activity Report Comparison

Hospitals Visited	2011/12	2012/13	2013/14	2014/15
Level I	14 hospitals 20 programs	13 hospitals 20 programs	18 hospitals 34 programs	19 hospitals 35 programs
Level II	21 hospitals 67 programs	24 hospitals 73 programs	17 hospitals 59 programs	21 hospitals 64 programs
Level III	5 hospitals 6 programs	5 hospitals 5 programs	5 hospitals 7 programs	1 hospitals 1 programs
Public:	25 hospitals 55 programs	28 hospitals 61 programs	29 hospitals 70 programs	31 hospitals 77 programs
Private:	11 hospitals 33 programs	11 hospitals 35 programs	7 hospitals 28 programs	10 hospitals 23 programs
Universities:	9 facilities 12 programs	9 facilities 14 programs	3 facilities 5 programs	3 facilities 5 programs
Others: Independent Practicing Midwives, Ramsay Healthcare, RANZCOG, Staffing Synergy, Victorian Newborn Resuscitation Project, MNCN conference, ACEM, Epworth Simulation Centre	9 facilities 20 programs	5 facilities 16 programs	7 facilities 22 programs	7 facilities 18 programs
Doctor assisted sessions/programs		46*	32*	39**
Total sessions	**120**	**126**	**126**	**123**
Total hours	**436.5**	**488.5**	**484.5**	**515.5**
Total attendees	**2346**	**2465**	**2312**	**2180**

* Approximately. ** Some sessions facilitated by non-PIPER medical staff.

7. Innovations and Initiatives

7.1 Towards an integrated PIPER service - Cross Training our Staff

PIPER Neonatal nurses commenced cross training with the aim to create a more flexible and efficient service by increasing the scope of practice for the Neonatal nurses to safely stabilise and transport patients up to 12months of age.

PIPER neonatal nurses undertook 2 full days of training. PIPER Paediatric and RCH PICU medical and nursing staff gave a series of lectures that included the principles of paediatric ventilation, respiratory assessment, and assessment of the sick child. Workshops covered equipment used in Paediatric retrieval and as well as sessions on Paediatric resuscitation.

Neonatal staff then accompanied the Paediatric team on a transport to gain further insight into the Paediatric transport environment. They then completed all the required equipment competencies before being credentialed to undertake retrievals with the PIPER Paediatric medical registrar.

PIPER Neonatal registrars and our nurse practitioner also attended the cross training sessions. In addition they have commenced listening to Paediatric referrals and completing a gap analysis report on each referral to assist with identifying gaps in scope of practice between neonatal and paediatric retrieval skill sets.

We continue to work on the cross training and ensure all staff are given the required support to increase their skill set and feel comfortable to undertake these transports.

Donna Miller and Alison Fleming

7.2 Neonatal Retrieval Nurse Practitioner – a seamless addition to the team

Our first NNP, Catherine Fox, was awarded the prestigious Dame Elizabeth Murdoch Scholarship to evaluate the implementation of this role in PIPER. Her work was accepted for presentation at the 2015 American Academy of Paediatrics Section on Transport Medicine Meeting in Washington DC. The table shows some of the results of this evaluation.

Activity and outcome data for NNP and Fellow led transports.

Variable	NNP (n = 1)	Fellow (n = 6.5)	p value
Retrievals (n= 1069)	124	945	
Time critical retrievals	32/124 (26%)	157/945 (17%)	p = 0.01
Weight on transport, mean (sd)	2775 (1071)g	2955 (1041)g	p = 0.07
Corrected GA, mean (sd)	37(5.6) weeks	37(4.7) weeks	p = 0.16
Respiratory support	83/124 (67%)	556/945 (59%)	p = 0.08
Intubations by transport team	16/124 (13%)	93/945 (10%)	p = 0.30
Stabilisation time, mean (sd)	79(52) mins	75(54) mins	p = 0.26
Hypoglycaemia at stabilisation *	0/55 (0%)	19/310 (6%)	p = 0.06
Hypothermia at stabilisation *	11/111 (10%)	77/781 (10%)	p = 0.98

* Blood sugar and temperature readings in high risk babies at the end of stabilisation.

7.3 Student Nurse Visitors to PIPER Neonatal

In 2014/15 PIPER hosted 40 Post Graduate Neonatal Nurses and Midwives from tertiary and non-tertiary hospitals to spend an observation day with PIPER.

A visit to PIPER allows these nurses and midwives to participate as observers in the retrieval of critically ill newborns. Retrievals may be undertaken by road, rotary or fixed wing aircraft. They are exposed to the principles and practice of retrieval nursing necessary to transport critically ill babies from diverse settings.

They are also exposed to the state-of-the-art PIPER Coordination centre where they witness the taking of perinatal, newborn, paediatric and trauma calls. The feedback from visiting students has been positive and recognition of the expert care and logistical support involved in retrievals is appreciated from those who have participated in the PIPER observation day.

PIPER believes this is an important part of our education process showing our stakeholders how a state-wide emergency referral and retrieval organisation provides services for Victoria's women, newborn babies and children.

Felice Pettolino
Clinical Nurse Facilitator.

8. PIPER Neonatal Research

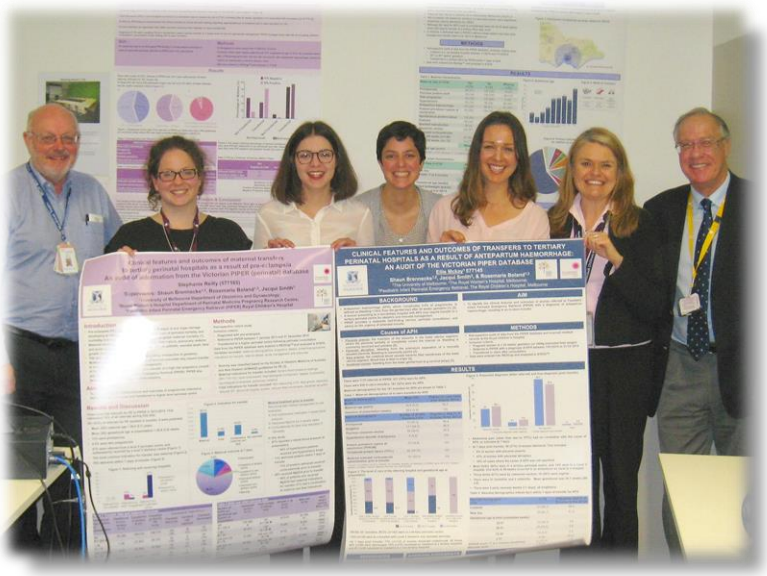
A list of publications and presentations is included in Appendix 3. This reflects the diverse range of skills among clinicians who spend part of their time with PIPER Neonatal. We have included work directly related to retrieval, neonatal resuscitation and neonatal education as well as other areas of interest of our staff.

This diversity of interests and expertise ensures a stimulating environment within the Service. A commitment to academic support is an integral component of all clinical services. We achieve this through research and audit directly related to retrieval, and by supporting staff while they pursue research in related areas. We had 3 medical and 1 nursing staff members enrolled in higher degrees while working part time for PIPER in 2014/15.

Highlights

- A new initiative in 2015 was offering research electives for Scholarly Selective Students in the final year of their Doctor of Medicine degree at the University of Melbourne. Under the supervision of Rosemarie Boland, Michael Stewart, Jacqui Smith and Professor Shaun Brennecke (Department of Obstetrics and Gynaecology), 4 students were supported to undertake the following projects:

  - Clinical features and outcomes of transfers to tertiary perinatal hospitals as a result of antepartum haemorrhage: An audit of the Victorian PIPER database. Ms Ellie McKay.
  - Clinical features and outcomes of transfers to tertiary perinatal hospitals as a result of pre-eclampsia- an audit of information from the Victorian PERS database. Ms Stephanie Reilly.
  - Evaluating the positive and negative predictive power of cervicovaginal fetal fibronectin testing women with threatened preterm labour in non-tertiary hospitals in Victoria. Ms Annabel Sheehan.
  - Maternal and neonatal characteristics of outborn 28-36 weeks' gestation infants transferred to a tertiary neonatal intensive care unit. Ms Chloe Spiegel.



Dr Michael Stewart, Ms Stephanie Reilly, Ms Annabel Sheehan, Ms Chloe Spiegel, Ms Ellie McKay, Dr Rosemarie Boland, Professor Shaun Brennecke

- PIPER neonatal consultants, fellows and educators continue to have a strong presence at national and international conferences presenting outcomes of research undertaken at PIPER.

- Dr Calum Roberts, retrieval Fellow with PIPER and research Fellow at The Women's, led a randomized controlled trial, HIPSTER, comparing nasal CPAP with high flow humidified oxygen for babies born between 28 and 37 weeks' gestation in tertiary NICUs. Calum also wrote the PIPER guideline that facilitated the introduction of high flow as a means of respiratory support in transport. In addition Calum leads the HUNTER trial, investigating the use of high flow in non-tertiary hospitals for infants with respiratory distress.

- Dr Lorraine McGrory led a randomised controlled trial, HUMID, investigating the efficacy of humidifying and warming gas delivered to babies born before 30 weeks in the delivery room via a T-piece device.

- Dr Marta Thio has a research interest in Neonatal Resuscitation and Education. She completed her PhD on the use of self-inflating bags in resource-limited settings. She has co-supervised the PhD student Dr Joyce O'Shea, who also has an interest in Education. They have measured very preterm babies' faces, to show what mask size is adequate from birth till 34 weeks' gestational age. They have also shown that intubations performed by inexperienced neonatal medical staff have higher success rates when the procedure is guided with the use of videolaryngoscopy.

- Marta also works in collaboration with national and international multidisciplinary research teams. At Monash (The Ritchie Centre, Prof. Stuart Hooper) the team has developed a congenital diaphragmatic hernia animal model and they are currently investigating the optimal ventilation strategy to support these challenging newborn infants during their transition after birth.

- Dr Rosemarie Boland has continued her research into risk factors for morbidity and mortality in 22-31 weeks' gestation infants born in non-tertiary versus tertiary hospitals. With funding from the Murdoch Children's Research Institute and a postdoctoral fellowship from the Nurses Board of Victoria, Rose is leading a three year program of research aimed at improving outcomes for these infants.

We acknowledge all staff who have contributed to this impressive achievement.

APPENDIX 1

know your transport

— CLASSIFICATION —

✸ Primary Time Critical: depart within **15** minutes — **PRIORITY 1**

for:

- Ongoing resuscitation
  - collapse or shock
  - severe asphyxia
  - cyanosis or bradycardia
- Extreme prematurely
  - < 32 weeks in level 1 hospital
  - ≤ 28 weeks in level 2 hospital
- Ventilated in
  - any nursery without mechanical ventilator
  - level 1 hospital
  - low dependency level 2 hospital
  - greater than 60% oxygen
- Infant in hospital without staff or equipment to deal with clinical situation
- bile stained vomiting – rule out malrotation

➢ *Consider helicopters*

➢ *Consider rapid response vehicle*

✸ Primary Urgent: depart within **25** minutes — **PRIORITY 2**

for:

- all other transports except those classified under non-time critical below

✸ Primary Non-Time Critical: depart within **60** minutes — **PRIORITY 3**

for:

- Overflow transfers (some)
- Other acute transfers from level 3 hospitals (some)
- Other non-elective transfers (e.g. special investigations, MRI)
- All 'returns' on respiratory support (booked)

✸ Elective & Return: booked time — **PRIORITY 4**

for:

- Non-ventilated, booked, transports (e.g. CT/MRI, special investigations)
- Back transfer of infants who are **NOT** on respiratory support

✸ Consultation – neonatal:

for:

- Contact with NETS in which the infant is **NOT** transported within 24 hours of initial call

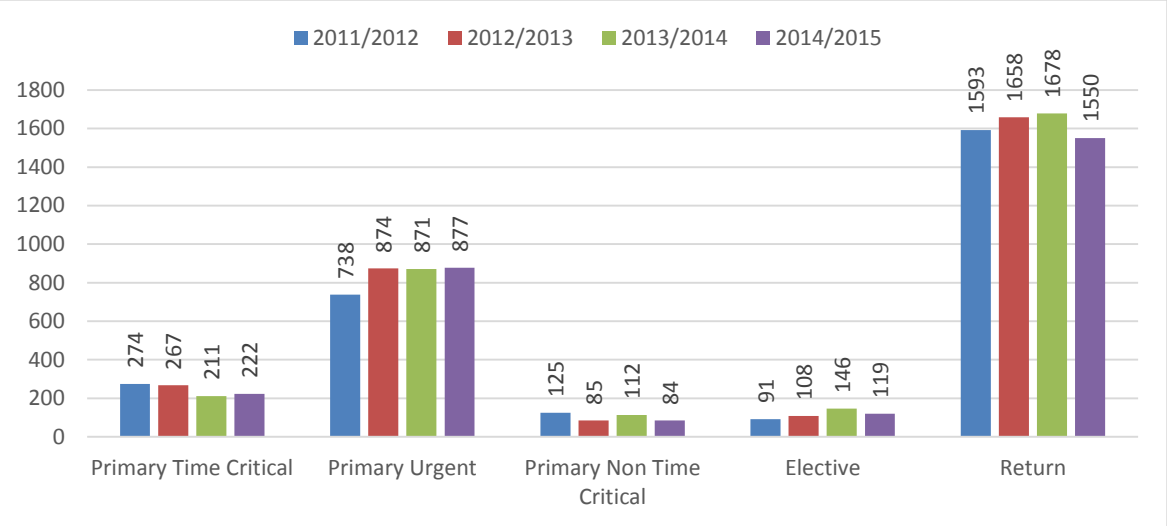
✸ Consultation – perinatal:

for:

- In-utero bed finding
- Perinatal advice
- Does **NOT** result in mobilisation of transport team

Detailed Clinical Activity

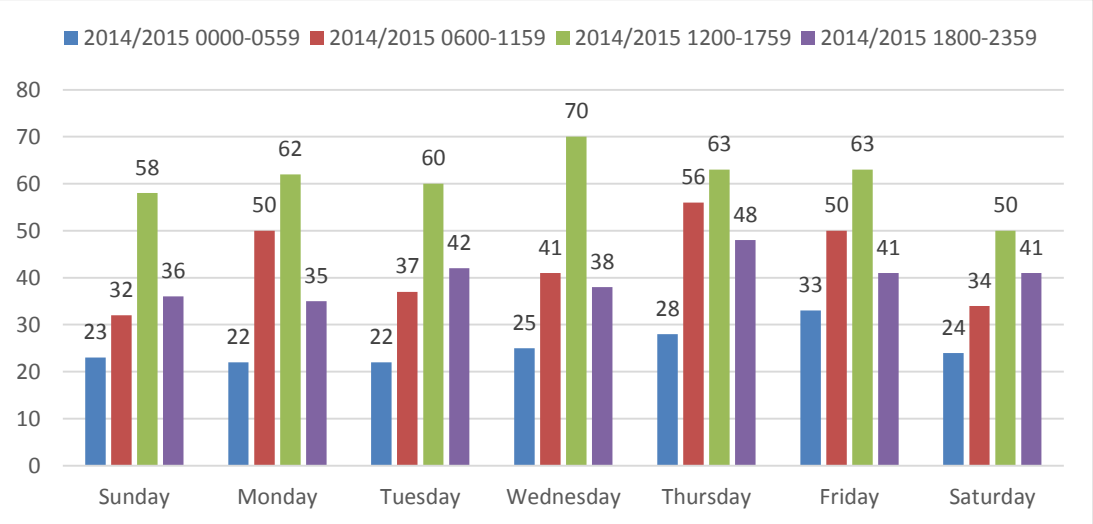
PIPER Neonatal Transfers by Level of Acuity



Interventions on Emergency Transfers

	2011/12	2012/13	2013/14	2014/15
Ventilation	308	385	385	371
Nasal CPAP	314	367	373	376
Prostaglandin	92	134	172	164
Surfactant	99	99	114	104
Therapeutic hypothermia	36	51	42	35
Nitric Oxide	19	26	28	21

Emergency Transfers by Day and Time of referral in 2014/15



Emergency Transfers– Referring Hospital

Location	2011/12	2012/13	2013/14	2014/15
Metropolitan				
Alfred	0	2	0	1
Angliss	24	28	33	23
Austin	15	17	19	8
Berwick	15	21	13	21
Box Hill	34	37	35	51
Cabrini	17	19	24	33
Casey	38	38	32	42
Dandenong	43	40	43	33
Epworth	4	2	2	1
Epworth Freemasons	32	31	18	33
Frances Perry House	14	9	11	15
Frankston	52	65	42	49
Frankston Peninsula Private	5	3	5	5
Hawthorn	1	0	0	0
Jessie McPherson	1	0	0	2
Knox	11	8	3	8
Maroondah	4	5	9	7
Mercy Hospital for Women	60	63	56	49
Mitcham	18	21	22	12
Monash Medical Centre	23	20	29	36
North Park	10	11	5	10
Northern	35	48	39	54
Royal Children's Hospital	17	4	14	12
Royal Melbourne Hospital	0	0	1	0
Royal Women's Hospital	128	129	151	133
Sandringham	17	23	19	24
South Eastern	8	1	0	0
St Vincent's Private	29	29	13	20
Sunshine	94	95	99	100
Waverley	11	17	14	11
Werribee Mercy	24	41	35	37
Sub-Total	784	827	786	830

Emergency Transfers – Referring Hospital (cont'd)

Location	2011/12	2012/13	2013/14	2014/15
Country				
Ararat & District Hospital	0	3	4	3
Bacchus Marsh	12	19	17	6
Bairnsdale	10	6	8	8
Ballarat Health	42	31	38	24
Ballarat SJOG	6	9	9	1
Benalla	2	1	0	2
Bendigo Health	15	21	23	34
Bendigo SJOG	3	9	5	8
Birchip	0	1	0	0
Camperdown	1	0	2	0
Castlemaine	3	3	0	2
Cohuna	0	2	0	3
Colac	7	5	7	5
Donald	1	0	0	0
Echuca	4	16	9	5
Foster	2	2	2	0
Geelong Bellarine	34	39	48	48
Geelong SJOG	5	8	11	10
Hamilton	2	4	2	4
Hopetoun	0	0	0	1
Horsham	7	6	9	13
Kerang	5	3	0	0
Kilmore	7	6	8	6
Kyabram	1	0	2	0
Kyneton	2	0	2	1
Leongatha	10	4	9	6
Mansfield	2	2	0	0
Maryborough	2	3	0	3
Mildura Base	6	7	17	14
Mornington	6	8	9	6
Nhill	0	0	2	0
Omeo	0	1	0	0
Orbost	1	1	1	1
Portland	2	1	1	1

Emergency Transfers – Referring Hospital (cont'd)

Location	2011/12	2012/13	2013/14	2014/15
Country (cont'd)				
Stawell	0	0	2	0
Rosebud	0	1	1	0
Sale	12	12	6	6
Seymour	1	3	4	0
Shepparton Goulburn	30	29	20	22
St Arnaud	2	0	0	0
Swan Hill	9	12	8	4
Terang	2	1	0	0
Traralgon	21	19	19	17
Wangaratta	9	9	17	8
Warragul	26	26	21	23
Warrnambool Base	7	10	9	16
Wodonga	15	32	29	24
Wonthaggi	8	12	14	6
Yarrawonga	0	1	0	0
Sub-Total	342	288	295	341
Interstate				
Albury Base	4	5	5	6
Burnie	0	1	0	0
Canberra Hospital	0	0	1	0
Deniliquin	2	2	2	3
Finley	0	1	0	0
Hobart	1	1	0	0
Launceston Queen	0	1	0	0
Royal Darwin	0	0	1	2
Townsville	1	0	0	0
Wagga Base	1	0	0	0
Wagga Calvary	0	0	0	1
Sub-Total	9	11	9	12
Total	**1135**	**1226**	**1190**	**1183**

Emergency Transfers – Receiving Hospital

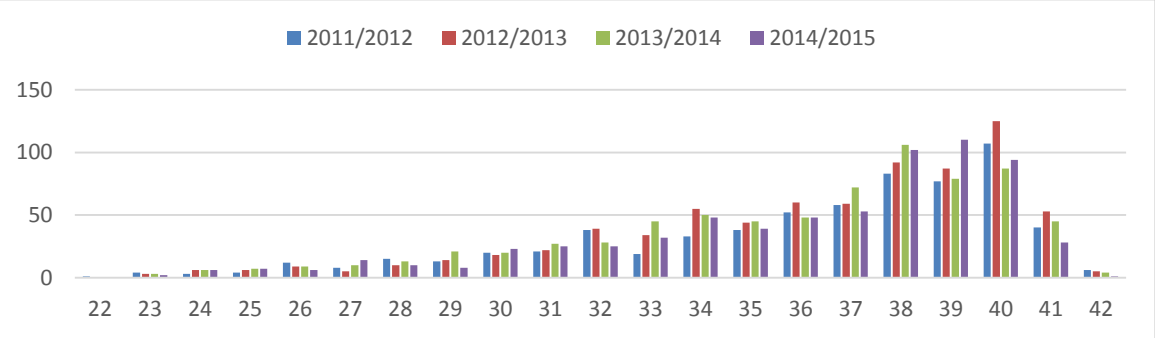
Hospital Level	2011/12	2012/13	2013/14	2014/15
Tertiary				
Adelaide Women & Children's	3	0	0	0
Canberra Hospital	1	1	1	0
Flinders Medical Centre	0	0	2	0
Mercy Hospital for Women	149	142	145	156
Monash Medical Centre				
MMC	62	95	56	40
MMC – Monash Newborn	61	95	92	74
MMC - Emerg	34	25	29	19
MMC - PICU	34	25	33	29
Royal Children's Hospital				
RCH - not specified	49	47	18	12
RCH – Butterfly	346	298	408	484
RCH – Emerg	22	17	19	8
RCH – Koala	16	18	26	20
RCH – Platypus	0	0	1	1
RCH – Possum	0	0	1	0
RCH – Rosella	81	100	110	117
RCH – Sugar Glider	0	0	1	0
Royal Women's Hospital	184	284	144	142
Sub-Total	1042	1147	1086	1104
Non-Tertiary				
Albury Base	0	0	0	1
Angliss	0	0	2	1
Ballarat Health	2	5	5	4
Bendigo Health	9	9	5	6
Berwick SJOG	0	1	0	0
Box Hill	6	5	3	3
Casey	0	1	6	5
Dandenong	14	7	4	3
FPH	0	0	1	0
Frankston	2	4	3	2
Geelong Bellarine	5	4	5	7
Hamilton	0	1	0	0
Kilmore	1	0	0	0
North Park	1	0	0	0

Emergency Transfers – Receiving Hospital (cont'd)

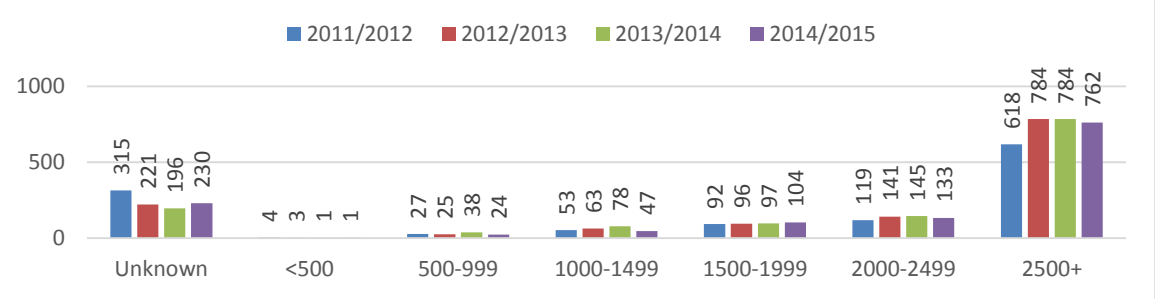
Hospital Level	2011/12	2012/13	2013/14	2014/15
Non-Tertiary (cont'd)				
Sale	**0**	**1**	**1**	**2**
Northern	4	5	12	5
RMH	0	0	1	0
Sandringham	2	1	0	0
Shepparton Goulburn	1	1	3	0
Sunshine	14	7	12	9
Traralgon	0	3	1	0
Wagga Wagga	0	0	0	1
Wangaratta	1	1	0	0
Warragul	2	0	1	1
Warrnambool Base	2	0	1	2
Waverley	0	2	0	0
Werribee Mercy	4	1	11	2
Wodonga	2	2	1	1
Sub-Total	72	61	78	55
TOTAL	**1114***	**1208***	**1164***	**1159***

* Receiving hospital totals are less than referring hospital totals as some babies are not transported after the retrieval team arrives.

Emergency Transfers – Gestational Age at Transfer



Emergency Transfers – Weight at Transfer



Elective Transfers – Referring Hospital

Location	2011/12	2012/13	2013/14	2014/15
Metropolitan				
Angliss	1	0	1	2
Austin	0	0	1	0
Box Hill	0	2	0	3
Cabrini	1	0	0	0
Casey	1	0	1	5
Dandenong	4	4	1	4
Epworth Freemasons	1	0	1	1
Frances Perry House	0	3	1	1
Frankston	2	2	0	0
Knox	0	0	1	0
Mercy Hospital for Women	9	27	22	12
Mitcham	0	1	0	5
Monash Medical Centre				
MMC - Other	14	12	14	3
Monash Newborn	3	5	6	4
North Park	0	0	2	0
Northern	12	9	16	15
Peter MacCallum Hospital	0	0	0	1
Royal Children's Hospital				
RCH - Butterfly	3	1	10	12
RCH - Emerg	0	2	0	1
RCH – Koala	0	0	1	0
RCH - Rosella	1	1	1	4
RCH - Other	4	2	7	6
Royal Melbourne Hospital	1	0	1	0
Royal Women's Hospital	16	17	30	13
Sandringham	3	2	1	8
South Eastern	1	0	0	0
St Vincent's Private	1	0	0	0
Sunshine	4	1	3	1
Werribee Mercy	0	2	8	8
Sub-Total	82	93	129	109

Elective Transfers – Referring Hospital (cont'd)

Location	2011/2012	2012/2013	2013/2014	2014/15
Country				
Ballarat Health	2	1	3	0
Bendigo Health	0	1	0	0
Geelong Bellarine	3	3	1	2
Horsham	0	0	2	0
Kilmore	0	0	0	1
Mornington	0	0	1	0
Sale	0	1	0	0
Shepparton Goulburn	1	1	1	2
Traralgon	1	2	1	0
Warragul	0	1	1	0
Warrnambool Base	0	1	0	0
Wodonga	1	3	2	1
Sub-Total	8	14	12	6
Interstate				
Brisbane	0	0	2	0
Darwin Private	1	0	0	0
Hobart	0	0	1	2
Launceston QV Maternity Hospital	0	1	1	1
Non- Australian Hospital	0	0	1	0
Royal Darwin	0	0	0	1
Sub-Total	1	1	5	4
TOTAL	**91**	**108**	**146**	**119**

Elective Transfers – Receiving Hospital

Hospital Level	2011/12	2012/13	2013/14	2014/15
Tertiary				
Flinders Medical Centre	0	0	1	0
Hobart	0	0	0	2
Mercy Hospital for Women	11	6	11	12
Monash Medical Centre				
MMC – Other	9	13	8	10
MMC – Monash Newborn	3	1	4	11
MMC – Emerg	0	1	0	0
Royal Children's Hospital				
RCH – Other	14	25	8	5
RCH – Rosella	5	3	3	3
RCH – Emerg	1	0	0	0
RCH – Butterfly	24	35	47	23
RCH – Koala	10	14	11	8
RCH – Sugar Glider	0	0	1	0
RCH – Platypus	0	0	2	0
Royal Women's Hospital	10	6	20	31
Sydney North Shore Public Hospital	0	0	1	0
Sub-Total	87	104	117	105
Non-Tertiary				
Alice Springs	0	0	1	0
Austin	1	0	0	0
Ballarat Health	0	0	2	0
Casey	0	0	0	1
Dandenong	0	0	1	0
Epworth Freemasons	0	1	1	1
Geelong Bellarine	0	0	2	0
Northern	0	0	11	5
Royal Melbourne Hospital	1	0	1	0
Shepparton Goulburn	0	0	1	1
St Vincent's Private	0	0	1	0
Sunshine	0	2	5	0
Werribee Mercy	1	0	2	0
Sub-Total	3	3	28	8
TOTAL	**90**	**107**	**145**	**113**

Return Transfers — Referring Hospital

Hospital Level	2011/12	2012/13	2013/14	2014/15
Tertiary				
Adelaide Women & Children's	2	1	0	0
Brisbane	0	1	0	1
Canberra Hospital	0	1	0	1
Hobart	0	0	1	0
Mercy Hospital for Women	299	252	331	276
Monash Medical Centre	456	476	500	500
Royal Children's Hospital	238	228	255	229
Royal Hospital for Women	1	0	0	0
Royal Women's Hospital	496	607	491	466
Sub-Total	1492	1566	1578	1473
Non-Tertiary				
Alfred	0	5	0	0
Angliss	1	0	0	2
Ballarat Health	0	5	3	1
Ballarat SJOG	1	1	0	0
Bendigo Health	0	0	1	2
Bendigo SJOG formerly Mt Alvernia (Bendigo)	1	0	0	0
Box Hill	11	12	23	15
Cabrini	2	0	0	0
Casey	2	1	3	4
Dandenong	17	4	12	8
Epworth Freemasons	2	1	1	3
Frances Perry House	6	1	9	2
Frankston	3	2	3	0
Geelong Bellarine	11	5	8	9
Geelong SJOG	0	0	0	1
Gold Coast	0	0	0	1
Jessie McPherson	4	5	1	1
Mitcham	0	1	0	0
North Park	1	0	0	2
Northern	12	12	7	8
Sandringham	1	5	0	0
Shepparton Goulburn	0	3	3	0

Return Transfers — Referring Hospital (cont'd)

Non-Tertiary (cont'd)				
Hospital Level	2011/12	2012/13	2013/14	2014/15
St Vincent's Private	4	4	1	0
Sunshine	16	12	15	13
Traralgon	0	1	0	0
Warragul	1	0	1	0
Waverley	0	2	0	0
Werribee Mercy	3	5	9	5
Wodonga	1	0	0	0
Sub-Total	100	87	100	77
TOTAL	**1592**	**1653**	**1678**	**1550**

Return Transfers – Receiving Hospital

Location	2011/12	2012/13	2013/14	2014/15
Metropolitan				
Alfred	0	4	0	0
Angliss	59	66	65	61
Austin	1	1	0	1
Berwick	10	9	14	17
Box Hill	70	51	63	65
Cabrini	26	15	24	26
Casey	99	80	106	224
Dandenong	212	179	176	79
Epworth Freemasons	33	29	25	27
FPH	11	7	8	7
Frankston	93	100	89	76
Frankston Peninsula Private	0	1	1	3
Hawthorn	1	0	0	0
Jessie McPherson	1	3	0	1
Knox	6	4	5	8
Met at Melbourne Airport (Tulla)	0	0	0	1
Mercy Hospital for Women	19	23	31	12
Mitcham	27	30	30	24
Monash Medical Centre	10	18	22	4
MMC – Monash Newborn	0	2	2	1
North Park	23	21	31	18
Northern	106	116	125	135
Royal Children's Hospital	0	0	3	1
Royal Children's Hospital – Butterfly	0	0	1	2
Royal Women's Hospital	18	15	18	13
Sandringham	55	80	62	84
South Eastern	7	0	0	0
St Vincent's Private	37	27	16	27
Sunshine	128	146	161	130
Waverley	15	20	17	14
Werribee Mercy	123	130	105	93
Sub-Total	1191	1176	1200	1154

Return Transfers – Receiving Hospital (cont'd)

Location	2011/12	2012/13	2013/14	2014/15
Country				
Ararat & District Hospital	0	1	0	0
Bacchus Marsh	6	5	0	1
Ballarat Health	42	65	67	43
Ballarat SJOG	9	18	12	3
Bellarine	0	1	0	0
Benalla	0	0	0	3
Bendigo Health	37	79	67	44
Bendigo SJOG	7	5	4	7
Castlemaine	1	2	0	0
Cohuna	0	1	0	1
Echuca	2	0	0	0
Geelong Bellarine	62	50	68	64
Geelong SJOG	8	12	23	10
Healesville	1	0	0	0
Horsham	3	1	4	1
Kerang	0	0	0	2
Kilmore	1	1	1	2
Kyneton	0	0	0	2
Leongatha	3	1	2	25
Mildura Base	8	9	21	4
Mornington	4	4	4	0
Not Known (Country)	1	0	0	23
Sale	34	24	21	0
Seymour	5	9	1	33
Shepparton Goulburn	36	27	40	0
Shepparton Private	0	1	0	0
Sunbury	0	0	1	1
Swan Hill	4	1	1	0
Terang	1	0	0	1
Timboon	0	0	0	26
Traralgon	30	29	31	17
Wangaratta	20	31	24	18
Warragul	18	21	16	20
Warrnambool Base	10	21	18	34
Wodonga	36	43	40	0
Wonthaggi	1	1	0	0
Sub-Total	390	463	468	385

Return Transfers – Receiving Hospital (cont'd)

Location	2011/12	2012/13	2013/14	2014/15
Interstate				
Adelaide Women & Children's Hospital	1	0	0	0
Albury Base	3	5	2	2
Alice Springs	0	0	0	1
Brisbane	0	1	1	0
Canberra Hospital	0	1	0	0
Deniliquin	0	1	2	0
Launceston QV Maternity Hospital	1	0	0	1
Mt Gambier	0	0	1	0
Newcastle - NSW	0	1	0	1
Princess Margaret Hospital Perth				1
Sydney North Shore Private Hospital	1	0	0	0
Sydney North Shore Public Hospital	0	0	1	0
Wagga Base	0	1	0	0
Wagga Calvary	0	1	0	0
Westmead	0	0	0	1
Sub-Total	6	11	7	7
TOTAL	**1587***	**1650***	**1673***	**1546***

* Receiving hospital totals are less than referring due to a small number of babies where the transfer is not undertaken after the team has arrived or who deteriorate early in the transport and returned to the referring unit.

Appendix 3

PIPER Neonatal Research Publications and Presentations

Papers

Chamney S, **McGrory L**, McCall E, Twaij S, Napier M, Rollins R, Marshall AH, Craig S, McLoone E. ***Treatment of retinopathy of prematurity in Northern Ireland, 2000-2011: a population-based study.*** JAAPOS. 2015 Jun;19(3):223-7. doi: 10.1016/j.jaapos.2015.02.012.

Cottle DL, Ursino GM, Ip SC, Jones LK, Ditommaso T, Hacking DF, Mangan NE, Mellett NA, Henley KJ, Sviridov D, Nold-Petry CA, **Nold MF**, Meikle P, Kile BT, Smyth IM. ***Fetal inhibition of inflammation improves disease phenotypes in harlequin ichthyosis.*** Hum Mol Genet. 2015 Jan 15;24(2):436-49.

Dawson J, Ekström A, Frisk C, **Thio M**, Roehr C, Kamlin C, Donath S, Davis P; the Giraffe Study Group. ***Assessing the tongue colour of newly born infants may help to predict the need for supplemental oxygen in the delivery room***. Acta Paediatr. 2015 Apr;104(4):356-9.

Dawson JA, **Owen LS**, Middleburgh R, Davis PG. ***Quantifying temperature and relative humidity of medical gases used for newborn resuscitation.*** Journal of Paediatric Child Health. 2014 Jan;50(1):24-6. doi: 10.1111/jpc.12393. Epub 2013 Oct 6.

Foglia EE, Owen LS, Kirpalani H. ***Delivery room research: when does poor quality evidence become an ethical issue?*** Pediatrics. 2015 May;135(5):e1368. doi: 10.1542/peds.2015-0546A. No abstract available.

Foglia EE, **Owen LS**, **Thio M**, Ratcliffe SJ, Lista G, Te Pas A, Hummler H, Nadkarni V, Ades A, Posencheg M, Keszler M, Davis P, Kirpalani H. ***Sustained Aeration of Infant Lungs (SAIL) trial: study protocol for a randomized controlled trial.*** Trials. 2015 Mar 15;16:95. doi: 10.1186/s13063-015-0601-9.

Lean WL, Arnup S, Danchin M, Steer AC. *Rapid diagnostic tests for group A streptococcal pharyngitis: a meta-analysis.* Pediatrics. October 2014. 134 (4): 771 – 781

Lean WL, Kamlin CO, Garland SM, Jacobs SE. ***Stable rates of neonatal sepsis in a tertiary neonatal unit.*** Journal of Paediatrics & Child Health. March 2015. 51 (3): 294 – 299

Luo Y, Cai X, Liu S, Wang S, Nold-Petry CA, **Nold MF**, Bufler P, Norris D, Dinarello CA, Fujita M. ***Suppression of antigen-specific adaptive immunity by IL-37 via induction of tolerogenic dendritic cells.*** Proc Natl Acad Sci U S A. 2014 Oct 21;111(42):15178-83.

Manley BJ, Owen LS, Davis PG. ***High-flow nasal cannulae in very preterm infants after extubation.*** N Engl J Med. 2014 Jan 23;370(4):385-6. doi: 10.1056/NEJMc1314238.

Nold-Petry CA, Lo CY, Rudloff I, Elgass KD, Li S, Gantier MP, Lotz-Havla AS, Gersting SW, Cho SX, Lao JC, Ellisdon AM, Rotter B, Azam T, Mangan NE, Rossello FJ, Whisstock JC, Bufler P, Garlanda C, Mantovani A, Dinarello CA, **Nold MF**. ***IL-37 requires the receptors IL-18Ralpha and IL-1R8 (SIGIRR) to carry out its multifaceted anti-inflammatory program upon innate signal transduction.*** Nat Immunol. 2015 Apr;16(4):354-65.

Olischar M, Stavroudis T, Katz Karp J, Kaufmann W, **Theda C**. ***Medical and ethical challenges in the case of a prenatally undiagnosed congenital brain tumor.*** Journal of Perinatology – in press for September 2015.

O'Shea JE, Thio M, Owen LS, Wong C, Dawson JA, Davis PG. ***Measurements from preterm infants to guide face mask size.*** Arch Dis Child Fetal Neonatal Ed. 2015 Apr 10. pii: fetalneonatal-2014-307350. doi: 10.1136/archdischild-2014-307350. [Epub ahead of print].

Owen LS, Dawson JA, Middleburgh R, Buttner S, McGrory L, Davis PG. ***Feasibility and practical considerations for heating and humidifying gases during newborn stabilisation: an in vitro model.*** Neonatology. 2014;106(2):156-62. doi: 10.1159/000363126. Epub 2014 Jun 27.

Owen LS, Morley CJ, Davis PG. ***Effects of synchronisation during SiPAP-generated Nasal Intermittent Positive Pressure Ventilation (NIPPV), in preterm infants.*** Arch Dis Child Fetal Neonatal Ed. 2014 Jun 18. pii: fetalneonatal-2013-305830. doi: 10.1136/archdischild-2013-305830. [Epub ahead of print].

Roberts CT, Owen LS, Manley BJ, Donath SM, Davis PG. ***A multicentre, randomised controlled, non-inferiority trial, comparing high flow therapy with nasal continuous positive airway pressure as primary support for preterm infants with respiratory distress (the HIPSTER trial): study protocol.*** BMJ Open. 2015 Jun 24;5(6):e008483. doi: 10.1136/bmjopen-2015-008483.

Rudloff I, Godsell J, Nold-Petry CA, Harris J, Hoi A, Morand EF, Nold MF. ***Interleukin 38 exerts anti-inflammatory functions and is associated with disease activity in systemic lupus erythematosus.*** Arthritis Rheumatol, in press.

Skiöld B, Stewart M, Theda C. ***Predictors of unfavorable thermal outcome during emergency retrievals of newborn infants.*** Air Medical Journal 2015 34(2): 86-91.

Theda C, Gibbons K, DeFor TE, Donohue PK, Golden WC, Kline AD, Gulamali-Majid F, Panny SR, Hubbard WC, Jones RO, Liu AK, Moser AB and Raymond GV. ***Newborn Screening for X-linked Adrenoleukodystrophy: Further evidence high throughput screening is feasible***. Mol Genet Metab; 2014 Jan 111(1) 55-57.

Thio M, Dawson JA, Moss TJ, Galinsky R, Rafferty A, Hooper SB, Davis PG. ***Self-inflating bags versus T-piece resuscitator to deliver sustained inflations in a preterm lamb model***. Arch Dis Child Fetal Neonatal Ed. 2014 Jul;99(4):F274-7.

van Zanten HA, Tan RN, **Thio M**, de Man-van Ginkel JM, van Zwet EW, Lopriore E, te Pas AB. ***The risk for hyperoxaemia after apnoea, bradycardia and hypoxaemia in preterm infants.*** Arch Dis Child Fetal Neonatal Ed. 2014 Jul;99(4):F269-73.

Wong A, Greene S, Dargan P, **Sokol J**, Koutsogiannis J, Ramkrishna J. ***"Chronic ayurvedic medicine use associated with major and fatal congenital abnormalities".*** Submitted, accepted pending revisions, to the Medical Journal of Australia.

Book chapters 2014

Castilla Y, **Thio M.** Chapter n,n. Neonatal Transport. Book title: ***De guardia en Neonatología***, pages n-n. Editors: M. Vento, M.Moro. Ergón 3rd edition 2015. ISBN: in press.

Owen Louise, Davis Peter, te Pas Arjan, Morley Colin. ***Role of positive pressure ventilation in neonatal resuscitation***. Neonatal-Perinatal Medicine. Ed. Fanaroff and Martin, Elsevier publishing, ISBN: 987-1-4557-5617-9. 10th Edition, Publication Date: 17-10-2014.

Thio M. Chapter 3.5. Neonatal transport of the very preterm infant. Book title: ***Master in Neonatology*** (2 years), Spanish Society of Neonatology, pages n-n. 1st Edition 2015. Editorial medica Panamericana.
http://www.medicapanamericana.com/Libros/Libro/5309/Master-de-Neonatologia-de-la-Sociedad-Espanola-de-Neonatologia-2-anos.html

Invited Speaker

Nold MT. Day of the Lung, Monash Children's Hospital, Melbourne. ***Anti-inflammatory therapy and prevention of BPD.***

Nold MT. European Workshop on Neonatal Transition, Prato, Italy. ***What Does the Transition of the Neonatal Immune System Have To Do with IL-1 and BPD?***

Nold MT. German Sepsis Society, Weimar, Germany. ***Latest Insights in Necrotizing Enterocolitis***

Roberts CT. ***High flow on the highway: high flow therapy during neonatal transport.*** Breakfast Session. Perinatal Society of Australia & New Zealand Annual Congress, Melbourne, Australia. April 2015.

Roberts CT. ***Training and education within the CRE in Newborn Medicine***. Melbourne Children's Campus Research and Education Week. October 27th, 2014.

Sokol J. ***How to ensure a Happy Birth-Day: the Clinician's approach to Neonatal Resuscitation***. Australian College of Emergency Medicine Conference, ASM December 2014.

Sokol J. ***In Situ Neonatal, Maternal and Obstetric simulation: Helping teams work together***. Parkville Precinct Simulation Seminar, June 2015.

Sokol J. Co-Facilitator, ***Advanced Debriefing Course***, February 2015. Harvard Centre for Medical Simulation

Sokol J. Organiser for ***Paediatric Deteriorating Patient workshop and simulation program***, ANZICS 2014. Australian and New Zealand Society of Intensive Care, October 2014

Stewart MJ. ***Hypothetical – Regional Neonatology***. Cool Topics in Neonatology, Melbourne Nov 2014

Stewart MJ. ***Congenital Diaphragmatic Hernia – An Australian Perspective***. Cool Topics in Neonatology, Melbourne Nov 2014

Stewart MJ. ***Neonatal Retrieval in Australia – The Journey so far***. PSANZ Melbourne 2015

Theda C. Annual Conference of the American College of Medical Genetics and Genomics, Nashville, USA, 25-29 March 2014. Organizer and invited to chair scientific session ***Impact of Recent Advances in Genetics and Genomics on Neonatal Genetics***; also speaker with presentation title: ***Prematurity, Prenatal and Perinatal Environment and their short and long term genetic effects***.

Theda C. Faculty, ***Neonatal Simulation Day***, Royal Children's Hospital Melbourne, 30 July 2014.

Theda C. Invited lead and sole presenter: Workshop ***Neonatal Genetics: The basics, effect of recent technological advances and case based learning***. Pediatric Academic Societies, Society of Pediatric Research, Vancouver. 3-6 May 2014.

Theda C. Invited speaker, Melbourne Neonatal Fellowship Program, Education Day. 5 March 2014. An approach to diagnosing infants with congenital malformations and An approach to diagnosing infants with metabolic disorders.

Theda C. Invited speaker. Neonatal Intensive Care Course, University of Melbourne. ***Neonatal Skin and Skin Care*** and ***Genetics and Epigenetics: The basics and recent advances***; Melbourne 7 October 2014.

Theda C. Pediatric Academic Societies, Society of Pediatric Research, Chair ***Neonatal Genetics*** Session. Vancouver. 5 May 2014.

Theda C. Pediatric Academic Societies, Society of Pediatric Research, Invited main speaker: Workshop ***Neonatal Genetics: The basics, effect of recent technological advances and case based learning***. San Diego CA USA. 27 April 2015.

Theda C. Perinatal Society of Australia and New Zealand: Invited Speaker: ***Neonatal Genetics***. Melbourne 20 April 2015.

Thio M. 10th International Spark of Life Conference, Neonatal satellite meeting. **Presenter and facilitator** at Workshop - ***Neonatal Resuscitation***.

Thio M. 31st Annual Scientific Meeting of the Australasian College for Emergency Medicine ACEM, Melbourne, December 2014. **Presenter and facilitator** at Paediatric Workshop - ***Neonatal Resuscitation***.

Thio M. ***Interfaces-face masks, devices for applying airway pressure.*** 4th Neonatal Resuscitation Research Workshop, San Diego, USA April 2015.

Thio M. ***Respiratory support: keeping it simple.*** Cool topics in Neonatology Symposium, The University of Melbourne, November 2014.

Thio M. ***Survey on hand Hygiene and Potential better practices to decrease infection: what can I do in my NICU?*** 5th Congress of the European Academy of Paediatric Societies, Barcelona, Spain, October 2014. (ESN pre-congress course).

Walsh JM, Doyle LW, Anderson PJ, Lee KJ, Cheong JL. ***Moderate and late preterm birth: effect on brain size and maturation at term-equivalent age*.** Radiology. 2014 Oct; 273(1):232-40. doi: 10.1148/radiol.14132410. Epub 2014 Jun 10.

Abstracts – Poster / Platform presentations

Baker EK, Sweetman DU, Jacobs SE, Owen LS. ***Does pre-discharge newborn transcutaneous bilirubinometry (TCB) screening reduce blood sampling and presentation to emergency services with hyperbilirubinaemia?*** JPCH April 2015, vol 51, suppl. 1.

Burns C, **Healey E**, Stewart M, Sullivan M. ***A rare case of undifferentiated neonatal sarcoma.*** Perinatal Society of Australia and New Zealand Annual Congress, Melbourne, Australia. April 2015.

Cheong J, Spittle A, Potter C, Walsh J, Anderson P, Doyle LW. ***Delayed language development at 2 years in children born moderate to late preterm.*** PAS 2015-Poster presentation.

Cheong J, Walsh J, Spittle A, Potter C, Hunt R, Thompson D, Anderson P, Doyle LW. ***Deep nuclear grey matter size are related to 2 year language outcomes in moderate and late preterm children.*** PAS 2015-Poster presentation.

Courtot JE, Taylor JE, Medhurst AM, Eyssens NR, **Tanney KS**, Wong F. ***Ex-utero Intrapartum Treatment (EXIT) for Cystic Neck Mass: A NICU Perspective.*** PSANZ 2015 Poster Presentations: Journal of Paediatrics and Child Health, 51: p106–138.

Hough J, McKittrick J, Lima S, Sokol J, Allen M***. "Changing training to improve competence and outcomes in basic life support: Introduction of the "Rolling Trolley".*** International Medical Simulation in Healthcare Conference. San Diego, USA, 2016.

Lean WL, Arnup S, Danchin M, Steer AC. ***Rapid Diagnostic Test for Group A Streptococcal Pharyngitis: a Systematic Review and Meta-analysis*****.** XIX Lancefield International Symposium on Streptococci and Streptococcal Diseases, Buenos Aires, Argentina, November 2014.

Lim A, Manley B, Theda C. ***Umbilical venous catheter placement: the catheter/diaphragmatic intercept point on anterioposterior chest x-ray varies significantly as it relates to thoracic vertebrae.*** Oral Presentation at the 19th Annual Conference of the Perinatal Society of Australia and New Zealand, Melbourne Australia 20 April 2015.

Lim Adeline, Theda Christiane. ***UV Catheter Placement: The UV Catheter / Diaphragmatic Intercept Point on Anteroposterior Chest X-ray Varies Significantly as it Relates to Thoracic Vertebrae as Landmarks.*** Poster Presentation. Pediatric Academic Societies, Society of Pediatric Research, San Diego CA USA. 25 April 2015.

Manley B; Doyle L, Owen L, Davis P. ***Extubating Extremely Preterm Infants: Predictors of Success & Outcomes of Failure.*** PAS San Diego 2015 platform presentation.

Manley BJ, Owen LS, Doyle LW, Davis PG. ***Extubating Extremely Preterm Infants: Predictors of Success and Outcomes of Failure.*** JPCH April 2015, vol 51, suppl. 1.

McGrory L, Kamlin C, Owen L, Dawson J, Davis P. ***A ten year review of delivery room management of preterm infants born between 25 and 28 weeks gestation in a tertiary neonatal centre.*** Arch Dis Child Fetal Neonatal Ed. 2014 Jun;99 Suppl 1:A68. doi: 10.1136/archdischild-2014-306576.194.PC.93.

McGrory L, Kamlin C, Owen L, Dawson J, Davis P. ***A ten year review of delivery room management of preterm infants born between 25 and 28 weeks gestation in a tertiary neonatal centre.*** J Paed Child Health, Vol 50 suppl. 2, Mar 2014

McGrory L, Kamlin COF , Rafferty AR, Owen LS, Dawson JA, Davis PG. ***Delivery room management of extremely preterm infants in a tertiary neonatal centre: a ten year review.*** 5th Congress of the European Academy of Paediatric Societies (EAPS) Barcelona, Spain, October, 2014.

McGrory L, Rafferty AR, Thio M, Lean WL, Theda C, Davis PG. ***Topical Glyceryl Trinitrate ointment to aid umbilical artery cannulation in neonates.*** 19th Perinatal Society of Australia & New Zealand Congress , Melbourne, Australia, April 2015.

Mills BA, Owen LS, Argus BA, Wong C, Davis PG. ***Communication, coordination and positive family experiences: managing multiple research projects in the neonatal intensive care unit.*** JPCH April 2015, vol 51, suppl. 1.

Moran MM, Gunn JK, Doyle LW, Anderson PJ, Hunt RW. ***Developmental outcomes at 6 and 12 months following non-cardiac surgery in the newborn period*.** Perinatal Society of Australia & New Zealand Annual Congress, Melbourne, Australia. April 2015 (Poster Symposium).

Moran MM, Gunn JK, Spittle A, Doyle LW, Anderson PJ, Hunt RW. ***General movements and motor outcomes at 12 months in infants requiring non-cardiac surgery in the newborn period*.** Perinatal Society of Australia & New Zealand Annual Congress, Melbourne, Australia. April 2015 (Poster).

Moran MM, Walsh JM, Cheong JLY, Gunn JK, Doyle LW, Anderson PJ, Hunt RW. ***The brains of newborns undergoing early non-cardiac surgery differ from controls*.** Perinatal Society of Australia & New Zealand Annual Congress, Melbourne, Australia. April 2015 (Platform Presentation).

Moran MM, **Walsh JM**, Cheong JLY, Gunn JK, Doyle LW, Anderson PJ, Hunt RW. ***Newborns Undergoing Early Non-Cardiac Surgery Have Smaller Brains Than Controls.*** Pediatric Academic Societies Annual Meeting, San Diego. April 2015 (Poster).

McCall K, Rajapaksa A, Tan A, Perkins EJ, Sourial M, Davis PG, Dargaville PA, Dellaca' R, Tingay DG. ***Influence of gestational age on lung volumes responses to a sustained inflation at birth*.** Perinatal Society of Australia and New Zealand Annual Congress, Melbourne, Australia, April 2015.

Nold MP. ***From my laboratory: Four presentations at the meeting of the International Cytokine and Interferon Society*** (won two Milstein travel awards).

Nold MP. ***From my laboratory: Two presentations at the meeting of the Perinatal Society of Australia and New Zealand*** (won two travel and one best presentation awards).

O'Shea J, Thio M, Kamlin COF, McGrory L, Jubal J, Roberts CT, Kuschel C, Davis PG. ***Videolaryngoscopy as an intubation training tool for neonatal trainees – a randomized control trial***. Congress of the European Academy of Paediatric Societies, Barcelona, Spain. October 2014.

O'Shea JE, **Thio M**, Kamlin COF, McGrory L, Wong C, John J, Roberts C, Kuschel C, Davis PG. ***Videolaryngoscopy as an intubation training tool for neonatal trainees – a Randomised Control Trial.*** PAS Annual meeting, San Diego, USA, April 2015.

O'Shea JE, **Thio M**, Kamlin COF, McGrory L, Wong C, John J, Roberts C, Kuschel C, Davis PG. ***Videolaryngoscopy as an intubation training tool for neonatal trainees – a Randomised Control Trial.*** PSANZ Annual Congress, Melbourne, April 2015.

Owen L, Morley CJ, Davis PG. ***Effects of synchronised SiPAP-generated Nasal Intermittent Positive Pressure Ventilation (NIPPV) on tidal volume in preterm infants.*** Perinatal Society of Australia and New Zealand, Poster Symposium, Perth 2014.

Rafferty A, **Thio M,** McGrory L, **Lean WL**, **Theda C**, Davis P. ***Topical glyceryl trinitrate ointment to aid umbilical artery cannulation in neonates***. Poster symposium presentation at the 5th Congress on the European Academy of Paediatric Societies, Barcelona Spain, October 2014.

Rafferty AR, Thio M, McGrory L, Lean WL, **Theda C**, Davis P. ***Topical glyceryl trinitrate ointment to aid umbilical artery cannulation in neonates***. Oral Presentation at the 19th Annual Conference of the Perinatal Society of Australia and New Zealand, Melbourne Australia 20 April 2015.

Roberts CT, Jacobs SE, Stewart MJ. ***Initiation of therapeutic hypothermia by referring hospitals during neonatal transport – experience in Victoria, Australia*.** Congress of the European Academy of Paediatric Societies (Poster Symposium), Barcelona, Spain. October 2014.

Roberts CT, Kortekaas R, Dawson JA, Manley BJ, Owen LS, Davis PG. ***The effects of non-invasive respiratory support on oropharyngeal temperature and humidity: a manikin study***. Congress of the European Academy of Paediatric Societies, Barcelona, Spain. October 2014.

Roberts CT, Kortekaas R, Dawson JA, Manley BJ, Owen LS, Davis PG. ***The Effects of Non-invasive Respiratory Support on Oropharyngeal Temperature and Humidity: A Manikin Study.*** J Paed Child Health, Vol 50 suppl. 2, Mar 2014.

Roberts CT, Manley BJ Owen LS, Davis PG (for the ANZNN). ***Trends in Neonatal Respiratory Support in the Australian & New Zealand Neonatal Network*** (ANZNN) 2009–2012. JPCH April 2015, vol 51, suppl. 1.

Roberts CT, Manley BJ, Owen LS, Davis PG for the ANZNN. ***High flow nasal cannulae support in very preterm infants within The Australian & New Zealand Neonatal Network (ANZNN) 2009 – 2012.*** Pediatric Academic Societies Annual Meeting, San Diego, USA. 2015.

Roberts CT, Manley BJ, Owen LS, Davis PG for the ANZNN. ***High flow nasal cannulae support in very preterm infants within The Australian & New Zealand Neonatal Network (ANZNN) 2009 – 2012.*** Perinatal Society of Australia & New Zealand Annual Congress, Melbourne, Australia. April 2015.

Roberts CT, Owen LS, Manley BJ, Davis PG for the ANZNN. ***Trends in neonatal respiratory support in the Australian & New Zealand Neonatal Network (ANZNN) 2009 – 2012.*** Pediatric Academic Societies Annual Meeting, San Diego, USA. 2015.

Roberts CT, Owen LS, Manley BJ, Davis PG. ***Trends in neonatal respiratory support in the Australian & New Zealand Neonatal Network (ANZNN) 2009 – 2012.*** Perinatal Society of Australia & New Zealand Annual Congress, Melbourne, Australia. April 2015.

Spittle AJ, Olsen J, **Walsh J**, Lee KJ , Eeles A, McInnes E, Brown NC , Pace C, Anderson PJ, Doyle LW, Cheong J. ***The effect of gestational age at birth on neurobehaviour at term across the gestational range.*** PSANZ 2015-Poster symposium.

Tanney K, Mayes C. ***Assessing, Addressing and Educating: Neonatal Bacteraemia.*** PSANZ 2015 Poster Presentations: Journal of Paediatrics and Child Health, 51: p104.

Theda C. ***Use of silver impregnated dressing in a preterm neonate: marked absorption with slow excretion raises safety concerns.*** Poster presentation at the 19th Annual Conference of the Perinatal Society of Australia and New Zealand, Melbourne Australia 19-22 April 2015.

Theresia Vasko,Margareta Westberg, Jennifer Dawson, Louise Owen, **Marta Thio**, Risha Bhatia, Susan Donath, Peter Davis. ***Reviewing neonatal x-rays at a distance: How accurate are smartphones?*** PAS Annual meeting, San Diego, USA, April 2015.

Thio M, Wallace MJ, Kitchen MJ, Flemmer A, Roehr CC, Jani J, Siew M, Lee K, Buckley G, Yagi N, Uesugi K and Hooper SB. ***Lung aeration at birth in a rabbit model of congenital diaphragmatic hernia.*** PAS Annual meeting, San Diego, USA, April 2015.

Thio M, Wallace MJ, Kitchen MJ, Flemmer A, Roehr CC, Jani J, Siew M, Lee K, Buckley G, Yagi N, Uesugi K and Hooper SB. ***Lung aeration at birth in a rabbit model of congenital diaphragmatic hernia*.** PSANZ Annual Congress, Melbourne, April 2015.

Vasko T, Westberg M, Dawson JA, **Owen LS**, **Thio M**, Bhatia R, Donath S, Davis PG. ***Reviewing neonatal x-ray images via smartphones: a systematic review.*** 19th PSANZ Annual Congress, Melbourne, April 2015.

White LN, Dawson JA, Sloss S, Thio M, Kamlin COF, Hooper SB, Davis PG. ***Can we achieve oxygen saturation measurements that meet prescribed targets in infants <32 weeks gestation in the delivery room?*** 19th PSANZ Annual Congress, Melbourne, April 2015.

List of Acronyms

AV	Ambulance Victoria
AAV	Air Ambulance Victoria
ARV	Adult Retrieval Victoria
DHHS	Department of Health and Human Services
ICU	Intensive Care Unit
MMC	Monash Medical Centre, Melbourne
PIPER Neonatal	Paediatric Infant Perinatal Emergency Retrieval—Neonatal
NSW	New South Wales
PIPER Perinatal	Paediatric Infant Perinatal Emergency Retrieval—Perinatal
PIPER Paediatric	Paediatric Infant Perinatal Emergency Retrieval—Paediatric
PICU	Paediatric Intensive Care Unit
RCH	The Royal Children's Hospital, Melbourne
RWH	The Royal Women's Hospital, Melbourne
TAS	Tasmania
VIC	Victoria
WA	Western Australia

PIPER Perinatal 2014-2015

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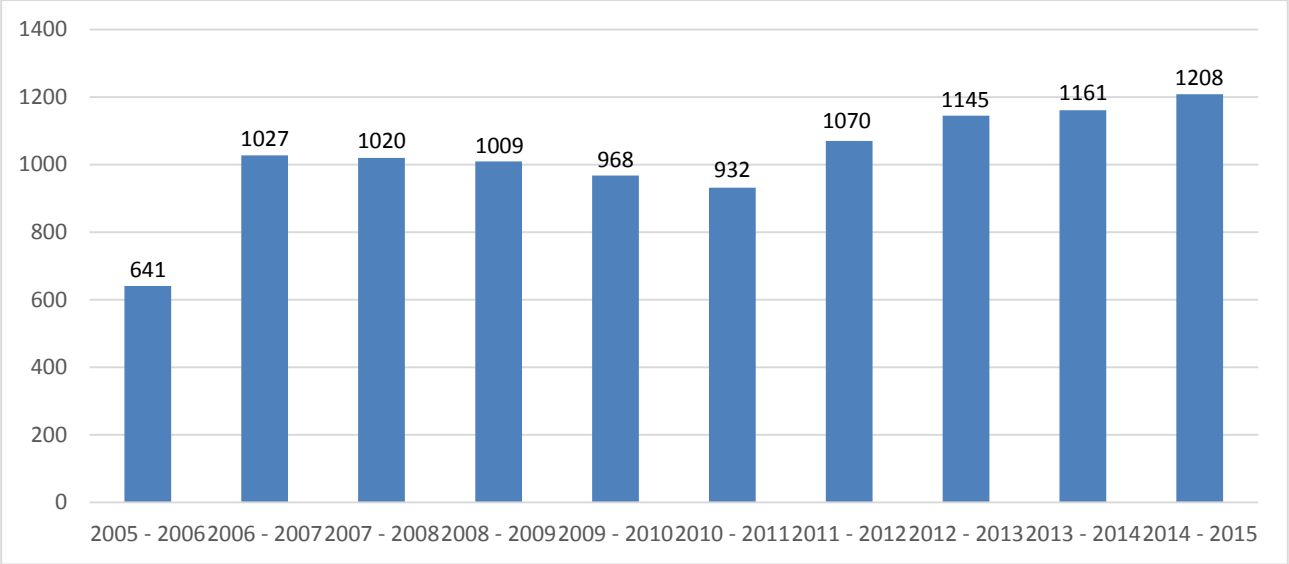
PIPER Perinatal

PIPER Perinatal Medical Director's Report

Referrals into PIPER Perinatal continue to increase steadily, and our workload is now 20% greater than the average workload recorded during the first 5 years of operation.

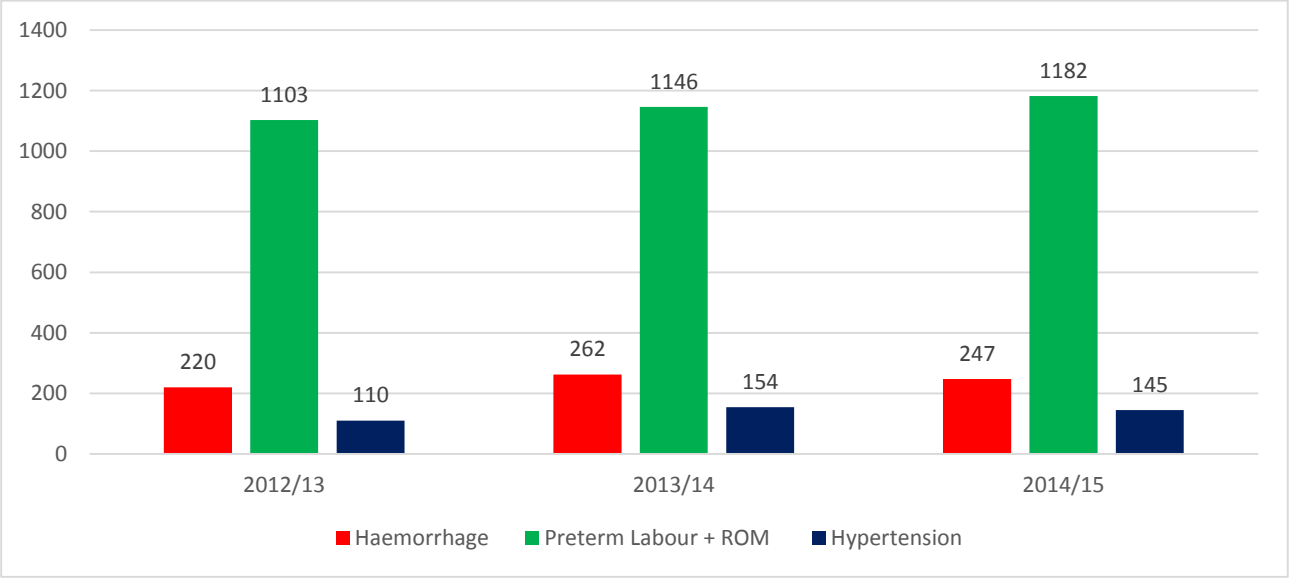
Clinical Activity – PIPER Perinatal

Total PIPER Perinatal Referrals from 1 July 2005 to 30 June 2015



As noted previously, the most common indication for referral is the occurrence of threatened preterm labour, and the lack of appropriate on-site neonatal services rather than obstetric support remains the principal determinant of the need to transfer women.

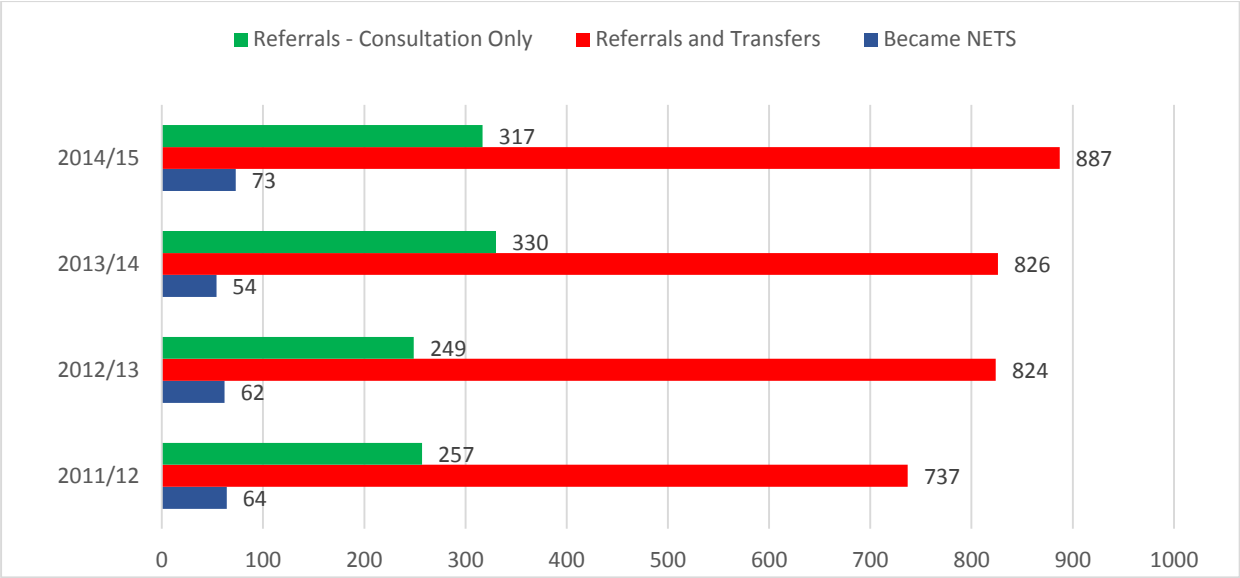
PIPER Perinatal Consultations by Clinical Details – 01/07/2011 to 30/06/201



*Some patients have more than 1 diagnosis

The number of women who continue to be managed at the referring hospital is stable, there has been an increase in transfers to a site with higher level facilities, but also a worrying increase in the number of babies who are outborn.

Breakdown of Total PIPER Perinatal Referrals from 2011/12 to 2014/15



Origin of PIPER Perinatal Referrals

	2011/12	*2012/13*	*2013/14*	*2014/15*
Level 3 to Level 3	10	4	1	1
Interstate Requests	**4**	**5**	**2**	**4**
Metro Level 2	454	428	480	478
Rural Level 2	**320**	**363**	**354**	**367**
Metro Level 3	21	6	10	4
Ref Hospitals Lower than level 2	**244**	**300**	**282**	**315**

Destination of PIPER Perinatal Transfers

	2011/12	*2012/13*	*2013/14*	*2014/15*
Interstate	15	7	5	1
Level 3	**613**	**682**	**621**	**676**
Metro Level 2	98	96	122	96
Rural Level 2	**69**	**86**	**89**	**123**
Hospitals Lower than level 2	2	11	11	6

We have been fortunate this year in having four Scholarly Selective students undertaking projects utilising the data recorded by PIPER Perinatal, and their manual analyses of previous year's data has suggested some interesting further lines of enquiry, especially regarding the decision-making processes involved in managing women with apparent preterm labour, and the real-world utility of fetal fibronectin testing. Many of the larger peripheral maternity units have started using quantitative rather than qualitative fetal fibronectin testing over the past year, and it will be interesting to see if this has an impact on the proportion of women who are able to safely remain managed at their referring hospital.

We are looking forward to replacement of the current PIPER Neonatal/Perinatal database with a more sophisticated new PIPER database, which will enable much easier data analysis and generation of reports. I would anticipate in the next annual report being able to provide a more detailed assessment of the reason for the apparent increase in outborn babies, particularly to determine the relative contributions of late presentation in active labour of women to the referring hospital, delay in initial assessment and consultation with PIPER, bed-finding difficulties, and ambulance transfer delays. It may also be that some of these preterm births are occurring in larger peripheral units developing enhanced neonatal capability, and it has been intended that the neonate births in the peripheral unit and is assessed, and only transferred subsequently if higher level services are needed.

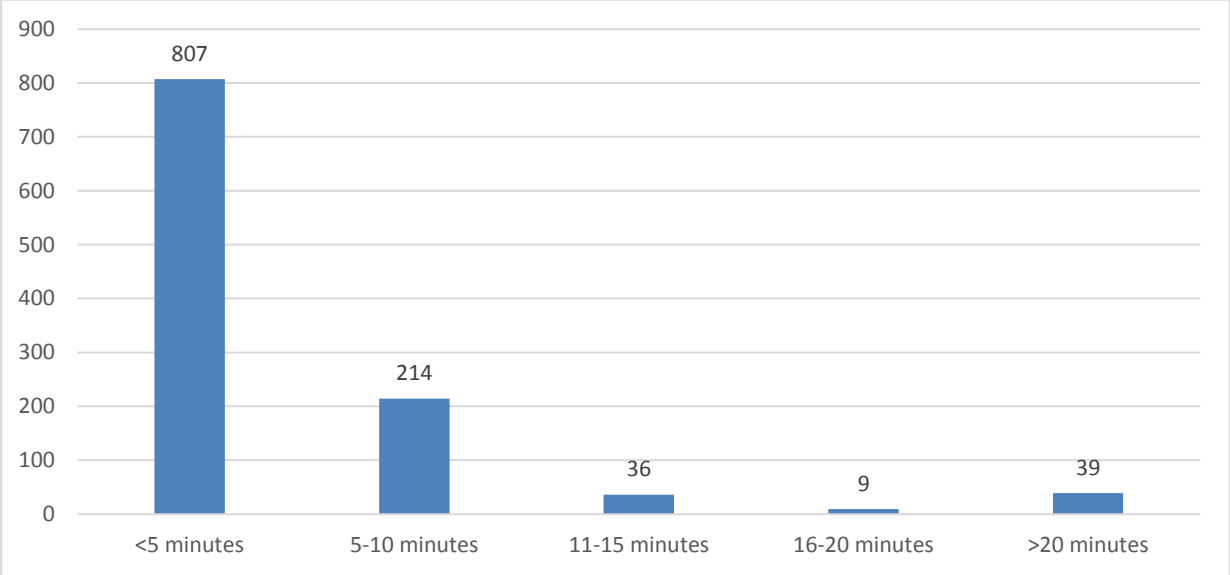
Neonatal and maternity capacity issues continue to impact on the ability to place women requiring transfer into the most geographically proximate unit providing the required higher level of care.

PIPER Perinatal Transfers by Regions between 01-Jul-2014 and 30-Jun-2015

Referring Hospitals \ Receiving Hospitals	Barwon	Grampians	Loddon Mallee	NorthWest Metro	RWH	Hume	Eastern Metro	MHW	Gippsland	Southern Metro	MMC	Other / Interstate	Unknown
Barwon	14	1		1	25			29			4		
Grampians	2	17	2	6	13			21			8		
Loddon Mallee		11	36	13	28	9		36			3		
NorthWest Metro	1			9	81		2	81		3	9		
RWH				1									
Hume	1		1	25	25	13	1	44			8		
Eastern Metro					17		1	56		4	24		
MHW													
Gippsland				2	10		2	17	9	9	30		
Southern Metro				2	16			29		8	34		
MMC					1								
Other / Interstate	1		1		1	2		3					
Unknown													

While we remain consistently able to connect a referring clinician with a consultant obstetrician within 10 minutes (92%), we have not been able to appreciably improve the rate of connection within 5 minutes (73%), despite setting up a more rigorous 'second on call' roster to accommodate the inevitability of procedural specialists being unable to take calls at some times during the day. This may also be partly due to the significantly increased workload of the co-ordinators within the communications centre, and we will undertake further analysis of this over the next year, again assisted by improved reporting capability promised by the new PIPER database.

Time from commencement of call to consultant joining the call - 2014/15



We continue to provide regular follow-up data to both referring and receiving hospitals, and in many units this is incorporated into their regular perinatal audit processes. We have also assisted in a number of hospital reviews of adverse clinical events and contributed to their quality improvement activities.

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