

BRAIN INJURY REHABILITATION DIRECTORATE

NSW BRAIN INJURY REHABILITATION PROGRAM

2011 and 2012 Annual Reports

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Background

NSW Brain Injury Rehabilitation Program

The NSW Brain Injury Rehabilitation Program (BIRP) was established in 1990 as a joint initiative between the NSW Department of Health and the Motor Accidents Authority as a specialist rehabilitation network to provide services to children young people and adults who have sustained a Traumatic Brain Injury (TBI).

The Brain Injury Rehabilitation Program aims to lead and coordinate:

- Establishment of clinical services network promoting seamless care across inpatient, transitional and community settings and improving access to services, primarily for children, young people and adults of working age with TBI.
- Develop and promote improved treatment coordination resulting in best practice care for patients receiving specialised brain injury rehabilitation.
- Research into and evaluation of services and outcomes for people with TBI
- Funding and coordination of public awareness and information programs on brain injury.

NSW Brain Injury Rehabilitation Program:

In 2011 and 2012 there were 14 (now 15) BIRPs located in metropolitan and rural locations for the population of NSW

Paediatric Units	Location
BIRP Sydney Children's Hospital (SCH)	Randwick
BIS Children's Hospital at Westmead (CHW)	Westmead
Kaleidoscope PBIRT John Hunter Children's Hospital (JHCH)	Newcastle
Rural/Regional Units	Location
South West BIRS (SWBIRS)	Albury
Mid-West BIRP (MWBIRP)	Bathurst
Dubbo BIRP	Dubbo
Southern Area BIS (SABIS)	Goulburn
Hunter BIS	Newcastle
Illawarra BIS (IBIS)	Port Kembla
North Coast BIRS (NCBIRS)	Port Macquarie, Coffs Harbour, Lismore
New England BIRS (NEBIRS)	Tamworth
Sydney Metropolitan Adult Units	Location
Liverpool BIRU	Liverpool
Royal Rehabilitation Centre Sydney (RRCS) BIRS	Ryde
Westmead BIRS	Westmead

ACI Brain Injury Rehabilitation Directorate

In 2002 NSW Health funded the establishment of clinical networks to improve the involvement of clinicians and consumers in health planning and service delivery to better manage service quality, health care costs, improve health outcomes and ensure equity of access. The Brain Injury Rehabilitation Directorate (BIRD) is one of more than 30 clinical networks, taskforces and institutes of the NSW Agency for Clinical Innovation (ACI), a board governed statutory authority. ACI acts as an advisory body to NSW Health while maintaining the clinician and consumer focus in policy development.

The underlying principle of the BIRD is to engage consumers, doctors, nurses, allied health professionals, managers, and the wider community in a collaborative process of designing and providing high quality, safe and cost-effective ways for delivering specialised rehabilitation services for children, young people and adults with severe traumatically acquired brain injuries admitted to the network of BIRP services.

Forward

The data used in this report was collected from the clinical data sets or by data extracts that are maintained by clinicians and made available from participating brain injury rehabilitation units.

Two reports are available from the 2011 and 2012 data.

1. An Excel interactive program comprising summaries and graphical representation of various individual and all unit data elements, to assist BIRP clinicians, directors and managers and Local Health Districts (LHDs) to monitor and improve services provided locally to clients and families.
2. The second is a PDF document that reports summary data of the NSW Brain Injury Rehabilitation Program for the ACI and BIRD executives. This Report is made available to stakeholders.

Data Inclusions and Exclusions

Unit	Included 2010	Included 2011	Included 2012	Comments
South West BIRS	✓	✓	✓	
Mid-West BIRP	✓	✓	✓	
Dubbo BIRP	✓	✓	✓	
Southern Area BIS	✓	✓	✓	
Hunter BIS		✓	✓	<i>Technology issues resolved in time for 2011 and 2012 data</i>
Illawarra BIS	✓	✓	✓	
*North Coast BIRS	✓	✓	✓	
New England BIRS	✓	✓	✓	
Liverpool BIRU	✓	✓	✓	
RRCS BIRS, Ryde	✓	✓	✓	
Westmead BIRS	✓	✓	☑	<i>Only inpatient data included for 2012</i>
BIRP SCH Randwick	✓	✓	✓	
BI Service The Children's Hospital Westmead	✓	✓	✓	
Kaleidoscope BIR Team John Hunter Children's Hospital	✓	✓	✓	

*data will be separated from 2013 to reflect LHD separation of services (Northern BIRS and Mid-North Coast BIRS) in December 2012.

BIRPs operate in and across 11 Local Health Districts and the Sydney Children's Hospitals Network (SCHN). There are 5 settings of care comprising BIRP services in this report. They are described as 'Adult Inpatient', 'Transitional Living (TLU)', 'Adult Community', 'Paediatric Inpatient' and 'Paediatric Community'. The "Adult Inpatient" refers to dedicated inpatient beds while "Paediatric Inpatient" is an inreach and sub - acute service without dedicated beds.

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Executive Summary

This report presents NSW Brain Injury Rehabilitation Program (BIRP) minimum data aggregated for 2011 and 2012 calendar years. Where possible, trend analysis with 2006-2010 years is provided and data inconsistencies are highlighted in the relevant sections of the report.

The report is provided in 9 sections and the key findings are highlighted below.

Section 1: Client Demographics

1,057 people were admitted to 14 BIRP units in 2011 and 1,109 people to 13 BIRP units in 2012. Over the years (2006-2012), the ratio of male to female admissions (around 70% to 30%) and the pattern for age based admissions remain consistent.

Section 2: Injury

The 2011 and 2012 client intake data finds that about 65% of the intake sustained an injury in the same year as the admission.

The data also confirms the following trends of BIRP clients, which have been consistent since 2006.

- Trend for injury cause – motor vehicle related injuries, falls and assaults account for over 60% of the total client intake.
- Trend for injury age – almost 70% of the total intake are under 34 years of age at the time of injury
- Trend for injury cause for different age groups - motor vehicle accidents remain as the number one injury cause for the 17-54 group.
- The ratio of TBI to Non-TBI clients is about 80% to 20%.

For the first time this report presents injury cause distribution for children under 5 years old. Falls are the most common injury cause for children under 5 (over 30%). This is in contrast to children aged 5-16, where the most common causes of injury are motor vehicle and sport related.

Consistent with the previous years, the 2011 and 2012 data analysis also supports the findings of existing literature that the most severe injuries (severity = more than 28 days post traumatic amnesia (PTA)) tends to be associated with motor vehicle related trauma rather than other causes.

Section 3: Referrals

Among the referral sources listed below, the two largest referral sources for client intake to BIRP services remain the same, 'NSW Trauma Hospitals' and 'Other Sources' (over 50% and around 30%, respectively).

Over the years, the ratio of NSW major to regional trauma hospital referrals also appears consistent. The referrals from NSW adult and paediatric major hospitals make up about 80% of all referrals from NSW trauma hospitals.

Within 'Other Sources', the two largest referral sources are an external specialist/ practitioner (GP) and family/self (over 40% and about 30%, respectively for both 2011 and 2012).

The breakdown of inpatient referral sources of client intake by setting of care (the first setting of care of individual clients) shows that over 90% of paediatric inpatient and over 80% of adult inpatient referral derives from NSW trauma hospitals.

Section 4: Financial Status

Financial status ('compensable', 'non-compensable' and 'unknown') is not directly related to claim type in the data collection system. Over the last 3 years, the proportion of 'Unknown' financial status has been consistent (about 20% of the intake) and includes those whose claim status has not yet been determined.

With available compensation status information, the analysis shows that the majority (more than 80%) of compensable injuries were motor vehicle related (MVA).

In addition, the data finds that for the motor vehicle related severe traumatic injuries (PTA duration > 7 days), the majority (around 60%) were compensable, contrary to the severe traumatic injuries from other causes (PTA duration > 7 days), with only around 15% of which were compensable. This trend has been consistent over the three years.

Section 5: Admissions

The admission data provided in this report is described for each setting of care – 'Adult Inpatient', 'Transitional living (TLU)', 'Adult Community', 'Paediatric Inpatient' and 'Paediatric Community'. Therefore, some clients are counted more than once as clients typically move through different settings of care during their rehabilitation program (length of service). "Adult Inpatient" is dedicated inpatient beds while "Paediatric Inpatient" is an inreach service to acute beds.

In 2011, 14 BIRP units admitted a total of 1,126 clients to 1,410 episodes of care. In 2012, 13 BIRP units admitted a total of 1,168 clients to 1,438 episodes of care.

For the admission type, the overall ratio of 80 to 20 for new admissions to readmissions has been consistent over the three years.

The trend for injury time to admission has been also consistent over the years. Nearly 90% of new clients admitted to the adult inpatient setting were seen within 3 months of injury and more than 60% of new clients admitted to the adult community setting within 6 months of injury.

The 2011 and 2012 paediatric data shows that nearly 90% of children admitted to the paediatric inpatient setting were seen within one month of injury and more than 60% of children admitted to the paediatric community setting within 3 months of injury.

There is still some degree of inconsistency across the 14 BIRP units in the definition for admission type ('new admission' versus 'readmission') but BIRD aims to improve consistency for future reports.

Section 6: Episode of Care (EOC) - Length

The individual EOC data analysis for three years (2010-2012) finds shorter episodes of care for the adult inpatient and TLU admissions, typically <3 months, with more varied length of episodes of care in the adult community setting.

The 2011 and 2012 paediatric data analysis finds even shorter episodes of care for the paediatric inpatient admission, typically < 1 month and longer episodes of care for the paediatric community admissions, typically > 12 months.

In the current data collection system for BIRD reporting, it is very hard or extremely difficult to capture clinical pathways of individual clients. The system is good for reporting activities in terms of activity within each setting of care during a particular period of time, but not how clients progress through the range of BIRP services.

In order to reflect the client journey through BIRP services, the future database revision and data collection system/methodology will aim to make data more client than setting of care focused.

Section 7: Discharges

The discharge data provided here is for discharges from each setting of care. As is the case with admission data by setting of care, some clients are counted more than once as clients typically move through different settings of care within the same rehabilitation program (length of service).

In 2011, 14 BIRP units discharged a total of 1,130 clients from 1,251 episodes of care. In 2012, a total of 1,085 clients from 1,193 episodes of care were discharged from all settings of care for 13 BIRP units and from only the adult inpatient program of the other unit.

Data concerning pre-admission and post-discharge accommodation type was analysed for the first time for clients discharged in 2011 and 2012. However, the findings are affected by a large proportion of missing data. However, available data shows that private residence is the predominate type of discharge accommodation and differences exist between pre and post accommodation types. BIRD will seek to reduce the rate of missing data for future reports.

Section 8: NSW Brain Injury Rehabilitation Program (BIRP) Total Clients

This report presents for the first time the total count of NSW BIRP clients including clients who were neither admitted to nor discharged from an episode of care in the respective calendar year.

In 2011, 14 BIRP units had a total of 3,266 clients including 1,657 clients who were neither admitted to nor discharged from an episode of care in 2011. In 2012, 13 BIRP units had a total of 3,322 clients including 1,759 clients who were neither admitted to nor discharged from an episode of care in 2012.

For future reports BIRD will seek to identify available data that can provide useful information about the broader BIRP caseload.

Section 9: Inpatient Outcomes

This report presents for the first time adult inpatient outcomes for 2011 and 2012 in terms of admission and discharge scores using the standardised Functional Independence Measure (FIM) and providing 126 episodes of care for 2011 and 153 episodes of care for 2012. The FIM assesses and scores function in areas (domains) of physical (motor) and cognitive function.

The pattern of admission and discharge FIMs across the 2 years is similar. Adult clients admitted to the BIRP inpatient setting of care generally improve in their cognitive and motor domain scores during their rehabilitation between admission and discharge.

People with the longest length of stay (LOS) generally arrive with the lowest total FIM scores. People arriving with mid-range or higher total FIM scores tend to have shorter LOS.

Some people who arrive with the lowest possible total FIM scores achieve a substantial change during their rehabilitation although they tend to stay the longest.

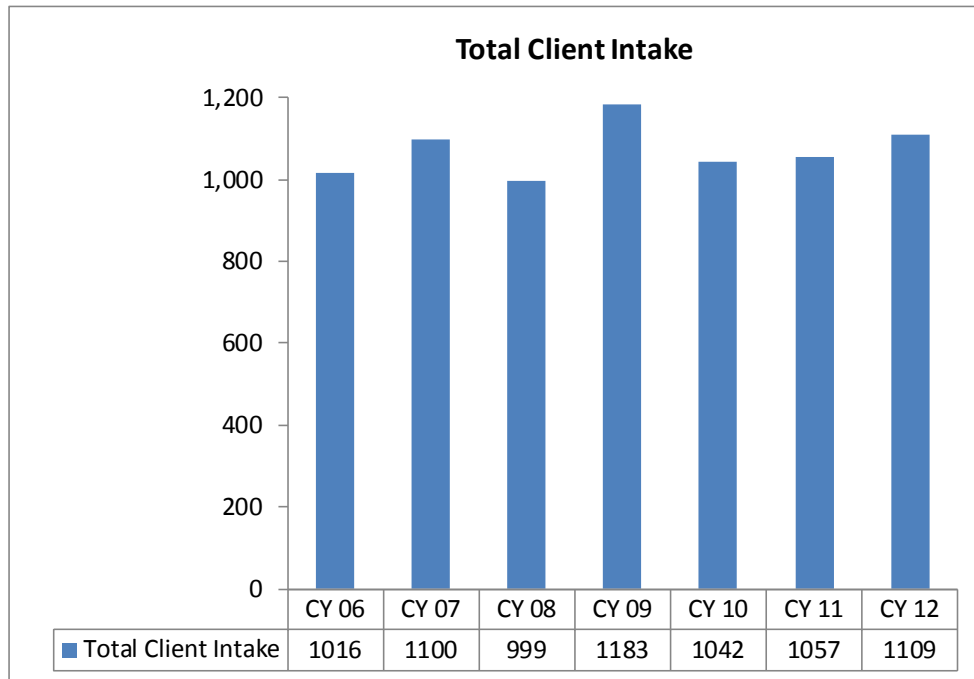
Overall, a large proportion of people makes very significant motor improvements and often approach or achieve the maximum FIM motor score of 91 at discharge. However, only a small number of patients achieve maximum cognitive scores at discharge, reflecting the greater impact that TBI often has on cognitive function. There is also a trend of improved outcomes for patients with shorter lengths of stay, which likely reflects less severe injury.

Section 1 - Client Demographics

Section 1 presents some demographic features of clients admitted to the NSW BIRP for indigenous status, gender and age groups.

Chart 1.1 shows the total clients intake. 14 units admitted a total of 1057 clients in 2011, and 13 units a total of 1109 clients in 2012.

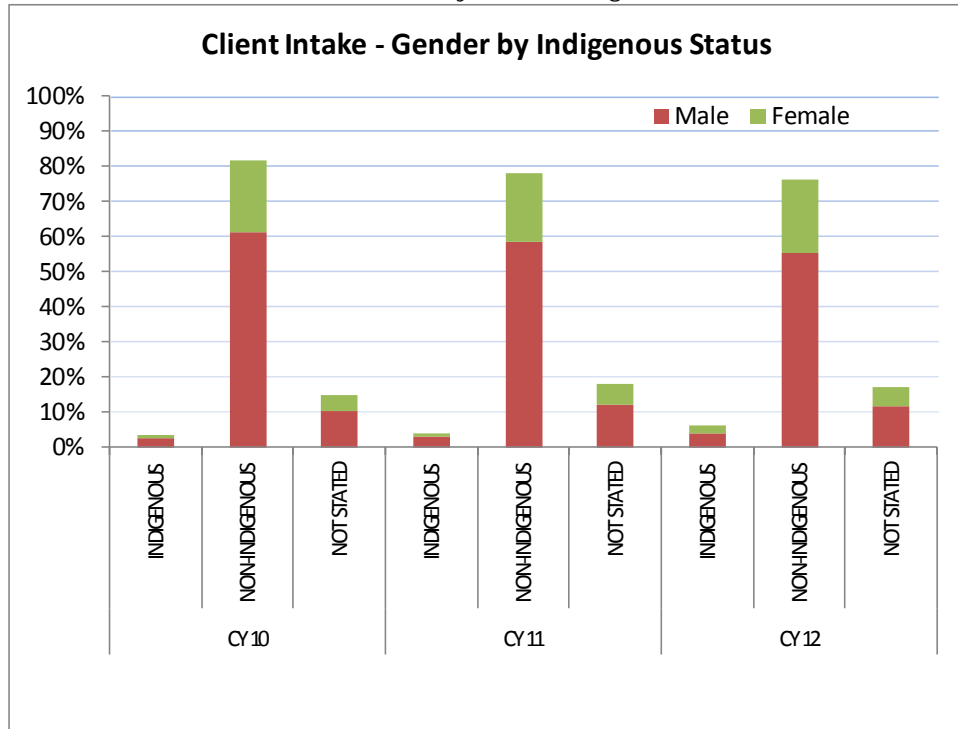
Chart 1.1 - Individual Clients Intake Trend



Here the clients within a unit were counted only once but some clients may have been counted more than once in the total client intake, if they were admitted to different units in the same calendar year.

Over the years, the total client intake count does not appear to vary much from one year to another for the units involved.

Chart 1.2 - Individual Client Intake by Sex & Indigenous Status



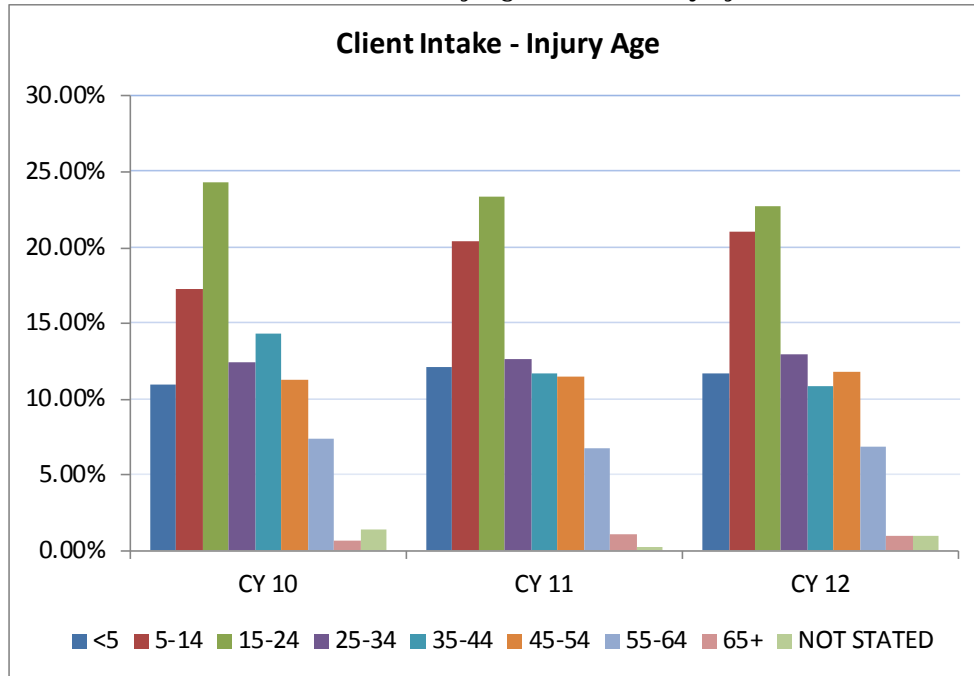
Status	CY 10			CY 11			CY 12		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Indigenous	2.7% (28)	1.0% (10)	3.7% (38)	3.0% (32)	.9% (10)	4.0% (42)	4.1% (45)	2.3% (25)	6.3% (70)
Non-Indigenous	61.4% (639)	20.3% (211)	81.7% (850)	58.4% (617)	19.8% (209)	78.1% (826)	55.5% (615)	20.8% (231)	76.4% (846)
Not Stated	10.5% (109)	4.2% (44)	14.7% (153)	12.2% (129)	5.7% (60)	17.9% (189)	11.9% (132)	5.4% (60)	17.3% (192)
Total	74.5% (776)	25.5% (265)	100.0% (1041)	73.6% (778)	26.4% (279)	100.0% (1057)	71.5% (792)	28.5% (316)	100.0% (1108)

Chart 1.2 shows the ratio of male to female admissions across the years within indigenous and non-indigenous populations. The proportions remain consistent across the years. In 2011, 14 units admitted a total of 778 (73.6%) male and 279 (26.4%) female clients. A similar trend appears in 2012 with 13 units admitting a total of 792 (71.5%) male and 316 (28.5%) female clients.

We can also see that in 2011, 14 services admitted at least a total of 42 indigenous clients, 32 males and 10 females. The number increased in 2012 to 45 males and 25 females, giving the percentage increase from 4% to 6.3%.

Throughout this report, all data tables present both percentages and frequencies.

Chart 1.3 - Individual Client Intake by Age at Date of Injury



Age Group	CY 10	CY 11	CY 12
<5	10.9% (114)	12.1% (128)	11.7% (130)
5-14	17.3% (180)	20.4% (216)	21.1% (234)
15-24	24.3% (253)	23.4% (247)	22.7% (252)
25-34	12.5% (130)	12.7% (134)	13.0% (144)
35-44	14.3% (149)	11.7% (124)	10.8% (120)
45-54	11.2% (117)	11.4% (121)	11.8% (131)
55-64	7.4% (77)	6.8% (72)	6.9% (76)
65+	.7% (7)	1.1% (12)	1.0% (11)
Not Stated	1.4% (15)	.3% (3)	1.0% (11)
Total	100% (1042)	100% (1057)	100% (1109)

For the clients admitted to the BIRP services, the two particular age groups remain consistently dominant over the years.

- In 2011, over 43% (463) of clients admitted to 14 units sustained the brain injury when aged between 5 and 24 years of age.
- A similar pattern continued in 2012 with 13 units admitting 486 (43.8%) clients who were injured when aged between 5 and 24 years of age.

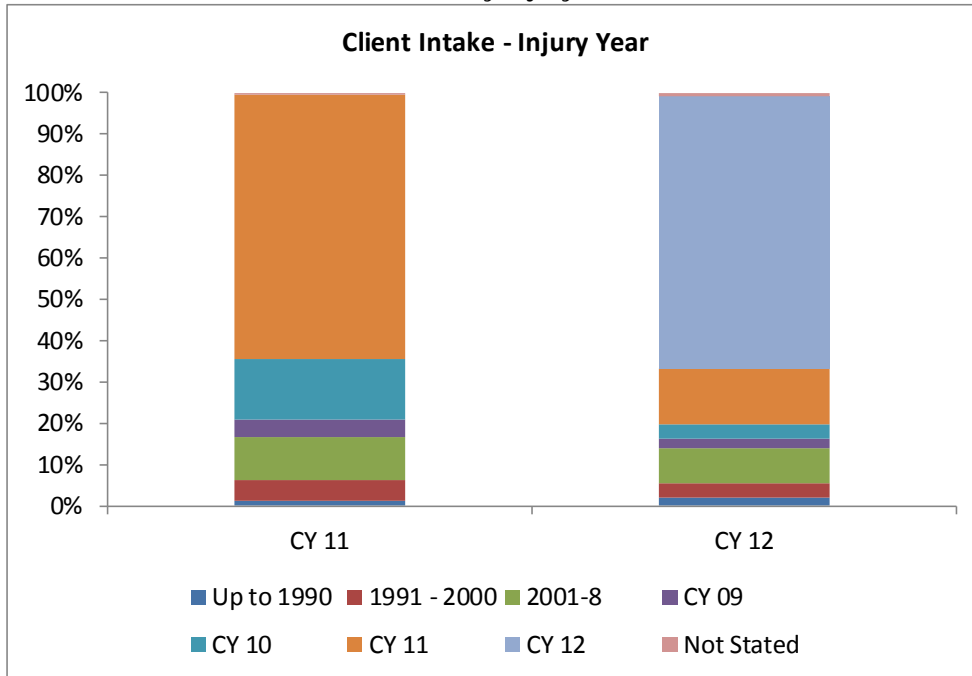
A very small number of clients over 65 (12 in 2011 and 11 in 2012) reflects the general admission criterion for people under 65 years old.

Section 2 – Injury

Section 2 presents injury characteristics of clients admitted to the units involved – injury year, injury type, injury cause, traumatic injury severity measured in duration of post traumatic amnesia (PTA) and correlation between injury age and injury cause.

It also attempts to discover any correlation between injury severity and motor vehicle related injuries.

Chart 2.1.A – Individual Client Intake by Injury Year

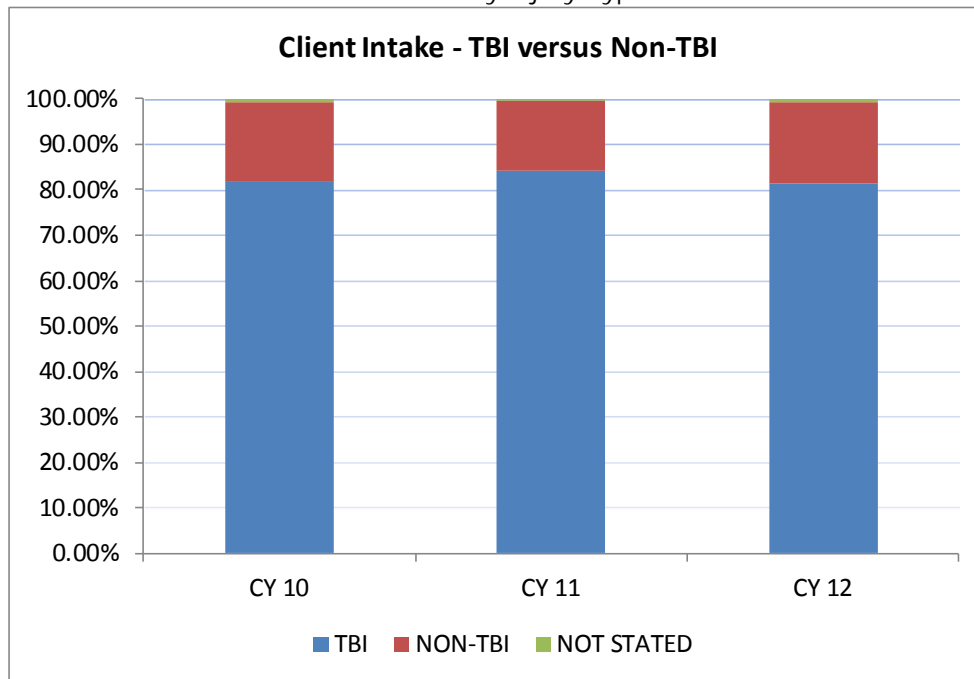


Injury Year	CY 11	CY 12
Up to 1990	1.3% (14)	2.1% (23)
1991 - 2000	5.1% (54)	3.3% (37)
2001-2008	10.2% (108)	8.7% (97)
CY 09	4.4% (46)	2.1% (23)
CY 10	14.6% (154)	3.5% (39)
CY 11	64.1% (678)	13.5% (150)
CY 12	.0% (0)	65.7% (729)
Not Stated	.3% (3)	1.0% (11)
Total	100% (1057)	100% (1109)

Chart 2.1.A shows that the majority clients had their injury in the same year as their admission to the NSW BIRP (64% in 2011 and 66% in 2012).

About 21% (222) of client intake in 2011 had the injury prior to 2010 and a similar proportion of client intake in 2012 (19.7 %) sustained the injury prior to 2011. This is noteworthy in relation to the analysis of injury cause trend presented in this section.

Chart 2.1.B – Individual Client Intake by Injury Type



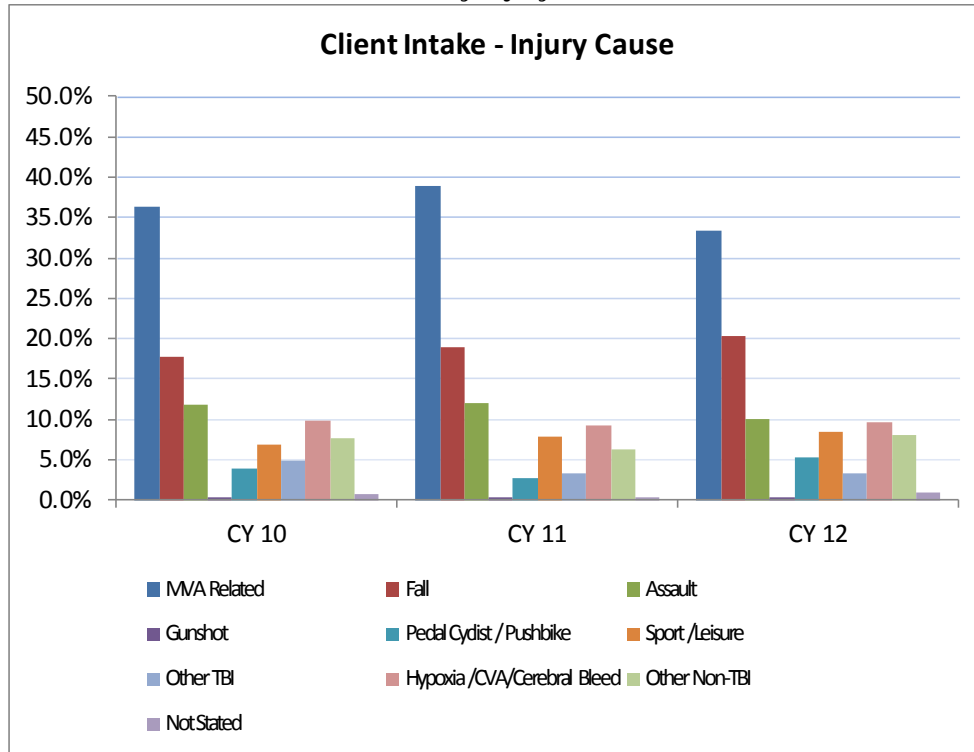
Injury Type	CY 10	CY 11	CY 12
TBI	81.8% (852)	84.1% (889)	81.4% (903)
Non-TBI	17.5% (182)	15.5% (164)	17.7% (196)
Not Stated	.8% (8)	.4% (4)	.9% (10)
Total	100.0% (1042)	100.0% (1057)	100.0% (1109)

Chart 2.1.B shows that in 2011, 14 BIRP units admitted to the service a total of 889 (84%) clients who sustained a traumatic brain injury (TBI). In 2012, 13 BIRP units admitted a similar proportion of TBI clients (81.4%).

The ratio of TBI to Non-TBI clients is consistent over the years, with non-TBI admissions not exceeding 20% of the total admissions to the service.

The analysis results are not presented in this report but the analysis of the data also indicated that there is little difference between NSW metro and rural services in the ratio of traumatic to non-traumatic injuries.

Chart 2.2 – Individual Client Intake by Injury Cause



Injury Cause	CY 10	CY 11	CY 12
MVA Related	36.4% (379)	38.9% (411)	33.5% (371)
Fall	17.8% (185)	19.0% (201)	20.4% (226)
Assault	11.7% (122)	12.0% (127)	10.1% (112)
Gunshot	.4% (4)	.3% (3)	.4% (4)
Pedal Cyclist / Pushbike	3.8% (40)	2.7% (29)	5.3% (59)
Sport /Leisure	6.8% (71)	7.9% (84)	8.5% (94)
Other TBI	4.9% (51)	3.2% (34)	3.3% (37)
Hypoxia /CVA/Cerebral Bleed	9.9% (103)	9.3% (98)	9.6% (106)
Other Non-TBI	7.6% (79)	6.2% (66)	8.1% (90)
Not Stated	.8% (8)	.4% (4)	.9% (10)
Total	100% (1042)	100% (1057)	100% (1109)

Chart 2.2 includes both TBI and non-TBI clients.

Over the years, the trend of major injury cause concerning BIRP clients remains consistent. Motor vehicle related injuries (driver, passenger pedestrian, cyclist), falls and assaults account for over 60% of the total client intake.

In 2011, 14 BIRP units admitted 411 clients who sustained injuries in motor vehicle accidents, 201 in falls and 127 in assaults and these groups together account for 83% of the total TBI clients. Motor vehicle related injuries alone account for 46% of the total TBI clients.

Similarly, in 2012, 13 units admitted 371 clients with motor vehicle related, 271 fall-related and 112 assault-related injuries, which accounts for 79% of the TBI clients. Motor vehicle related injuries alone account for 41% of the total TBI clients.

Chart 2.3 – Individual Client Intake by Injury Cause and Age

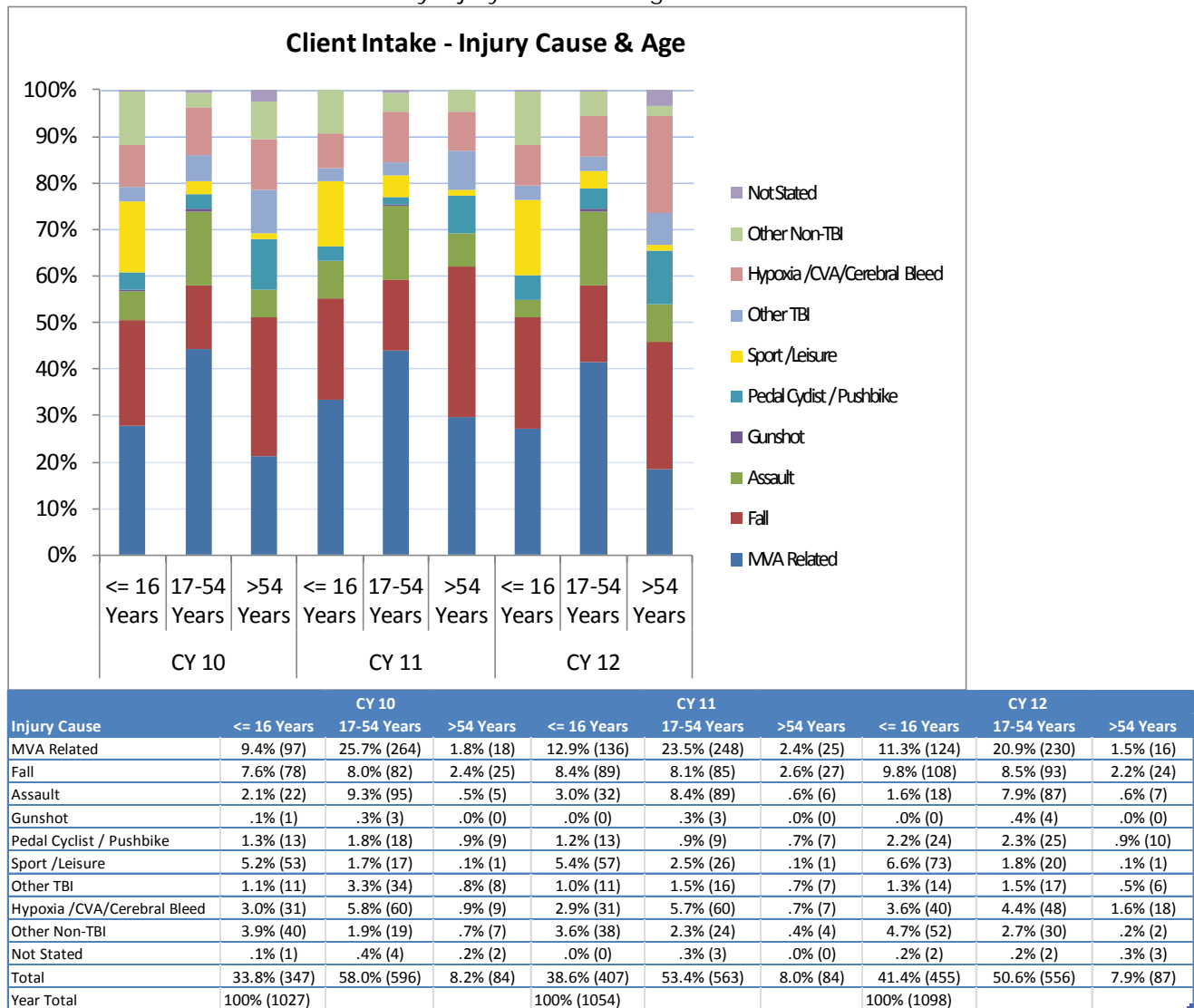


Chart 2.3 tells that different age groups show different injury characteristics.

Over 50% of the BIRP clients sustained an injury when they were between 17 and 54 years of age and this trend remains consistent over the years.

In 2011, 14 BIRP units admitted a total of 563 (53.4%) clients who were between 17 and 54 years of age, and 407 (38.6%) clients younger than 17 years of age at the time of injury, which makes up 92% of the total client intake.

Similarly, 13 BIRP units admitted in 2012, 556 (50.6%) clients aged between 17 and 54 years of age, and 455 (41.4%) clients younger than 17 years of age at the time of injury.

Form the chart above, it is clear that motor vehicle accidents remain as the number one injury cause for the 17-54 group clients. In 2011, 14 BIRP units admitted 248 clients who sustained an injury in motor vehicle accidents at the age between 17 and 54, which accounts for 44% of clients in this injury age group.

INJURY

Likewise, in 2012, 13 BIRP units admitted 230 clients who sustained motor vehicle related injuries in this age group which accounts for 41% of the age group.

Chart 2.4 – Injury Cause for Children < = 16 Years

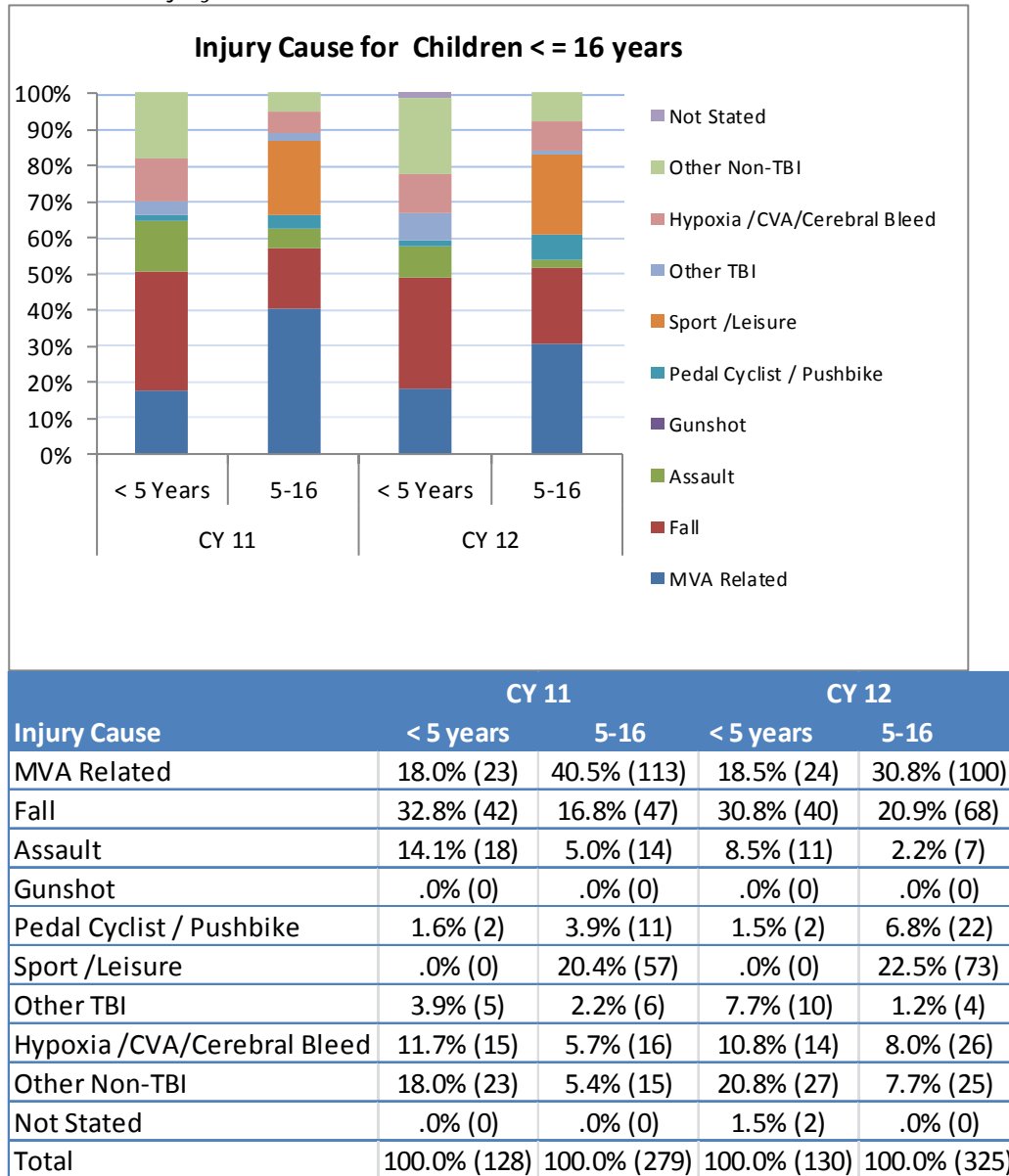
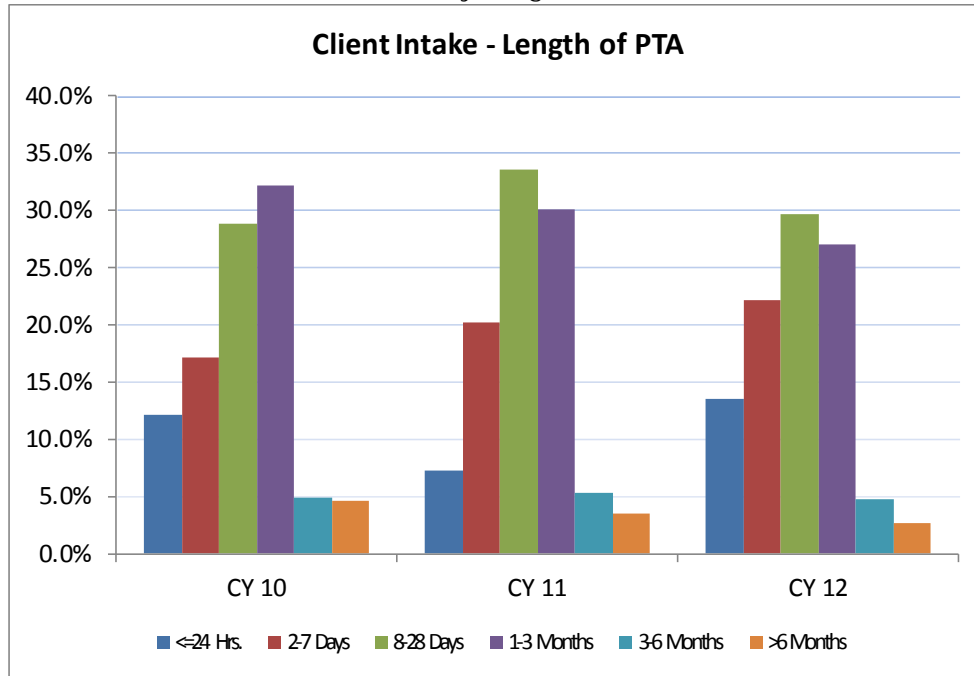


Chart 2.4 compares the injury circumstances for children younger than 5 years of age and children aged between 5 and 16 years. The category "Assault" captures children who sustained an "Abusive Head Trauma" or "Non-Accidental Injury"

Falls are the most common injury cause for children under 5 (over 30%). This is in contrast to children aged 5-16, where the most common causes of injury are motor vehicle and sport related.

Chart 2.5 – Individual Client Intake by Length of PTA

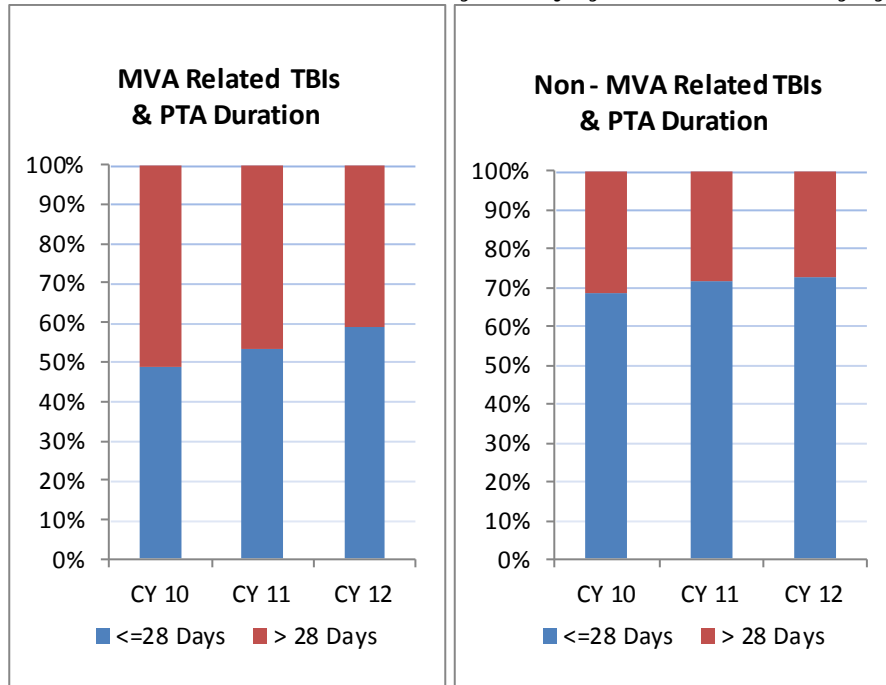


Length of PTA	CY 10	CY 11	CY 12
<=24 Hrs.	12% (60)	7.3% (33)	13.6% (60)
2-7 Days	17% (84)	20.2% (92)	22.2% (98)
8-28 Days	29% (142)	33.6% (153)	29.7% (131)
1-3 Months	32% (158)	30.1% (137)	27.0% (119)
3-6 Months	5% (24)	5.3% (24)	4.8% (21)
>6 Months	5% (23)	3.5% (16)	2.7% (12)
Total	100% (491)	100% (455)	100% (441)

Chart 2.5 shows the distribution of injury severity in the measure of post traumatic amnesia (PTA) duration for traumatic brain injury (TBI) clients. This analysis does not include TBI clients who did not experience PTA (62 and 88 cases in 2011 and 2012, respectively) and clients whose PTA data were not available due to various reasons including old injuries.

With available data, Chart 2.5 suggests a consistent trend that at least 60% of TBI clients with PTA had sustained severe or very severe injuries (i.e. PTA >7 days).

Chart 2.6 – Individual Client Intake by TBI Injury Cause and Severity by PTA



MVA Related			
PTA Duration	CY 10	CY 11	CY 12
<=28 Days	48.8% (126)	53.1% (138)	58.8% (134)
> 28 Days	51.2% (132)	46.9% (122)	41.2% (94)
Total	100% (258)	100% (260)	100% (228)

Non - MVA Related			
PTA Duration	CY 10	CY 11	CY 12
<=28 Days	68.7% (160)	71.8% (140)	72.8% (155)
> 28 Days	31.3% (73)	28.2% (55)	27.2% (58)
Total	100% (233)	100% (195)	100% (213)

Chart 2.6 is based on available post traumatic amnesia (PTA) data and injury cause of traumatic brain injury (TBI) clients.

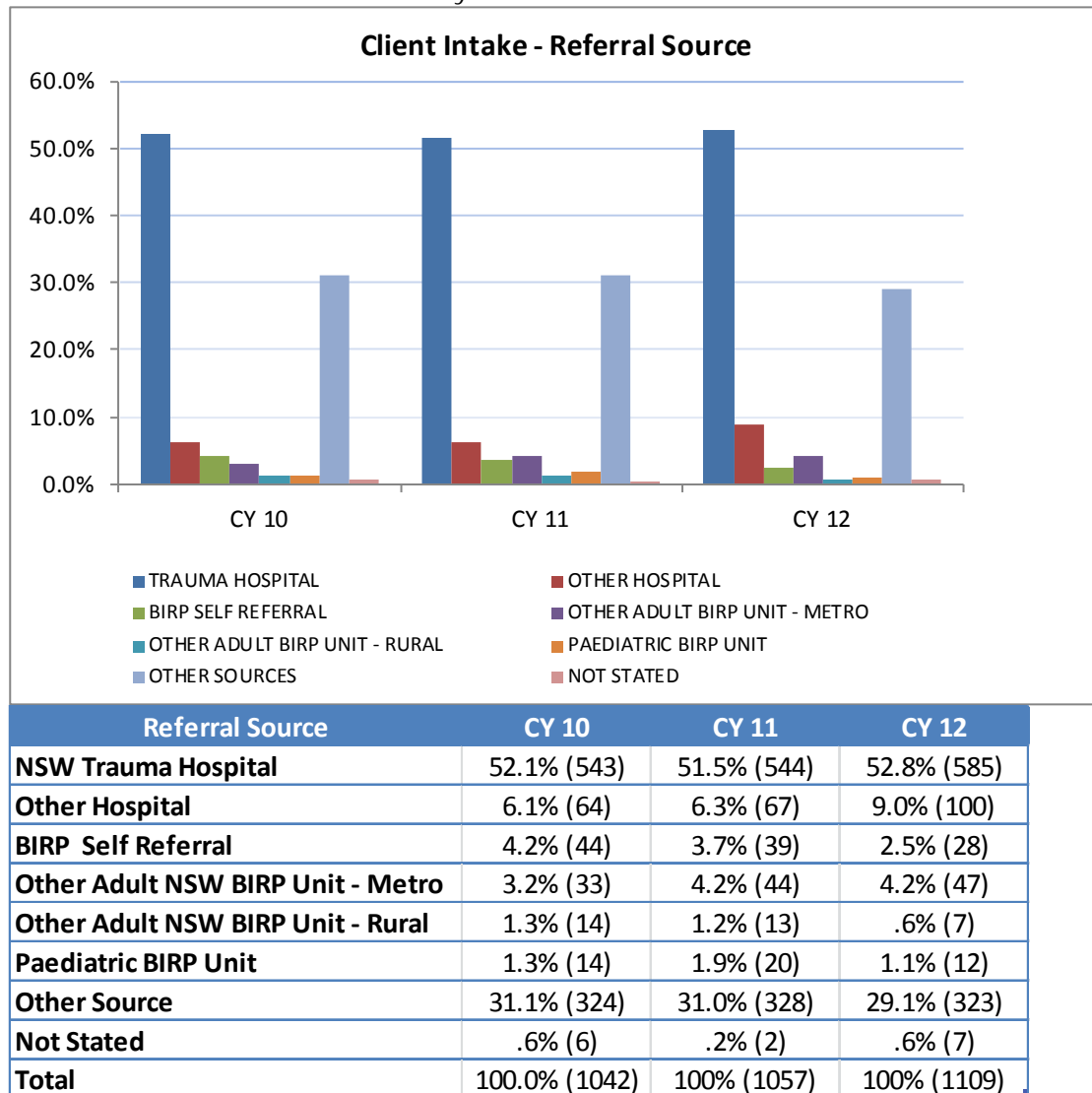
The data summary appears to reflect what has been reported in existing literature. That is, motor vehicle related injuries tend to be more severe than all other causes of TBI. Over the years, at least more than 40% of motor vehicle related injuries resulted in PTA longer than 28 days whereas around 30% of all other TBI led to this level of severity.

Section 3 - Referrals

This section describes different referral sources to the NSW Brain Injury Rehabilitation Program (BIRP) network of services. The two largest sources are NSW Trauma Hospitals and Other Sources, accounting for more than 80% of all referrals.

Chart 3.1 shows the percentage of clients referred from the different referral sources to all units within the BIRP. The Other Sources category is broken down further in Chart 3.2. The NSW major trauma hospitals are listed in Chart 3.3.A-B and the regional trauma hospitals at the back of this report.

Chart 3.1 – Individual Client Intake by Source of Referral



In 2011, 14 BIRP units admitted 544 (51.5%) clients from NSW trauma hospitals and 328 (31%) clients referred from other sources, which make up more than 80% of the 2011 client intake.

This trend continued in 2012. 13 BIRP units took 585 (52.8%) clients from NSW trauma hospitals and 323 (29%) clients from other sources of referral.

Chart 3.2 – Referrals (Other Sources)

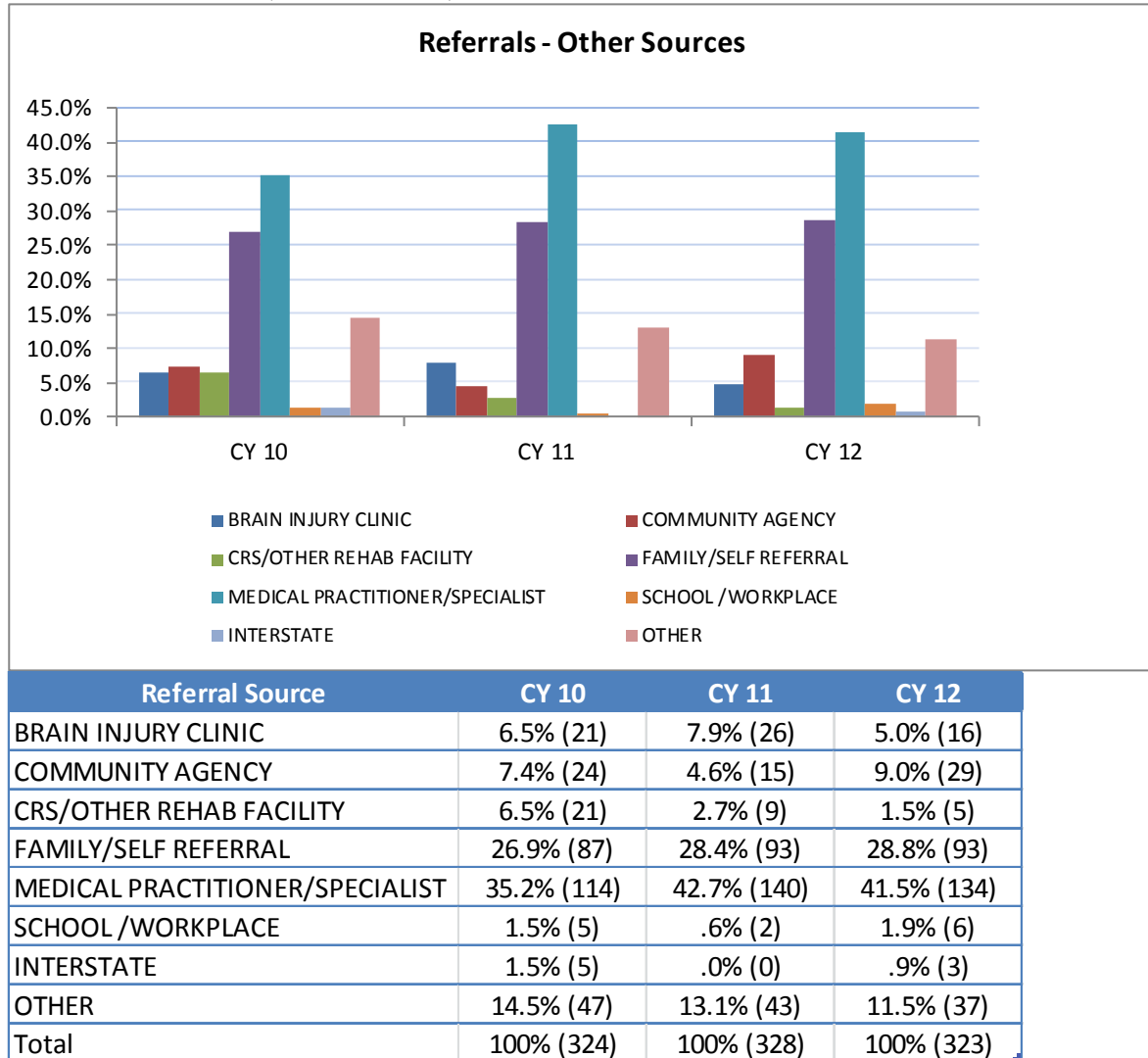


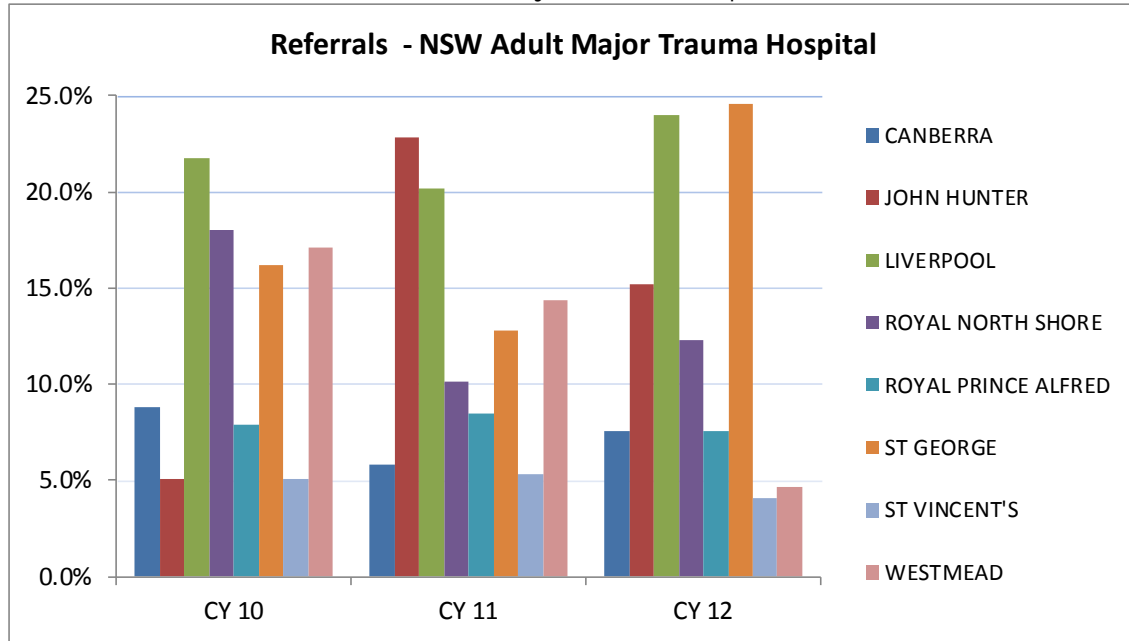
Chart 3.2 shows various referral sources within the Other Source category. Over the years, more than 60% of clients within this category were referred by an external specialist or practitioner (GP), or were initiated via a family or self-referral.

‘Family/Self-Referral’ in Chart 3.2 is different from ‘BIRP Self-Referral’ as listed in Chart 3.1 above. The former is a patient/client self-referral to a rehab service whereas the latter is a referral of a client to a different program (setting of care) within the same BIRP service unit.

In 2011, the number of clients either self-referred or referred by an external medical specialist or practitioner to 14 BIRP units was 233, accounting for 71% of this Other Source category.

Similarly, in 2012, 13 BIRP units accepted 227 clients either self-referred or referred by an external medical specialist or practitioner (70% of other sources).

Chart 3.3.A – Referrals from NSW Adult Major Trauma Hospitals



Major Trauma Hospital	CY 10	CY 11	CY 12
CANBERRA	8.8% (19)	5.9% (11)	7.6% (13)
JOHN HUNTER	5.1% (11)	22.9% (43)	15.2% (26)
LIVERPOOL	21.8% (47)	20.2% (38)	24.0% (41)
ROYAL NORTH SHORE	18.1% (39)	10.1% (19)	12.3% (21)
ROYAL PRINCE ALFRED	7.9% (17)	8.5% (16)	7.6% (13)
ST GEORGE	16.2% (35)	12.8% (24)	24.6% (42)
ST VINCENT'S	5.1% (11)	5.3% (10)	4.1% (7)
WESTMEAD	17.1% (37)	14.4% (27)	4.7% (8)
Total	100.0% (216)	100.0% (188)	100.0% (171)

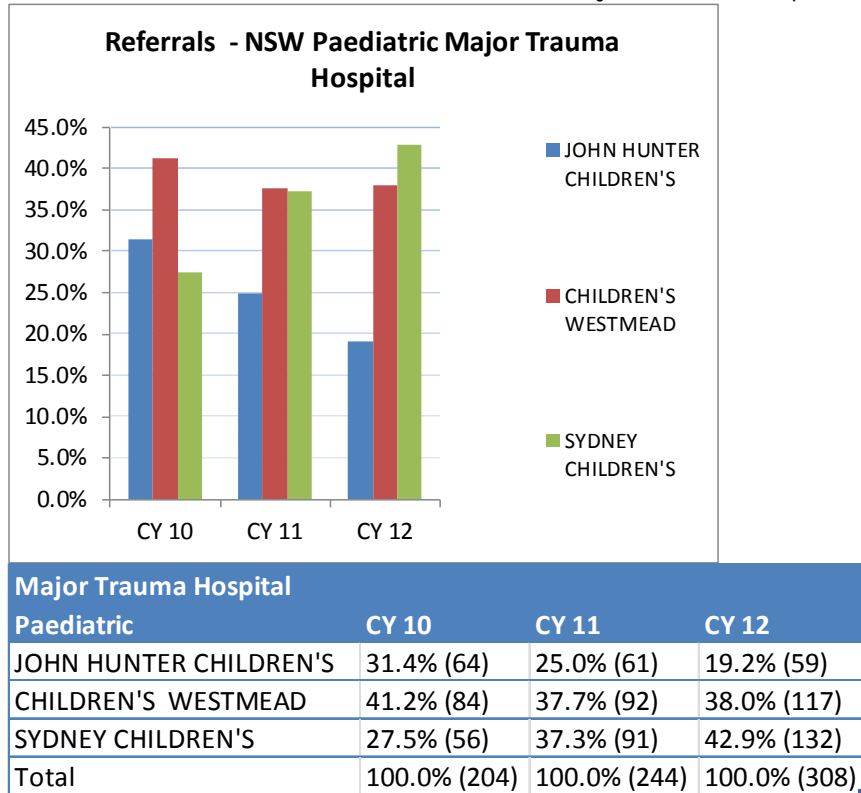
The majority of NSW trauma hospital referrals are from NSW major trauma hospitals, showing consistency over the years in the ratio of major to regional trauma hospital referrals – around 80% to 20%.

Chart 3.3.A shows referrals of individual adult major trauma hospitals to the NSW adult BIRP services and Chart 3.3.B referrals of paediatric major trauma hospitals. Because the referral pathway to paediatric service is not compatible to that of adult services, they are presented separately.

The 2012 Westmead BIRS activity data was not included in the analysis. This should explain the drop in referrals from Westmead Hospital in 2012.

REFERRALS

Chart 3.3.B – Referrals from NSW Paediatric Major Trauma Hospitals



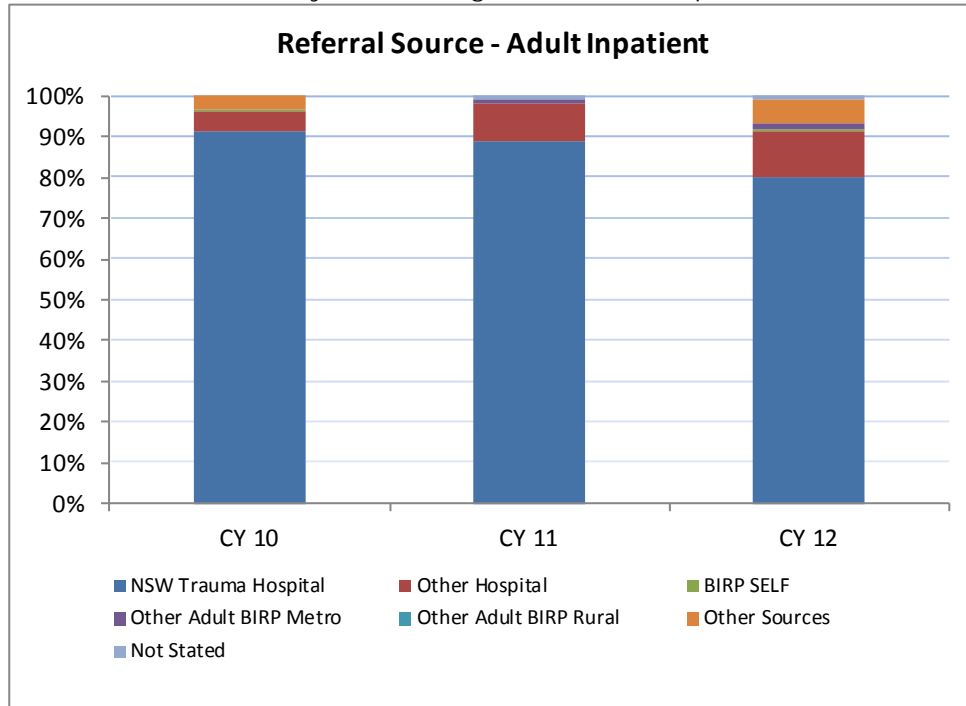
The trend for 2010 is unreliable due to changes in data definitions.

The following charts (Chart 3.4.A-F) show distribution of referral source for each setting of care within the BIRP- Adult Inpatient, TLU, Adult Community, Paediatric inpatient and Paediatric community.

These charts are based on the same clients' intake data used for the preceding charts and concern only the first setting of care that the client was admitted to in the reporting year. The same client therefore was counted for one setting of care only.

The preceding charts were based on total client intake data from all 14 units for 2011 but only 13 units in 2012. Chart 3.4.A however includes 2012 adult inpatient data from all 3 adult inpatient units.

Chart 3.4.A – Referrals by First Setting of Care: Adult Inpatient



Adult Inpatient			
Referral Source	CY 10	CY 11	CY 12
NSW Trauma Hospital	91.6% (141)	88.7% (110)	80.0% (120)
Other Hospital	4.5% (7)	9.7% (12)	11.3% (17)
BIRP SELF	.6% (1)	.0% (0)	.7% (1)
Other Adult BIRP Metro	.0% (0)	.8% (1)	1.3% (2)
Other Adult BIRP Rural	.0% (0)	.0% (0)	.0% (0)
Other Sources	3.2% (5)	.0% (0)	6.0% (9)
Not Stated	.0% (0)	.8% (1)	.7% (1)
Total	100% (154)	100% (124)	100% (150)

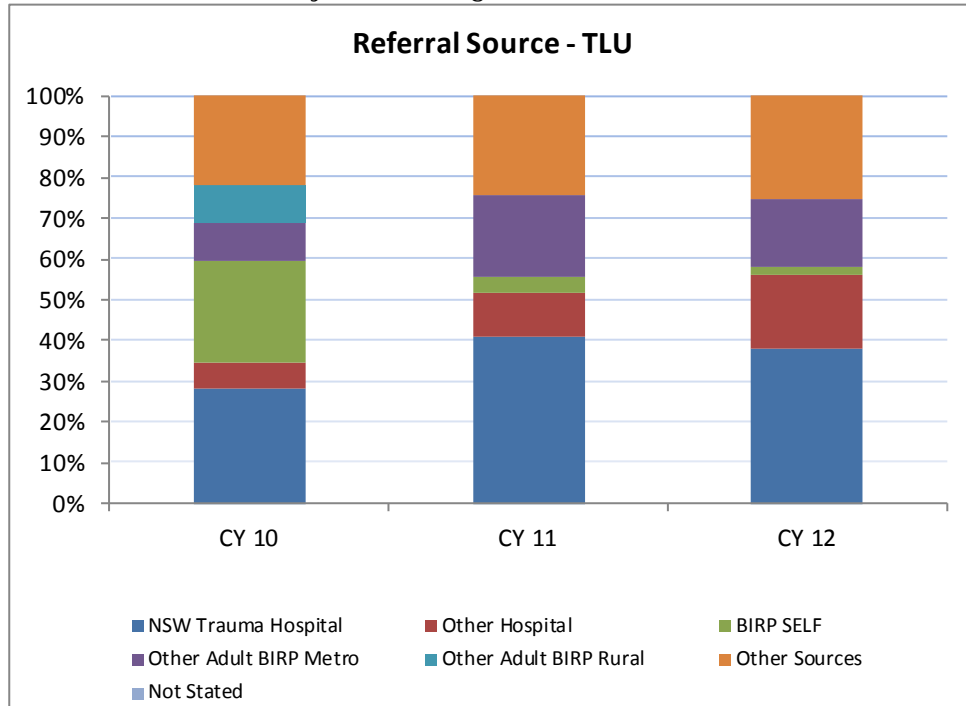
Chart 3.4.A shows that most of the referrals to the 3 adult inpatient units derive from NSW trauma hospitals.

In the 2011 client intake, 110 adult inpatients (88.7% of total inpatients admitted to the 3 adult inpatient units in the calendar year) were referred from NSW trauma hospitals.

In 2012, 3 BIRP adult inpatient units accepted 120 inpatients (80% of total inpatients admitted to the 3 units in the calendar year) from NSW trauma hospitals.

The chart shows an increase in referrals from other sources in the 2012 inpatients intake. The 9 inpatient referrals from other sources include 4 referrals from a medical practitioner/specialist and 1 referral from CRS/Other rehab facility.

Chart 3.4.B – Referrals by First Setting of Care: TLU



TLU Referral Source	CY 10	CY 11	CY 12
NSW Trauma Hospital	28.1% (9)	40.7% (22)	38.2% (21)
Other Hospital	6.3% (2)	11.1% (6)	18.2% (10)
BIRP SELF	25.0% (8)	3.7% (2)	1.8% (1)
Other Adult BIRP Metro	9.4% (3)	20.4% (11)	16.4% (9)
Other Adult BIRP Rural	9.4% (3)	.0% (0)	.0% (0)
Other Sources	21.9% (7)	24.1% (13)	25.5% (14)
Not Stated	.0% (0)	.0% (0)	.0% (0)
Total	100% (32)	100% (54)	100% (55)

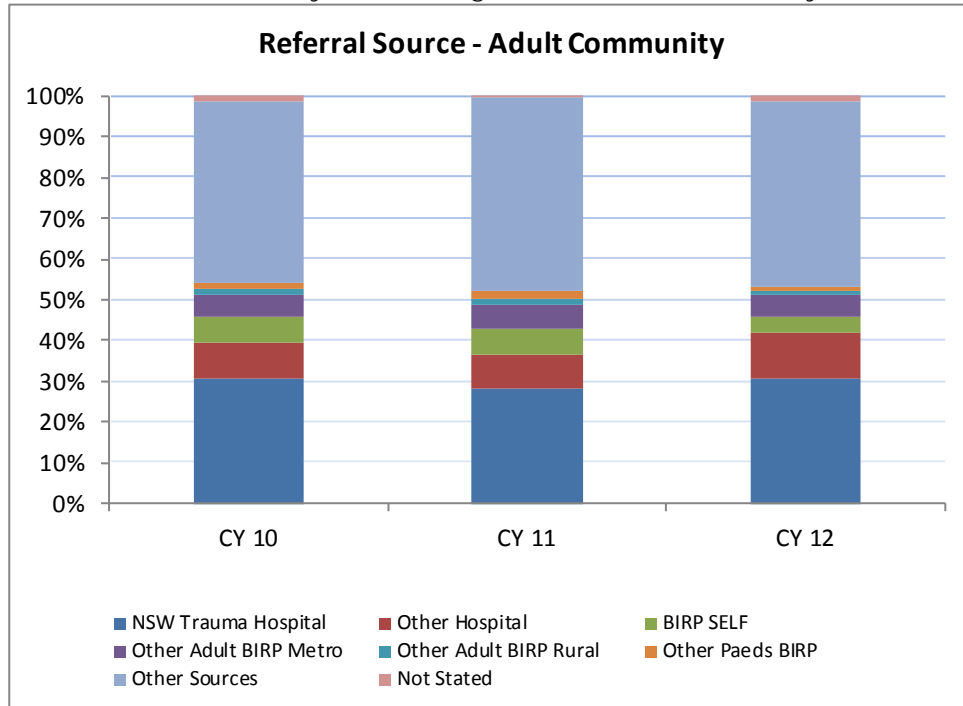
Chart 3.4.B shows that over the years, the Transitional Living Units consistently received the majority of referrals from two sources: directly from NSW trauma hospitals or from external medical practitioners. This chart does not include TLU clients who were already counted in the preceding chart.

In the 2011 client intake, more than 50% of TLU referrals (as the first setting of care in the reporting year) came from NSW trauma or other hospitals and this increased even more with the 2012 intake (56.4%), which was accompanied by a sharp decrease in referrals within the same BIRP unit.

The yearly trend in percent, however, can vary greatly in response to a small change in the clients count for each referral source, due to the small number of clients who are admitted to TLU as the first setting of care in the reporting year.

The chart also shows the movement of clients across the NSW BIRP units, 11 clients in 2011 and 9 clients in 2012.

Chart 3.4.C – Referrals by First Setting of Care: Adult Community

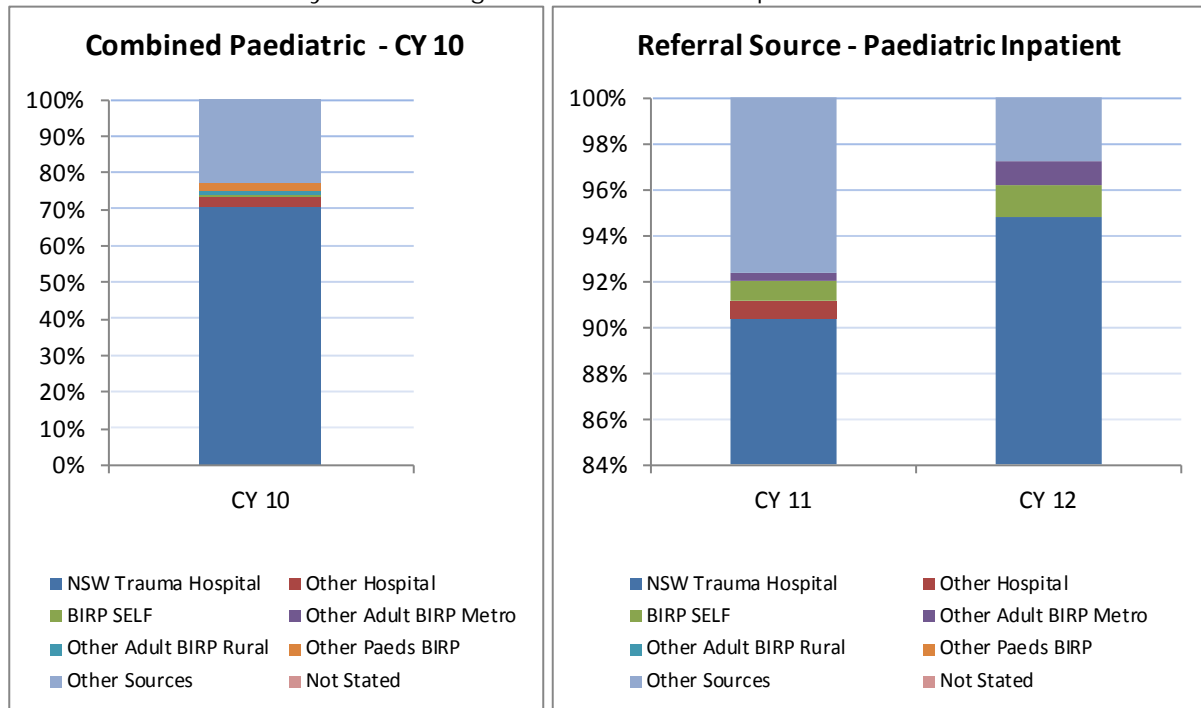


Adult Community			
Referral Source	CY 10	CY 11	CY 12
NSW Trauma Hospital	30.6% (162)	28.4% (147)	30.8% (159)
Other Hospital	8.7% (46)	8.1% (42)	11.0% (57)
BIRP SELF	6.4% (34)	6.2% (32)	3.9% (20)
Other Adult BIRP Metro	5.7% (30)	5.8% (30)	5.8% (30)
Other Adult BIRP Rural	1.1% (6)	1.5% (8)	.6% (3)
Other Paeds BIRP	1.5% (8)	2.1% (11)	1.2% (6)
Other Sources	44.8% (237)	47.6% (246)	45.6% (236)
Not Stated	1.1% (6)	.2% (1)	1.2% (6)
Total	100% (529)	100% (517)	100% (517)

Chart 3.4.C shows the breakdown of referral sources for adult community services. The referrals to the Community Rehabilitation Services came substantially and consistently from Other Sources (largely Family/Self-referrals and Practitioner/Specialist) and NSW trauma hospitals, followed by other hospitals, BIRP self-referrals and referrals from another BIRP unit.

The analysis did not include 2012 adult community data from one unit and this has affected the number of BIRP self-referrals in 2012.

Chart 3.4.D – Referrals by First Setting of Care: Paediatric Inpatient



Referral Sources	CY 10	CY 11	CY 12
NSW Trauma Hospital	70.6% (231)	90.4% (226)	94.8% (276)
Other Hospital	2.8% (9)	.8% (2)	.0% (0)
BIRP SELF	.3% (1)	.8% (2)	1.4% (4)
Other Adult BIRP Metro	.0% (0)	.4% (1)	1.0% (3)
Other Adult BIRP Rural	1.5% (5)	.0% (0)	.0% (0)
Other Paeds BIRP	1.8% (6)	.0% (0)	.0% (0)
Other Sources	22.9% (75)	7.6% (19)	2.7% (8)
Not Stated	.0% (0)	.0% (0)	.0% (0)
Total	100.0% (327)	100% (250)	100% (291)

Chart 3.4.D shows different sources of referrals to the paediatric inpatient setting of care.

The chart includes aggregated data for the 2010 report but it is not comparable to the data for the subsequent years. It represents a combined single paediatric setting of care without distinguishing between paediatric inpatient and community settings. The trend is also unreliable due to changes in data definitions.

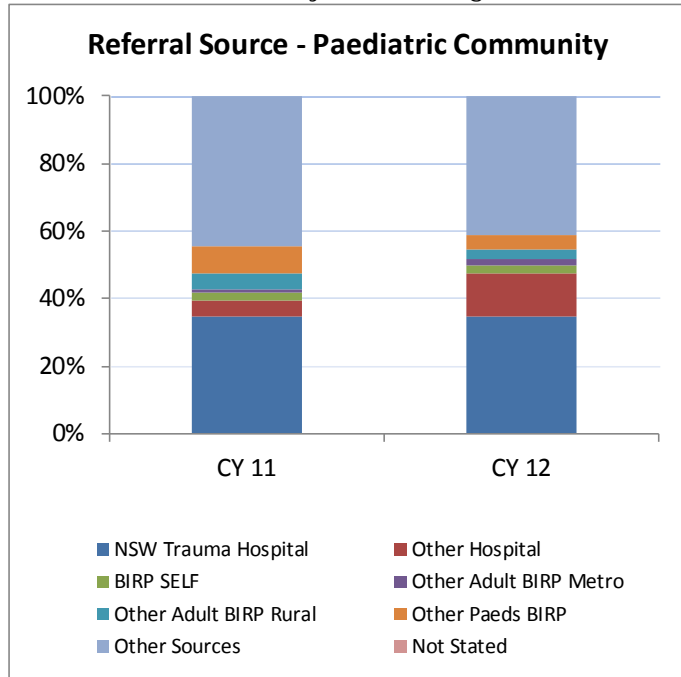
For 2011 and 2012, the chart shows that more than 90% of referrals to paediatric inpatient services came from NSW trauma hospitals.

In 2011, the BIRP admitted to the paediatric inpatient service a total of 226 children from NSW trauma hospitals.

In 2012, the number of NSW trauma hospital referrals increased both in percentage and count (276 referrals, 94.8%).

Chart 3.4.E shows different sources of referrals to paediatric community services. In contrast with paediatric inpatient, a larger proportion of referrals derive from sources other than the trauma hospitals.

Chart 3.4.E – Referrals by First Setting of Care: Paediatric Community



Paediatric Community Referral Source	CY 11	CY 12
NSW Trauma Hospital	34.8% (39)	34.8% (49)
Other Hospital	4.5% (5)	12.8% (18)
BIRP SELF	2.7% (3)	2.1% (3)
Other Adult BIRP Metro	.9% (1)	2.1% (3)
Other Adult BIRP Rural	4.5% (5)	2.8% (4)
Other Paeds BIRP	8.0% (9)	4.3% (6)
Other Sources	44.6% (50)	41.1% (58)
Not Stated	.0% (0)	.0% (0)
Total	100.0% (112)	100.0% (141)

A small number of young people were referred from adult BIRP services (6 in 2011 and 7 in 2012). It is a pathway to rehabilitation that some young people are admitted to adult services and then later transferred to paediatric services to better meet the needs of the younger person.

The client intake to the paediatric inpatient service outnumbers the client intake to the paediatric community service.

The 2011 paediatric intake consists of 250 children admitted to the paediatric inpatient service and an additional 112 children admitted to the paediatric community service (as the first episode of care for the year).

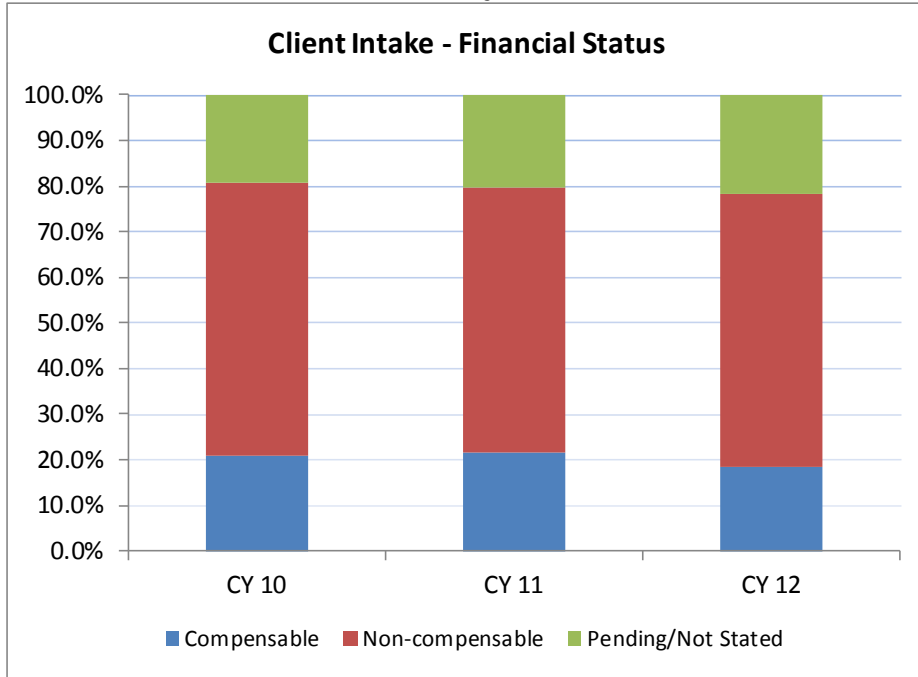
Similarly, the 2012 paediatric intake includes 291 children to the paediatric inpatient service and an additional 124 children to the paediatric community service.

Section 4 - Financial Status

This section describes the breakdown of client intake by financial status. Financial status refers to access to injury compensation (compensable) so financial status here concerns the outcome of claims, rather than claim type itself. In the data collection system, claim type is not directly related to financial status.

In some charts the missing and unknown category appears high however, this includes those whose claim status is still being determined (pending).

Chart 4.1.A - Individual Client Intake by Financial Status



Financial Status	CY 10	CY 11	CY 12
Compensable	20.9% (218)	21.6% (228)	18.3% (203)
Non-compensable	59.7% (622)	58.0% (613)	60.0% (665)
Pending/Not Stated	19.4% (202)	20.4% (216)	21.7% (241)
Total	100% (1042)	100% (1057)	100% (1109)

Charts 4.1.A shows that the proportion of “compensable” financial status for the yearly client intake is fairly consistent (around 20%) over the years.

The analysis did not include 2012 activity data for one unit that provides adult inpatient service, which may explain the small decrease in the proportion of compensable status in 2012.

Chart 4.1.B – Individual Client Intake by Injury Severity and Financial Status (I)

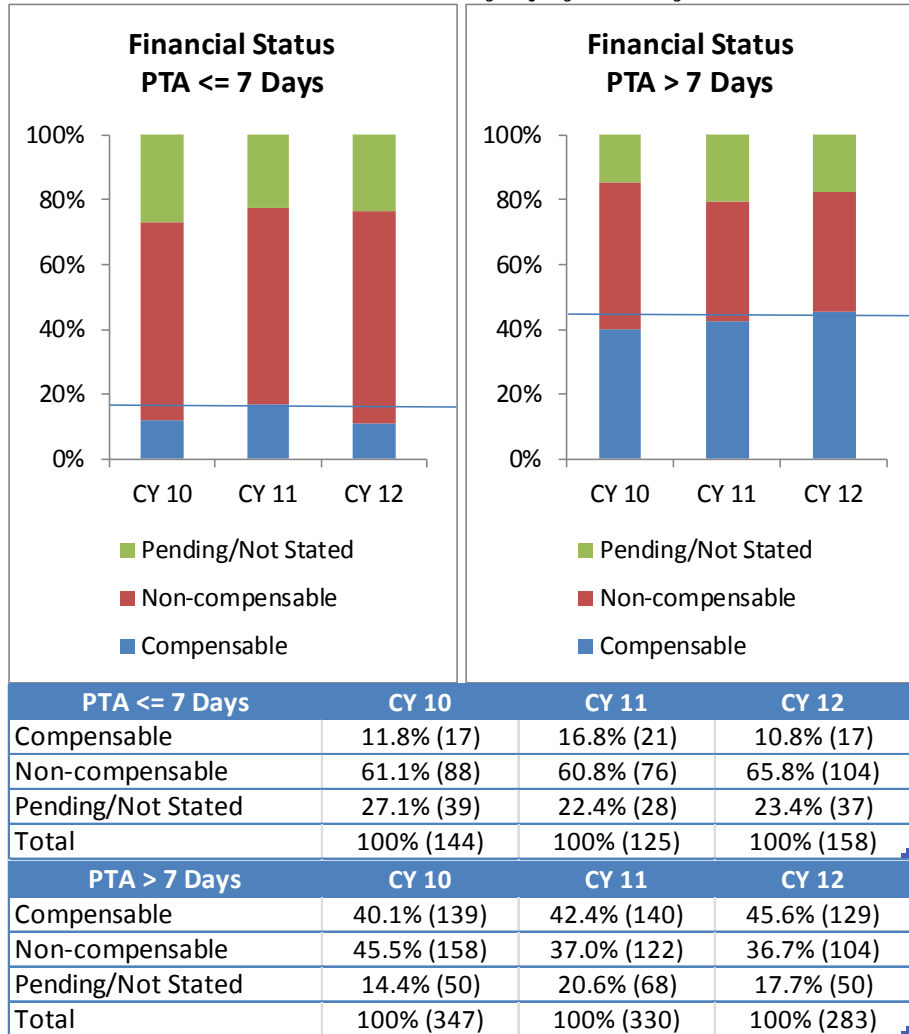


Chart 4.1.B presents a comparison of financial status between two groups of clients with traumatic brain injury (TBI), severely injured (PTA >7 Days) and less severely injured (PTA <=7 Days). The analysis therefore does not include children younger than 8 years old at the time of injury.

Other TBI clients not represented here include TBI clients who did not experience PTA and other TBI clients with missing PTA data.

Nevertheless, for the available PTA data, Chart 4.1.B clearly supports the general tendency that the more severe injuries have a higher percentage of compensation.

Chart 4.2.A – Individual Client Intake by Injury Cause and Financial Status

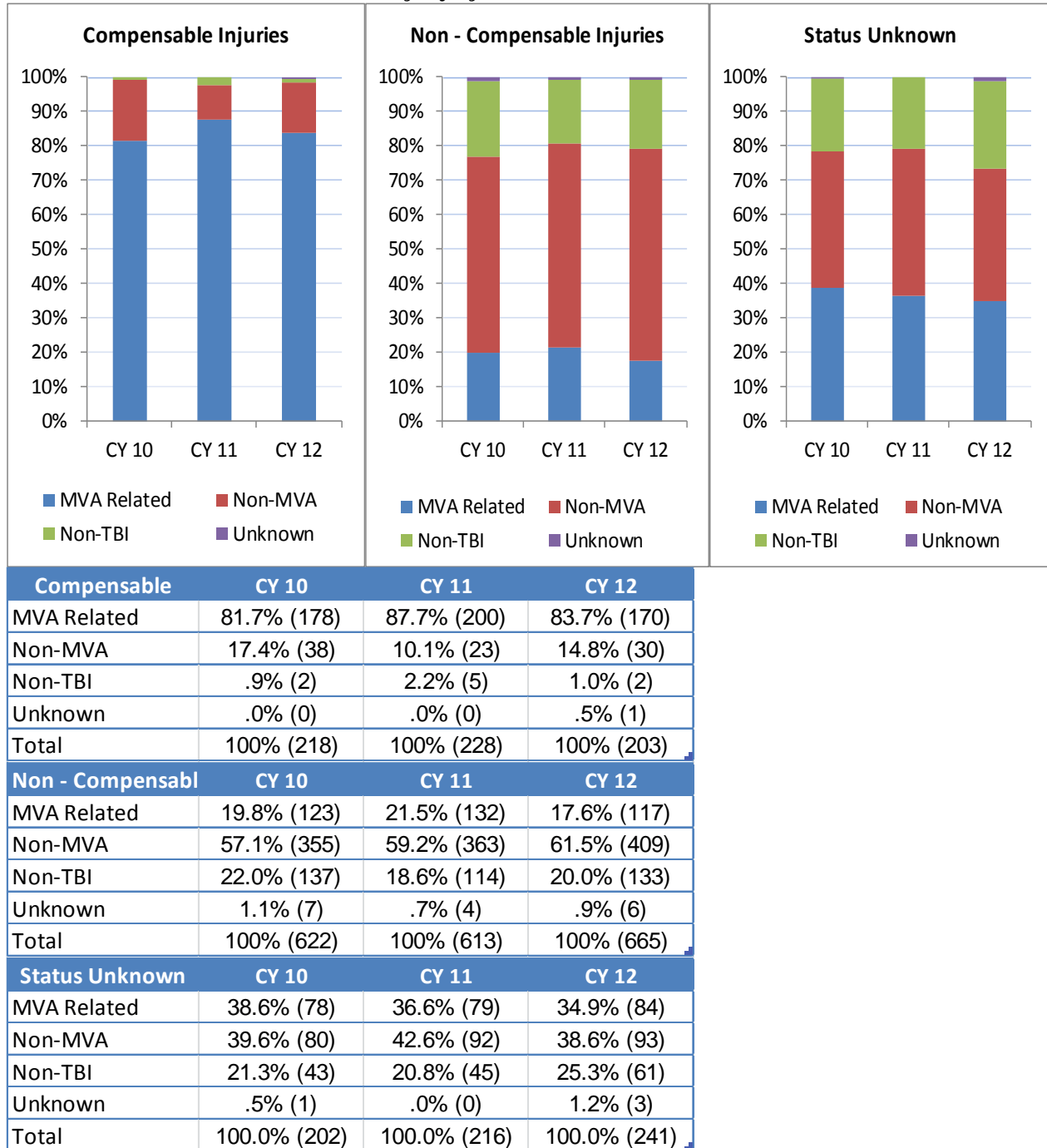


Chart 4.2.A presents the breakdown of injury cause for each of the three categories of financial status – compensable, non-compensable and unspecified status.

For the 2011 client intake, 88% of compensable clients sustained a traumatic brain injury (TBI) related to a MVA and 78% of non-compensable clients sustained a TBI from other causes or did not have TBI.

FINANCIAL STATUS

A similar pattern emerged in the 2012 client intake. Motor vehicle related injuries comprise 84% of compensable injuries and TBI from other causes or non-traumatic injuries account for 82% of non-compensable injuries.

This yearly trend is reasonably consistent with the 2010 client intake.

Chart 4.2.B - Individual Client Intake by Injury Severity and Financial Status (II)

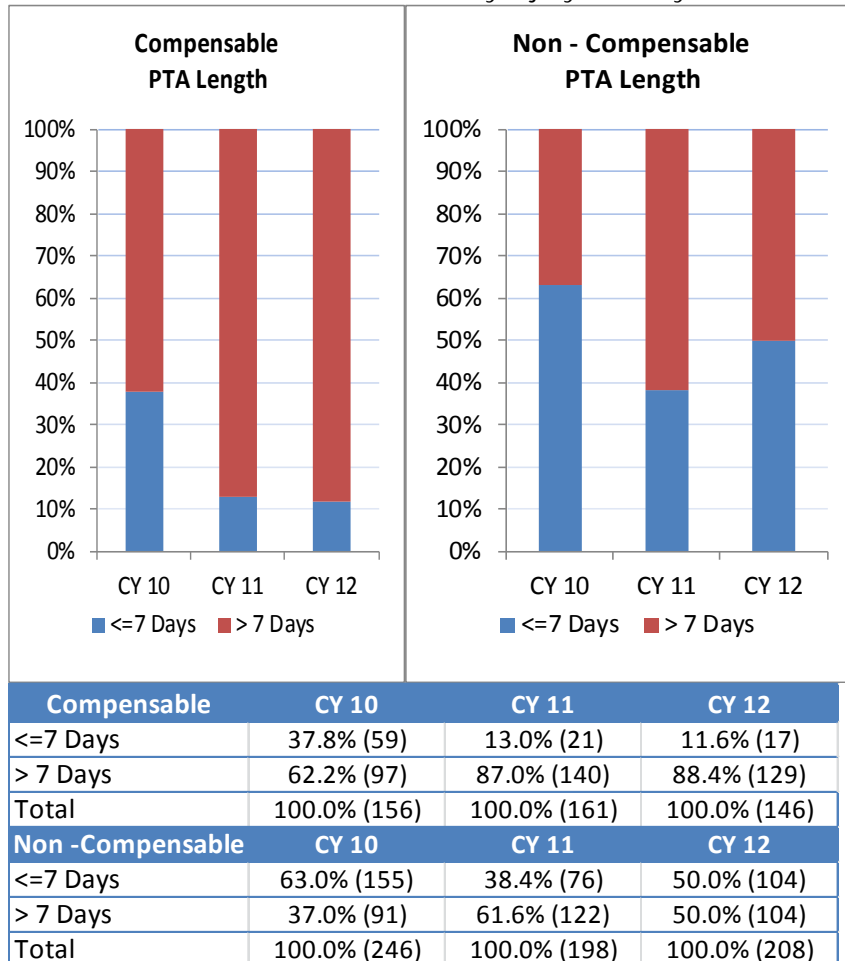


Chart 4.2.B presents an additional analysis of financial status in this section that utilises post traumatic amnesia (PTA) duration data. As pointed out in Chart 4.1.B above, this chart therefore does not represent all TBI clients. In addition, there is a group of 68 (16%) and 50 (12%) clients for 2011 and 2012 respectively whose financial status was pending or missing. Therefore we can only draw conclusions on the available data only.

In the 2011 client intake, injuries of PTA duration longer than 7 days comprise 87% of compensable traumatic injuries whereas milder injuries account for 13%. A similar trend continues in the 2012 client intake – 88% and 12% respectively.

On the other hand, Chart 4.2.B also shows that at least 122 clients of the 2011 intake and 104 clients of the 2012 intake had PTA longer than 7 days and were not compensable.

Chart 4.2.C –Financial Status by Injury Severity for MVA- Related Injuries

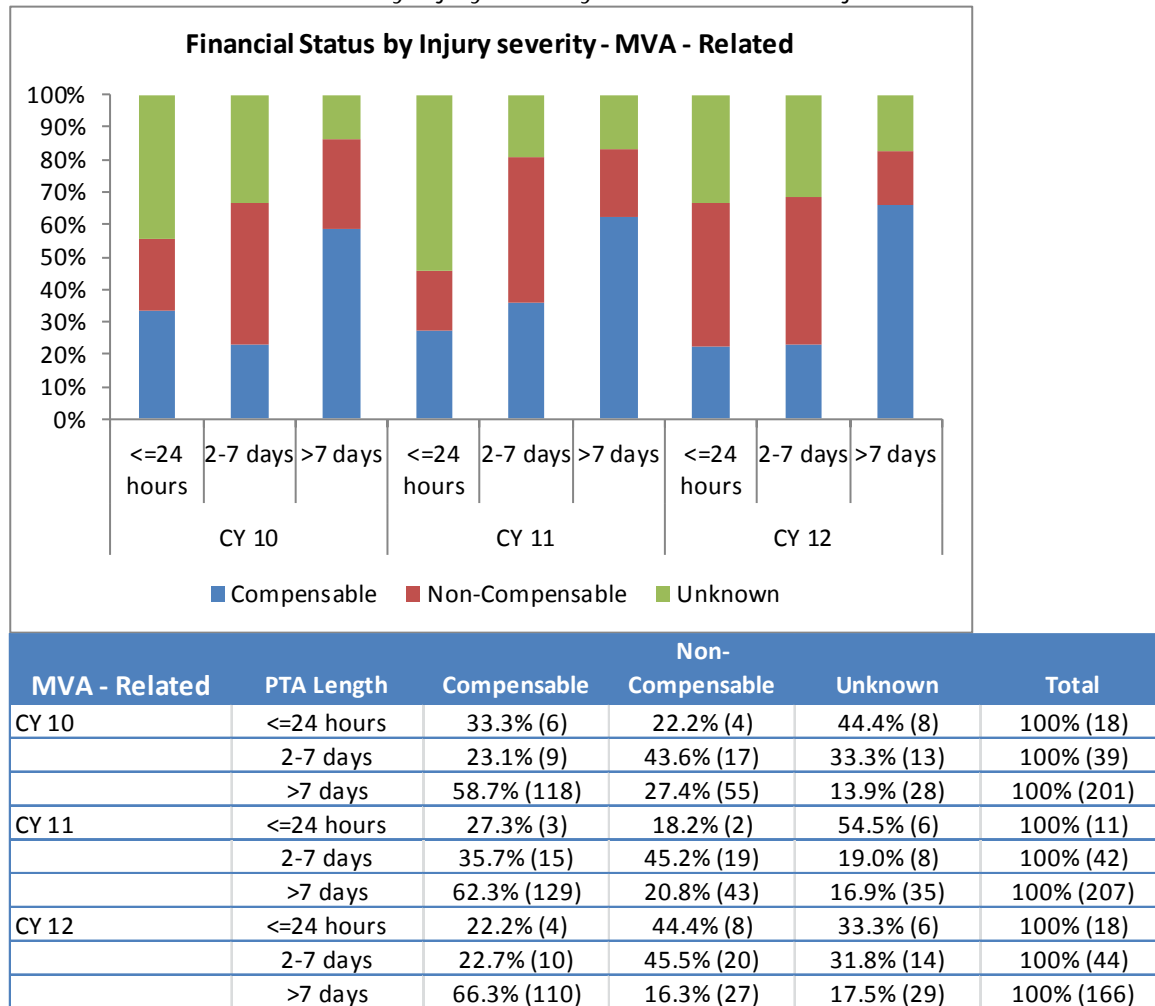
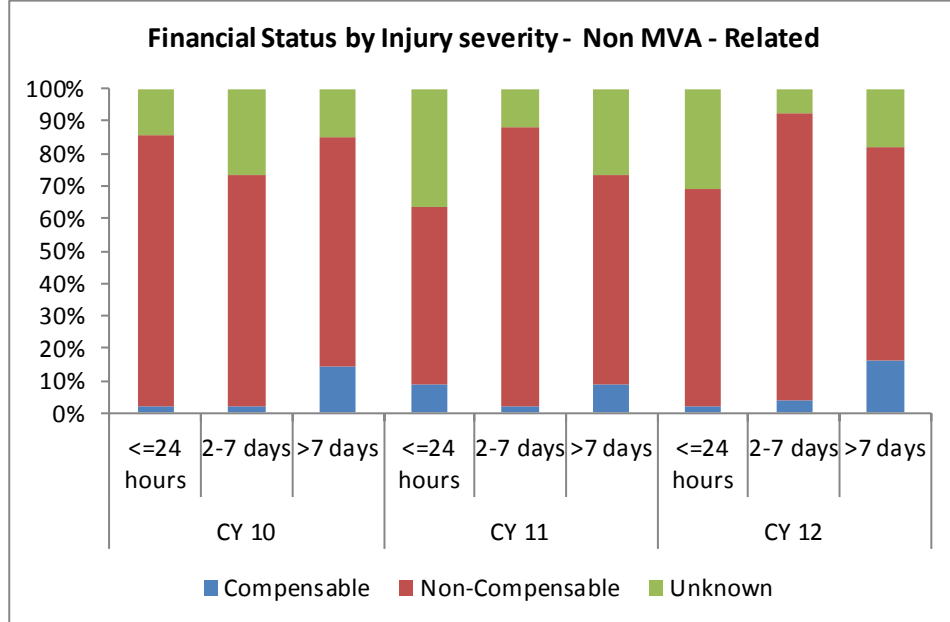


Chart 4.2.C shows breakdown of financial status for three levels of severity by duration of post-traumatic amnesia (PTA) for motor vehicle related injuries.

A relatively consistent pattern is observed here for motor vehicle related injuries with PTA duration longer than 7 days. In the 2011 and 2012 intakes, 62.3% and 66.3% respectively of motor vehicle related injuries of this level of severity were compensable with only 20.8% and 16.3% respectively not compensable.

Chart 4.2.D –Financial Status by Injury Severity for Non- MVA- Related Injuries



Non-MVA Related	PTA Length	Compensable	Non-Compensable	Unknown	Total
CY 10	<=24 hours	2.4% (1)	83.3% (35)	14.3% (6)	100% (42)
	2-7 days	2.2% (1)	71.1% (32)	26.7% (12)	100% (45)
	>7 days	14.4% (21)	70.5% (103)	15.1% (22)	100% (146)
CY 11	<=24 hours	9.1% (2)	54.5% (12)	36.4% (8)	100% (22)
	2-7 days	2.0% (1)	86.0% (43)	12.0% (6)	100% (50)
	>7 days	8.9% (11)	64.2% (79)	26.8% (33)	100% (123)
CY 12	<=24 hours	2.4% (1)	66.7% (28)	31.0% (13)	100% (42)
	2-7 days	3.7% (2)	88.9% (48)	7.4% (4)	100% (54)
	>7 days	16.2% (19)	65.8% (77)	17.9% (21)	100% (117)

Chart 4.2.D shows the distribution of financial status for TBI from causes other than motor vehicles related injuries for three different levels of severity in duration of post-traumatic amnesia (PTA) – ‘PTA of 24 hours or shorter’, ‘PTA between 2 and 7 days’, and ‘PTA longer than 7 days’.

In contrast to motor vehicle related injuries, a relatively small proportion of severe injuries (PTA >7 days) was compensable – 8.9% and 16.2% in the 2011 and 2012 intakes, respectively.

In summary, over the last three years consistently, the majority of motor vehicle related severe injuries (PTA >7 days) were compensable whereas a large proportion of severe injuries with TBI from causes other than motor vehicle accidents were not compensable.

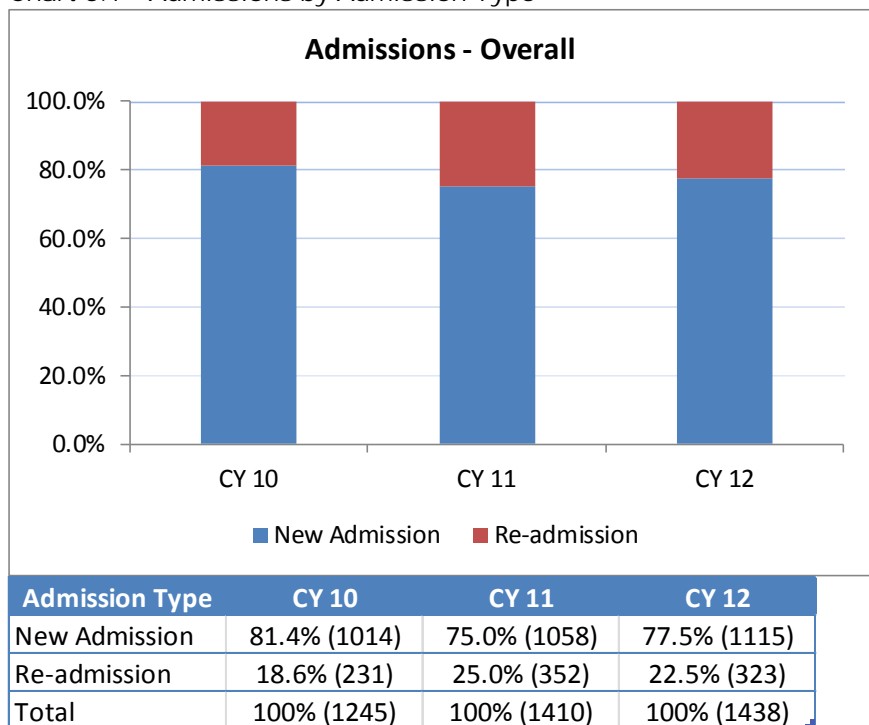
Section 5 - Admissions

This section describes admissions to individual settings of care within the NSW Brain Injury Rehabilitation Program (BIRP).

Unlike the client intake data summary presented in sections 1 to 4, for this section, some clients were counted more than once - as many times as the total number of admissions to individual settings of care (i.e. Adult Inpatient, TLU, Adult Community, Paediatric Inpatient and Paediatric Community).

This section includes admission data presented in the 2010 report but the paediatric data is not comparable between 2010 and the subsequent 2 years. Unlike the 2011 and 2012 data, the 2010 paediatric data was aggregated for a combined single setting of care and excluded some paediatric inpatient data from one paediatric BIRP due to changes in data definitions.

Chart 5.1 – Admissions by Admission Type



Overall, the total number of admissions seems to be relatively stable over the years

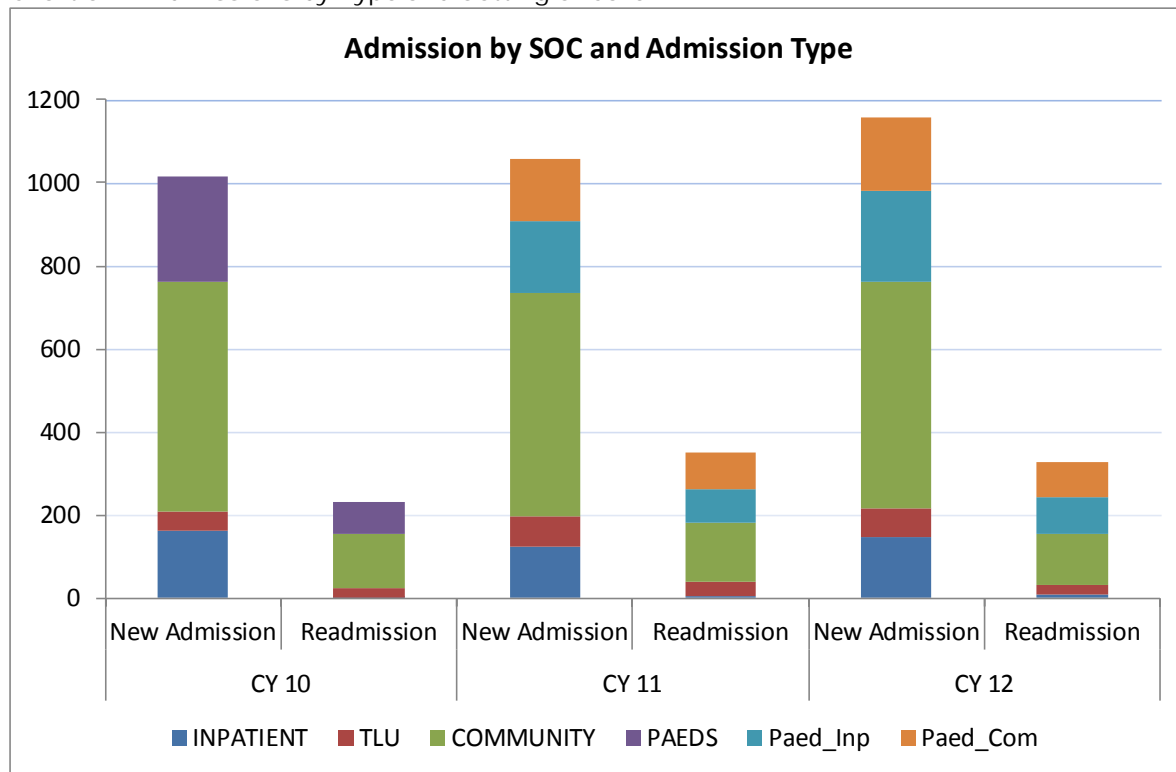
In 2011, a total of 1410 episodes of care commenced across the 14 BIRP units in the five settings of care.

In 2012, 1451 episodes commenced over 13 BIRP units in 5 settings of care.

The percentage of new admissions seems relatively consistent, 75% in 2011 and 78% in 2012.

There is still some degree of inconsistency across the 14 BIRP units in definition of admission type (new admission versus readmission). However, a consistent definition has been used within the same unit and the aim is to achieve consistency across all units in the future.

Chart 5.2 – Admissions by Type and Setting of Care



SOC	CY 10		CY 11		CY 12	
	New Admission	Readmission	New Admission	Readmission	New Admission	Readmission
Adult Inpatient	161 (15.9%)	1 (.4%)	124 (11.7%)	5 (1.4%)	147 (12.7%)	8 (2.4%)
TLU	49 (4.8%)	21 (9.1%)	73 (6.9%)	35 (9.9%)	69 (6.0%)	24 (7.3%)
Adult Community	552 (54.4%)	132 (57.1%)	539 (50.9%)	141 (40.1%)	547 (47.2%)	121 (37.0%)
PAEDS	252 (24.9%)	77 (33.3%)				
Paediatric Inpatient			173 (16.4%)	80 (22.7%)	219 (18.9%)	89 (27.2%)
Paediatric Community			149 (14.1%)	91 (25.9%)	176 (15.2%)	85 (26.0%)
Total	1014 (100.0%)	231 (100.0%)	1058 (100.0%)	352 (100.0%)	1158 (100.0%)	327 (100.0%)

Chart 5.2 shows relative level of activity, both new and readmission in various treatment settings over 3 separate years.

As can be seen in the data summary, in the 2010 report, paediatric services were not separately identified for two settings (i.e., paediatric inpatient and paediatric community settings).

2011 figures in the data summary are based on complete data from all 14 BIRPs across all 5 care settings.

2012 figures in the data summary are based on complete data from 13 BIRP units and adult inpatient data only from the remaining BIRP.

The following charts present the time elapsed since injury to admission for each setting of care. Only new admissions are included.

Chart 5.3.A – Time Elapsed between Injury and EOC Start for Adult Inpatient (New Admissions only)

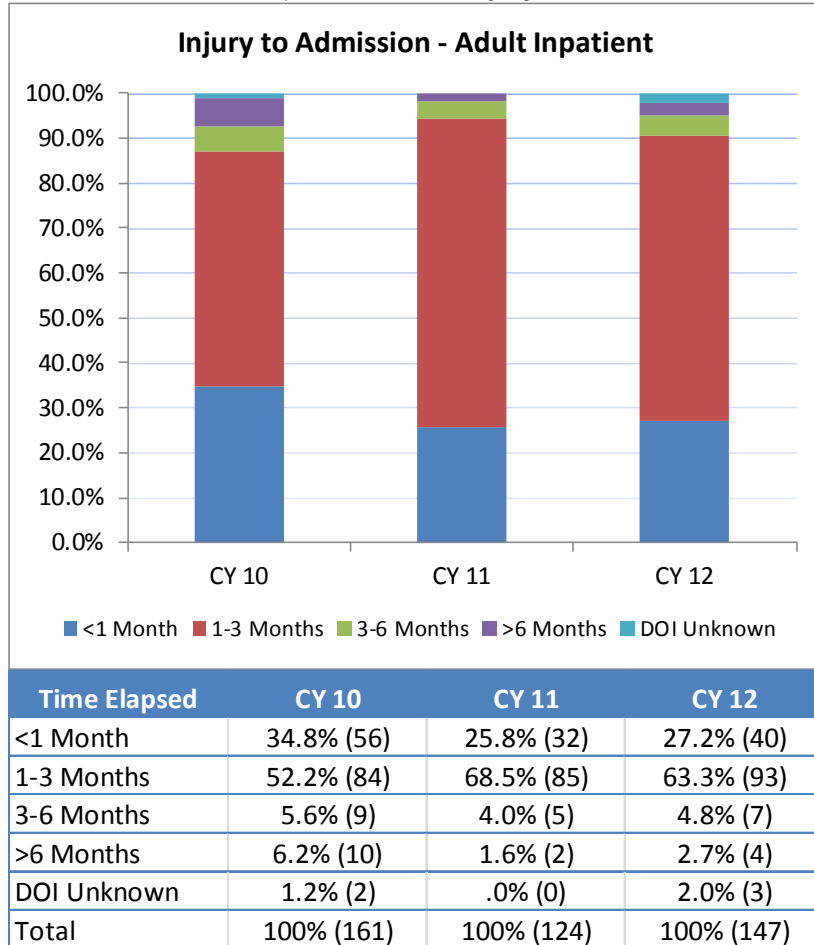
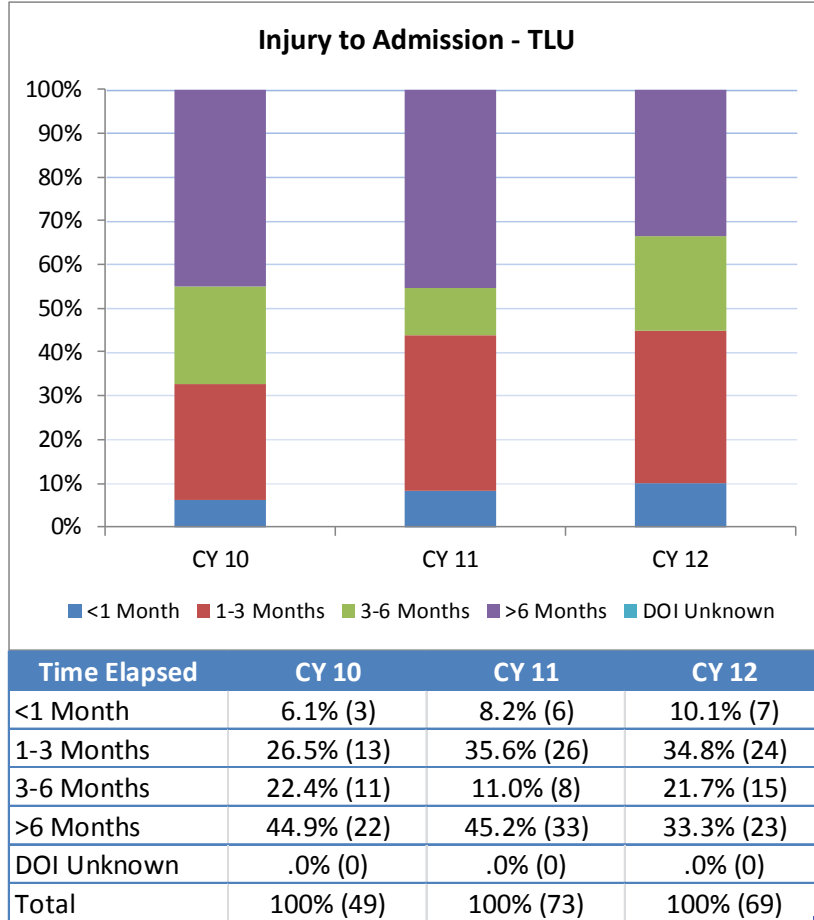


Chart 5.3.A shows that the time elapsed between injury and start of an episode of care in the BIRP adult inpatient setting.

Over the years, a high percentage of clients were admitted within a 3 month period – 87% in 2010, 94.3% in 2011 and 90.5% in 2012. This reflects the practice of early referrals to adult inpatient BIRPs.

Chart 5.3.B – Time Elapsed between Injury and EOC Start for TLU (New Admissions only)



Charts 5.3.B shows the time elapsed between injury and start of an episode of care in a Transitional Living Unit (TLU).

For many people entering TLU, injury to admission time represents a second stage of rehabilitation. They may have been transferred from an inpatient service or discharged to home first, following the most suitable pathway for BIRP services as close to home as possible.

Various factors influence the time from injury to admission, however a high proportion are within 3 months and another third or more are more than 6 months post injury.

Chart 5.3.C – Time Elapsed since Injury to EOC Start - Adult Community (New Admissions only)

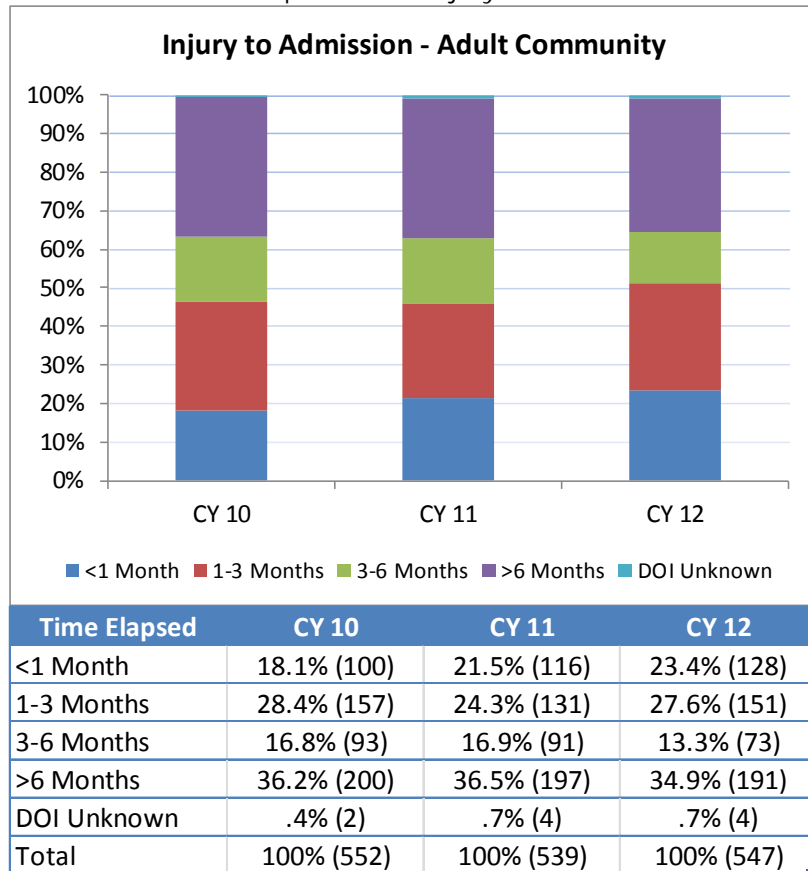
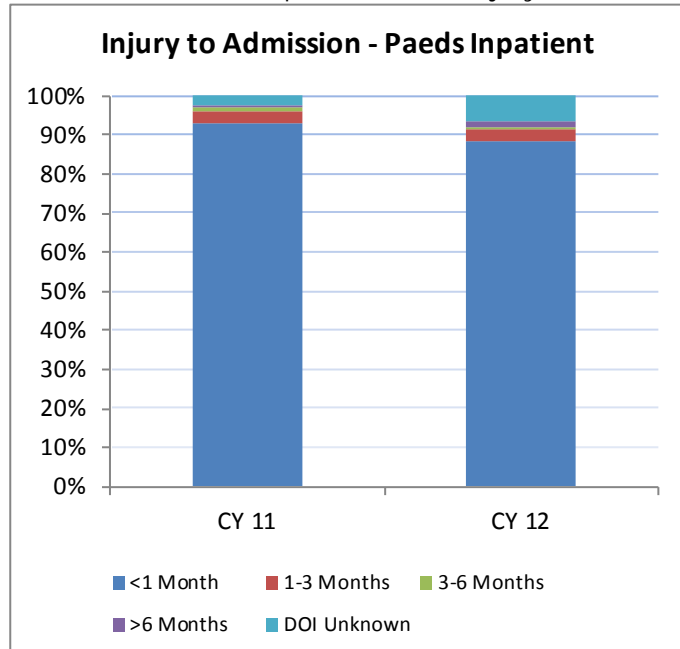


Chart 5.3.C shows the time elapsed between injury and start of an episode of care in the adult community setting.

Over the years a majority of adult community service clients were referred within 6 months from injury – 63% in 2010, 63% in 2011 and 64% in 2012.

ADMISSIONS

Chart 5.3.D – Time Elapsed between Injury and EOC Start for Paediatric Inpatient (New Admissions only)



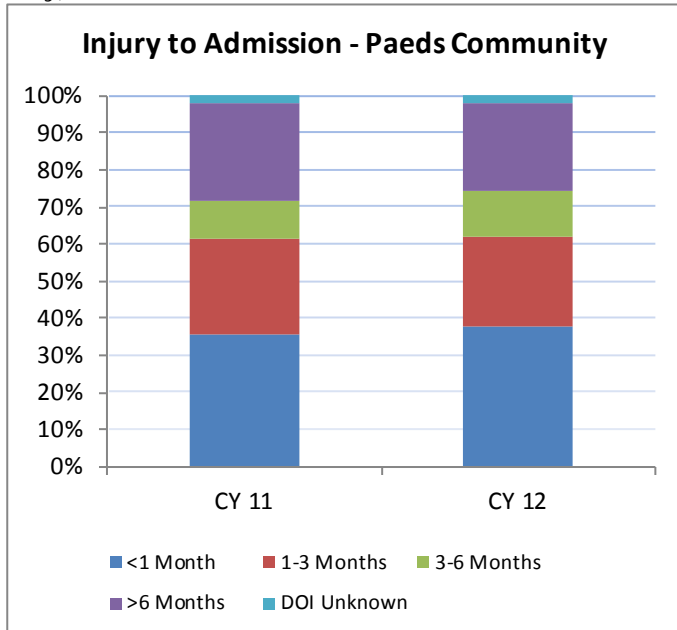
Time Elapsed	CY 11	CY 12
<1 Month	93.1% (161)	88.6% (194)
1-3 Months	2.9% (5)	2.7% (6)
3-6 Months	1.2% (2)	.9% (2)
>6 Months	.6% (1)	1.4% (3)
DOI Unknown	2.3% (4)	6.4% (14)
Total	100% (173)	100% (219)

Chart 5.3.D shows the time elapsed between injury and start of a paediatric inpatient episode of care. It does not present the 2010 data as it is incomparable to the other years for the reason stated at the beginning of this section.

A very high percentage of children were admitted within a month of injury in 2011 and 2012 – 93% and 89%, respectively.

ADMISSIONS

Chart 5.3.E - Time Elapsed between Injury and EOC Start for Paediatric Community (New Admissions only)



Time Elapsed	CY 11	CY 12
<1 Month	35.6% (53)	38.1% (67)
1-3 Months	26.2% (39)	23.9% (42)
3-6 Months	10.1% (15)	12.5% (22)
>6 Months	26.2% (39)	23.9% (42)
DOI Unknown	2.0% (3)	1.7% (3)
Total	100% (149)	100% (176)

Chart 5.3.E shows the time elapsed between injury and start of a paediatric community episode of care.

In 2011 and 2012, 62% of the paediatric community children were admitted to the service within 3 months of injury.

Section 6 Episode of Care - Length

This section presents distribution of Episode of care (EOC) length (duration) by setting of care – Adult Inpatient, Transitional Living (TLU), Adult Community, Paediatric Inpatient and Paediatric Community.

It is not unexpected to find more of shorter episodes of care, <3 months in the inpatient and TLU settings and more varied length of episodes of care in the Community.

This report does not include paediatric EOC length data reported in the previous 2010 BIRD Report. The 2010 paediatric EOC length data was aggregated for a combined single setting of care and therefore not comparable to the data aggregated for 2011 and 2012 reports for two separate paediatric settings of care (i.e. ‘Paediatric Inpatient’ and ‘Paediatric Community’).

Chart 6.1.A – EOC Length: Adult Inpatient

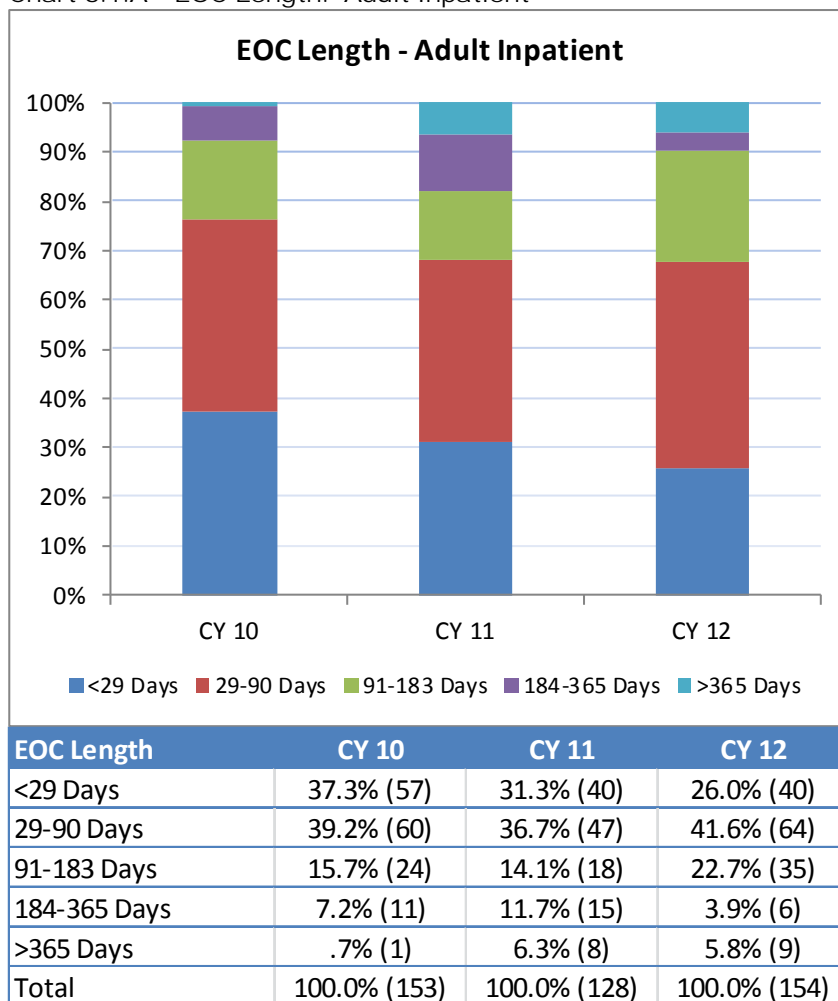


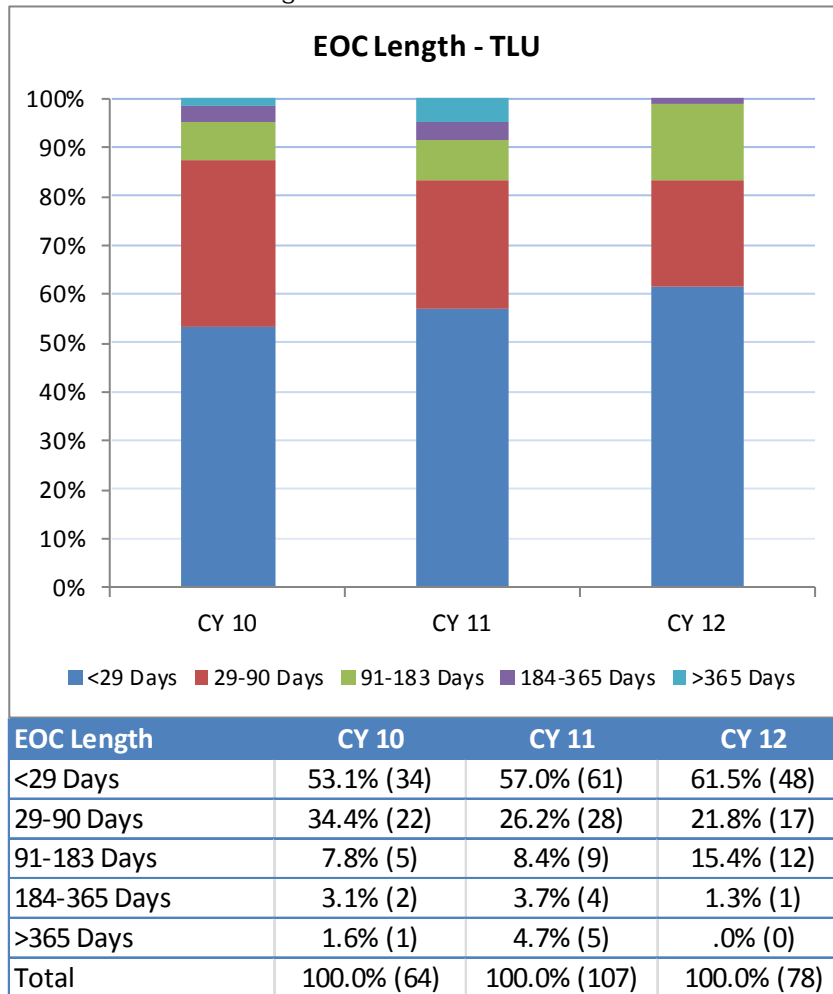
Chart 6.1.A shows that the majority of adult inpatients were discharged within 3 months of their admission but a very small number of people stayed longer than 12 months.

EOC LENGTH

More specifically, the data summary tells that about 40% of adult inpatients stayed for 1 to 3 months (39% in 2010, 37% in 2011 and 42% in 2012) and more than 25% discharged within a month (37% in 2010, 31% in 2011 and 26% in 2012).

In 2011 and 2012, there were a significant number of people staying longer than 365 days (8 and 9 people, respectively).

Chart 6.1.B - EOC Length: TLU



Similar to adult inpatients, Chart 6.1.B shows that the majority of TLU clients stay for less than 3 months.

It also shows that the proportion of TLU clients discharged within a month (53% in 2010, 57% in 2011 and 62% in 2012) is much higher than clients discharged after 1- 3 months (34% in 2010, 26% in 2011 and 22% in 2012).

EOC LENGTH

Chart 6.1.C - EOC Length: Adult Community

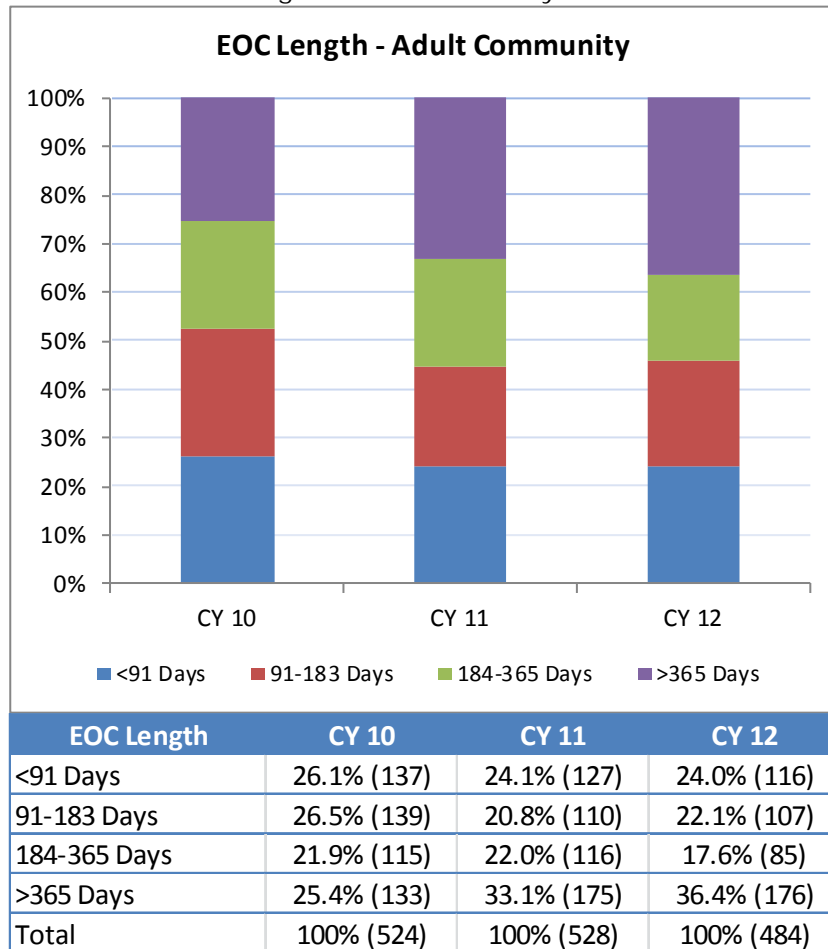
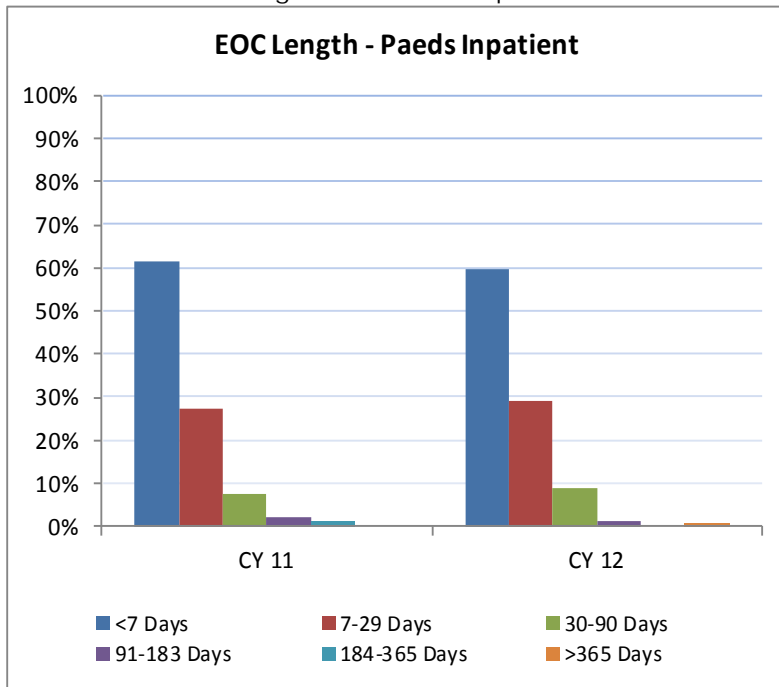


Chart 6.1.C shows varied lengths of episode of care in the adult community setting.

It also shows that a large proportion of people stay longer than 12 months – about 25% in 2010, 33% in 2011 and 36% in 2012.

EOC LENGTH

Chart 6.1.D - EOC Length: Paediatric inpatient



EOC Length	CY 11	CY 12
<7 Days	61.4% (153)	59.6% (174)
7-29 Days	27.3% (68)	29.1% (85)
30-90 Days	7.6% (19)	8.9% (26)
91-183 Days	2.4% (6)	1.4% (4)
184-365 Days	1.2% (3)	.0% (0)
>365 Days	.0% (0)	1.0% (3)
Total	100.0% (249)	100.0% (292)

Chart 6.1D shows that almost 90% of paediatric inpatients stayed in hospital less than 30 days and 60% remained in hospital for less than one week. This data accurately reflects the shorter length of stay for the paediatric population as they receive in reach services during acute care and are typically discharged to the care of parents.

EOC LENGTH

Chart 6.1.E - EOC Length: Paediatric community

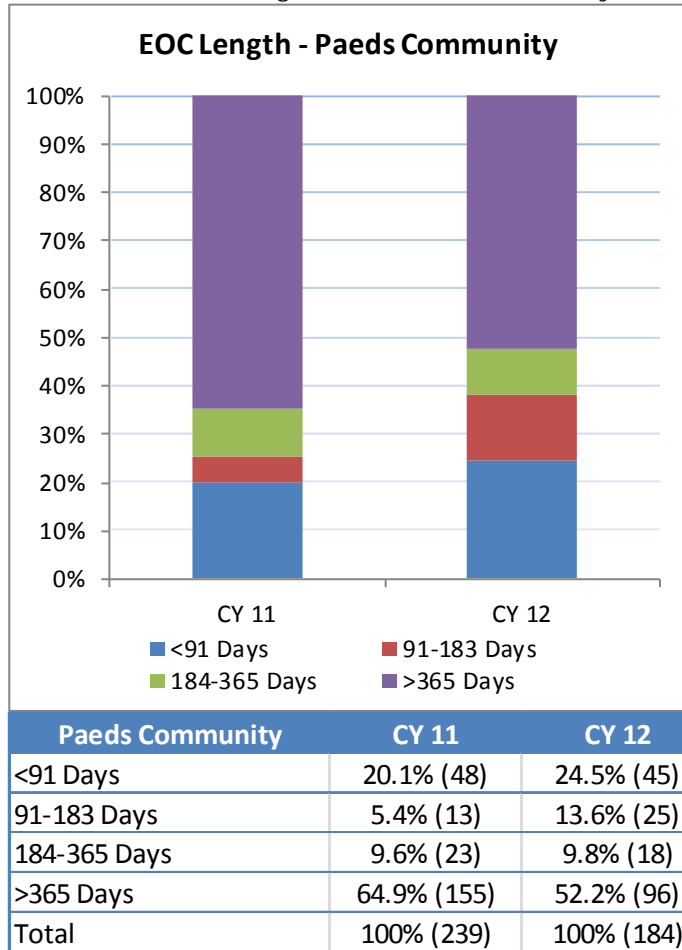


Chart 6.1.E shows the characteristically longer episode of care in the paediatric community service. Children with brain injuries are actively assessed at key developmental stages and monitored until they leave school to assist with the multiple educational transition periods experienced by a child or young person and their families.

In 2011, 155 (64.9%) children discharged from the paediatric community service had stayed in the service longer than 12 months.

In 2012, a smaller proportion of children stayed in the community service longer than 12 months (52.2%, 96 children).

Section 7 - Discharges

This section describes total discharges from individual settings of care within the BIRP individual units.

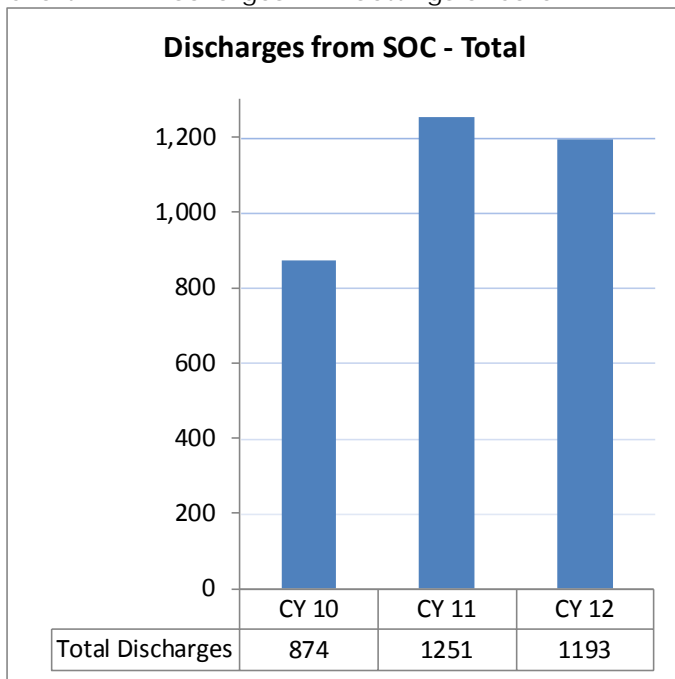
As is the case with admissions described in section 5, some clients were counted as many times as the total number of discharges from individual settings of care (i.e. Adult Inpatient, TLU, Adult Community, Paediatric Inpatient and Paediatric Community).

The numbers presented in section 6, Episode of Care Length for each care setting add up to the total discharges in Chart 7.1.

This section includes 2010 discharge data presented in the previous BIRD report but the paediatric discharge data is not comparable to the 2011 and 2012 data. Unlike the 2011 and 2012 data, the 2010 provided aggregated paediatric data as a combined single setting of care.

This limitation with the 2010 data may explain the lower number of total discharges for 2010 in Chart 7.1 and the lower percentage of paediatric discharges in Chart 7.2.

Chart 7.1 – Discharges – All Settings of Care



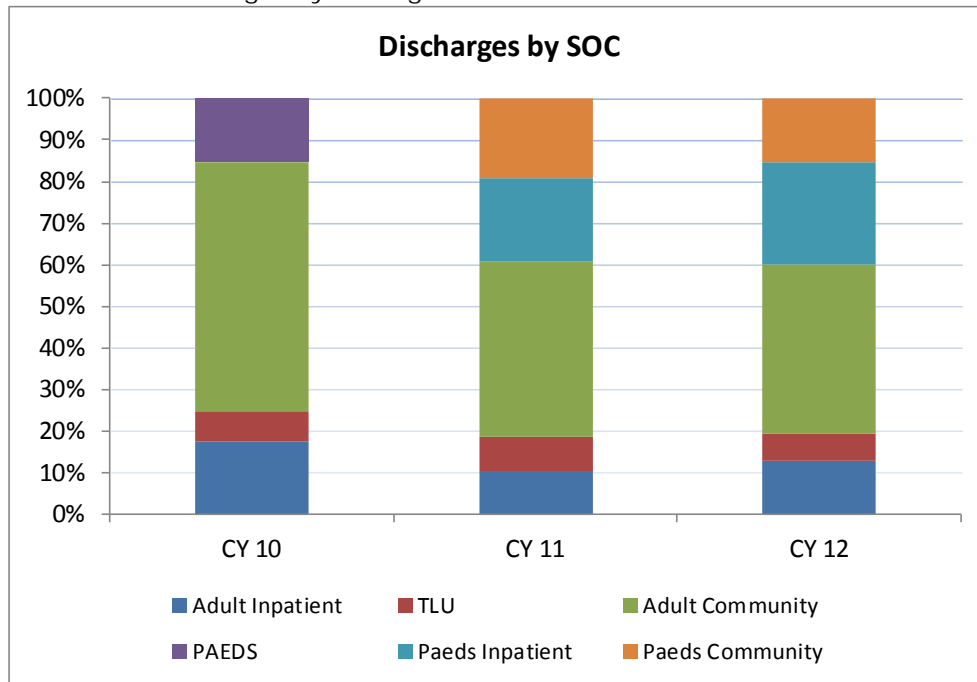
In 2011, 14 BIRP units ended a total of 1251 episodes of care across all settings of care.

The total number of discharges in 2012 (1193 episodes of care) does not include TLU and community discharges from one BIRP unit. It includes all discharges from 13 BIRP units but only 47 adult inpatient discharges from this one unit. With this factored in, total discharges appear consistent between 2011 and 2012.

DISCHARGES

Chart 7.2 presents the number of discharges from each setting of care and its percentage over the total number of discharges for all settings of care.

Chart 7.2 – Discharges by Setting of Care



Setting of Care	CY 10	CY 11	CY 12
Adult Inpatient	17.5% (153)	10.2% (128)	12.9% (154)
TLU	7.3% (64)	8.6% (107)	6.5% (78)
Adult Community	60.0% (524)	42.2% (528)	40.7% (485)
PAEDS	15.2% (133)		
Paeds Inpatient		19.9% (249)	24.5% (292)
Paeds Community		19.1% (239)	15.4% (184)
Total	100% (874)	100% (1251)	100% (1193)

Please note that for the adult inpatient discharges in 2011 and 2012, a rule was consistently applied across the three inpatient units that needed a gap of 14 days before the current episode of care ended and the next one started. If the gap out of the unit did not exceed 14 days, then it was considered to be recommencement of the same rehabilitation episode following suspension and not the end of that episode of care.

DISCHARGES

The following charts 7.3.A to 7.4.C compare type of accommodation at pre-admission and post-discharge for each of the three adult settings of care: Adult Inpatient, TLU and Adult Community.

This is a new item being reported for the first time and analysis is limited due to a high proportion of missing data. The aim is reduce the rate of missing data in future reports for accommodation type at admission and discharge across all settings of care. Improvements in missing data have already been achieved with about 30% missing in 2011 and under 20% missing in 2012).

Due to space restriction, 2011 and 2012 data are presented in separate charts.

Chart 7.3.A – Discharge Accommodation: Inpatient (2011)

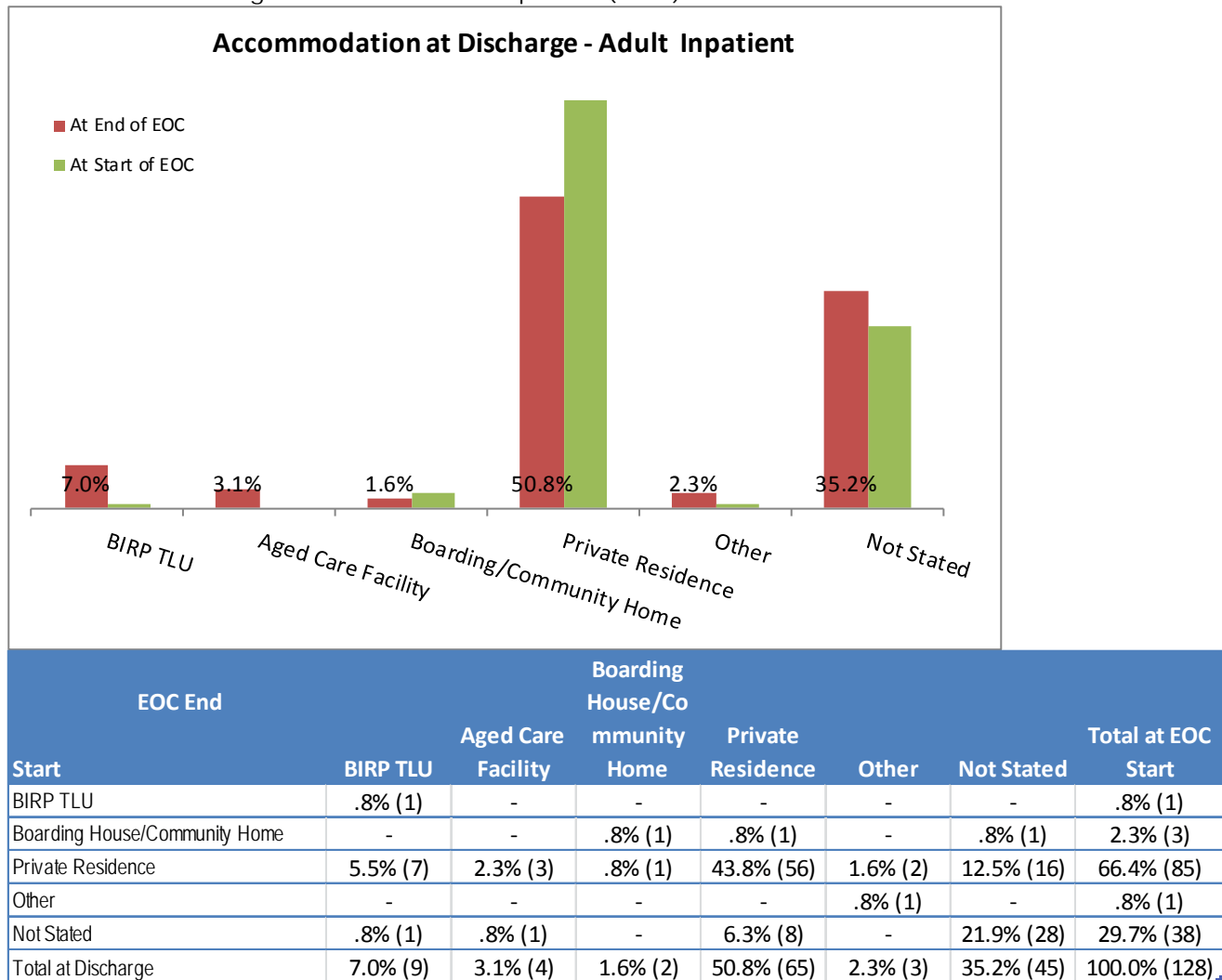


Chart 7.3.A shows various types of pre-admission and post-discharge accommodation of adult inpatients discharged in 2011. The green bars denote pre-admission accommodation type and red bars post-discharge accommodation type.

The data summary tells that 66.4% of adult inpatients discharged in 2011 were in a private residence prior to the accident and only 43.8% were able to return to a private residence. These numbers were based on 2011 adult inpatient discharge data with more than 30% of missing data (“Not Stated”) for accommodation type.

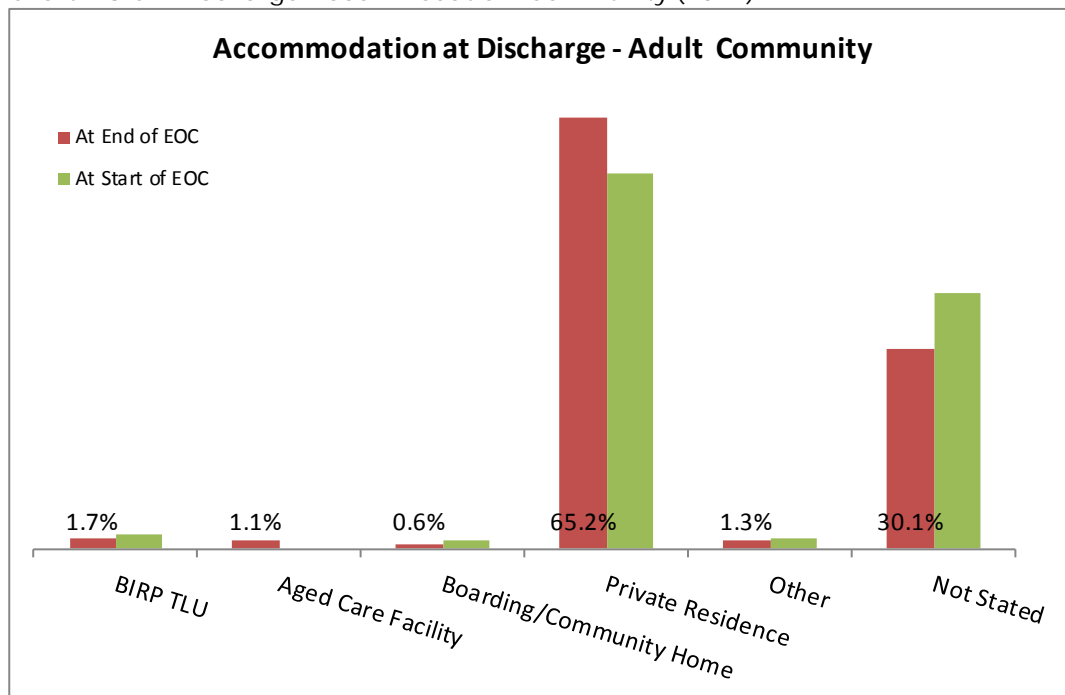
DISCHARGES

Chart 7.3.B – Discharge Accommodation: TLU (2011)

EOC End Start	Boarding House/Community Home					Private Residence	Other	Not Stated	Total at EOC Start
	BIRP TLU	Home	mmunity	Private	Residence				
BIRP TLU	-	.9% (1)	.9% (1)	.9% (1)	.9% (1)	-	-	1.9% (2)	
Boarding House/Community Home	-	.9% (1)	.9% (1)	.9% (1)	.9% (1)	-	-	1.9% (2)	
Private Residence	1.9% (2)	-	-	-	61.7% (66)	.9% (1)	4.7% (5)	69.2% (74)	
Not Stated	-	-	-	-	4.7% (5)	-	22.4% (24)	27.1% (29)	
Total at Discharge	1.9% (2)	1.9% (2)	1.9% (2)	1.9% (2)	68.2% (73)	.9% (1)	27.1% (29)	100.0% (107)	

Based on available data, Chart 7.3.B shows that unlike the inpatient setting of care, most of the TLU clients at discharge returned to the same type of accommodation.

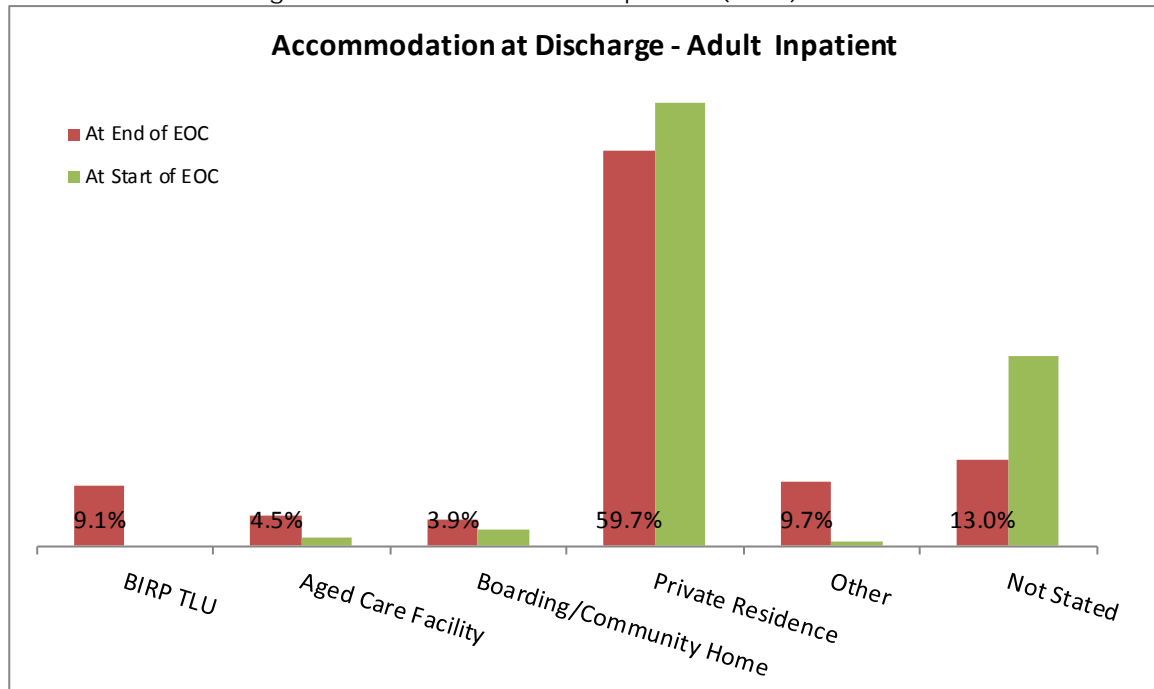
Chart 7.3.C – Discharge Accommodation: Community (2011)



EOC End Start	Boarding House/Community Home					Private Residence	Other	Not Stated	Total at EOC Start
	BIRP TLU	Aged Care Facility	mmunity Home	Private	Residence				
BIRP TLU	.4% (2)	-	-	-	1.7% (9)	-	-	2.1% (11)	
Boarding House/Community Home	-	-	.6% (3)	.4% (2)	.4% (2)	-	.2% (1)	1.1% (6)	
Private Residence	1.3% (7)	.8% (4)	-	-	46.0% (243)	.4% (2)	8.1% (43)	56.6% (299)	
Other	-	-	-	-	.6% (3)	.8% (4)	.2% (1)	1.5% (8)	
Not Stated	-	.4% (2)	-	-	16.5% (87)	.2% (1)	21.6% (114)	38.6% (204)	
Total at Discharge	1.7% (9)	1.1% (6)	.6% (3)	.6% (3)	65.2% (344)	1.3% (7)	30.1% (159)	100.0% (528)	

Based on available data, Chart 7.3.C shows some community clients who lived in a private residence moved to an Aged Care Facility at discharge. Conversely, some clients who lived in a boarding house/community home moved to a private residence at discharge. Overall the percentage of clients living in a private residence increased after the episode of care (57% to 62%).

Chart 7.4.A – Discharge Accommodation: Adult Inpatient (2012)



	EOC End						Total at EOC
Start	BIRP TLU	Aged Care Facility	Boarding House/Community Home	Private Residence	Other	Not Stated	Start
Boarding House/Community Home	.6% (1)	-	1.3% (2)	.6% (1)	-	-	2.6% (4)
Private Residence	7.8% (12)	4.5% (7)	.6% (1)	43.5% (67)	8.4% (13)	1.9% (3)	66.9% (103)
Aged Care Facility	-	-	1.3% (2)	-	-	-	1.3% (2)
Other	-	-	-	-	.6% (1)	-	.6% (1)
Not Stated	.6% (1)	-	.6% (1)	15.6% (24)	.6% (1)	11.0% (17)	28.6% (44)
Total at Discharge	9.1% (14)	4.5% (7)	3.9% (6)	59.7% (92)	9.7% (15)	13.0% (20)	100.0% (154)

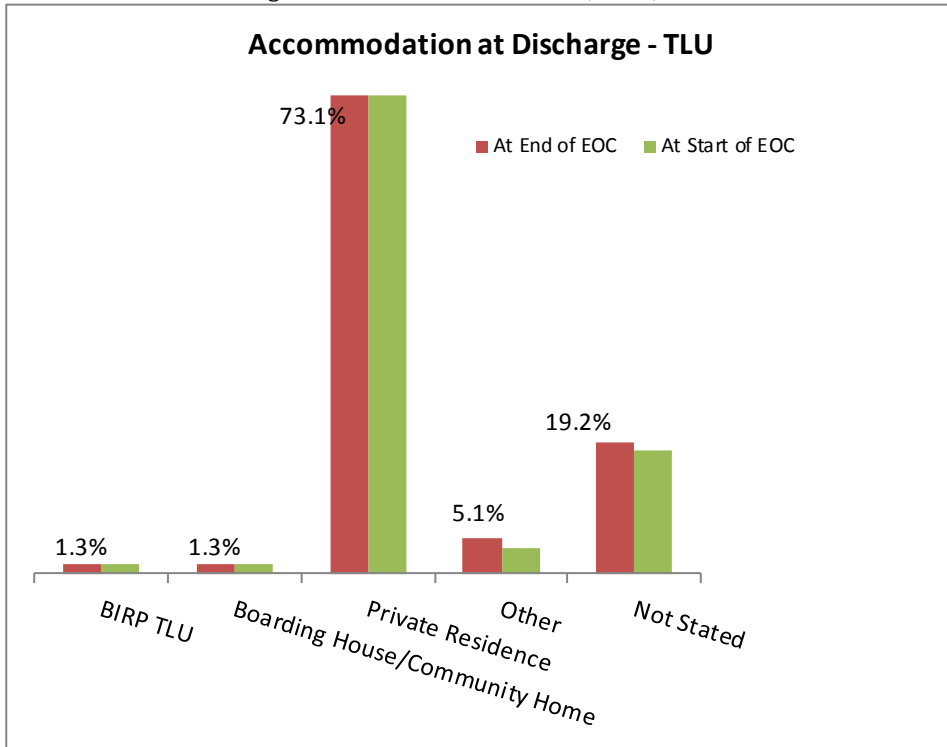
Similar to adult inpatients discharged in 2011, the data summary tells that 66.9% of adult inpatients discharged in 2012 were in a private residence prior to the accident and only 43.5% were able to return to a private residence.

With 29% of pre-admission and 13% of post-discharge accommodation data still unavailable for 2012 inpatient discharges, Chart 7.4.A shows that in 2012, at least 60% of inpatients were discharged into a private residence, 9% into a TLU, 5% into an Aged Care Facility, 3% into a boarding house/community group home and 10% into other types of accommodation.

To improve the accuracy of information we will seek to reduce the rate of missing data in the future reports.

DISCHARGES

Chart 7.4.B – Discharge Accommodation: TLU (2012)

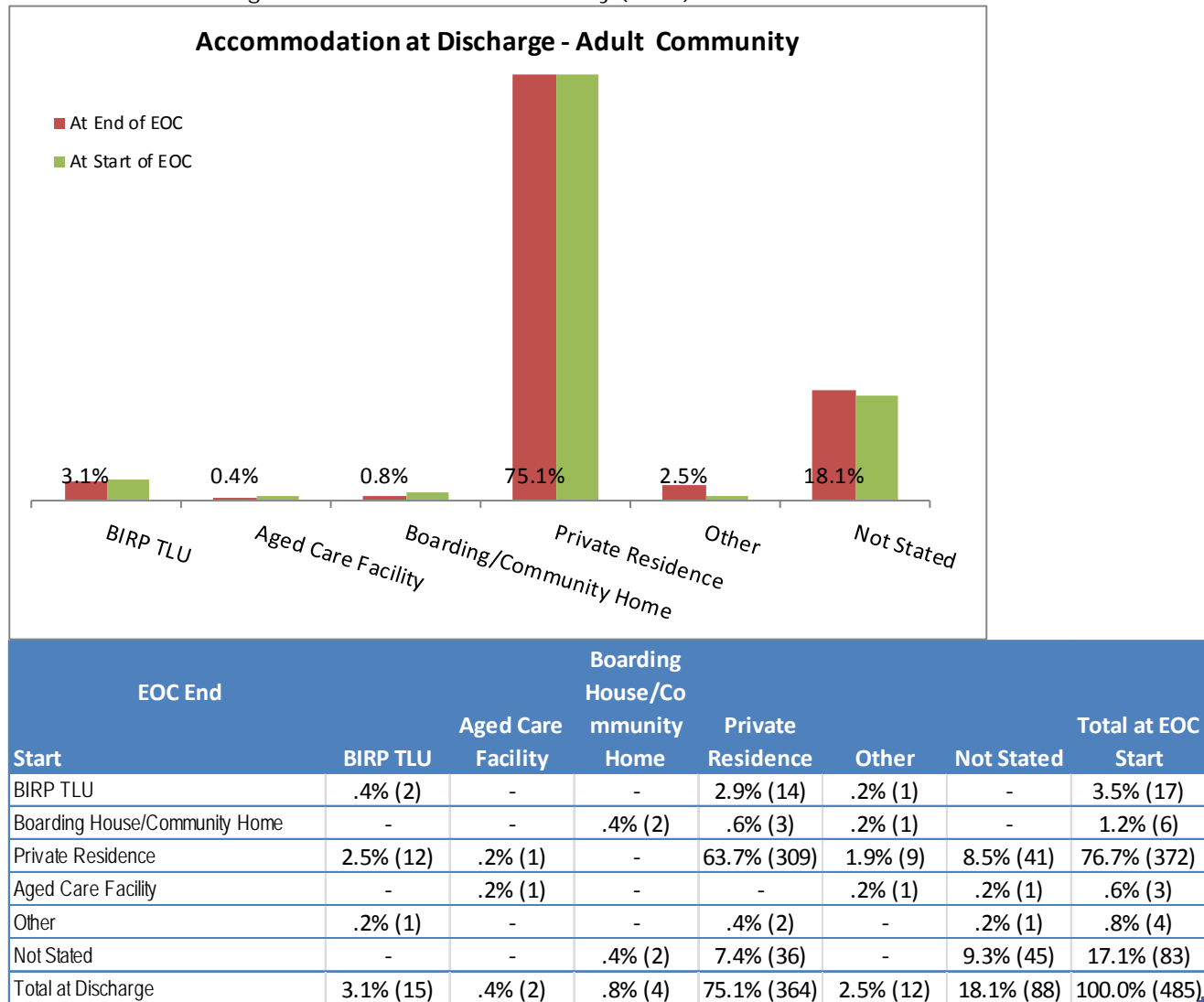


EOC End	BIRP TLU	Boarding House/Community Home	Private Residence	Other	Not Stated	Total at EOC
Start						Start
BIRP TLU	-	-	1.3% (1)	-	-	1.3% (1)
Boarding House/Community Home	-	1.3% (1)	-	-	-	1.3% (1)
Private Residence	1.3% (1)	-	69.2% (54)	3.8% (3)	1.3% (1)	75.6% (59)
Other	-	-	2.6% (2)	1.3% (1)	-	3.8% (3)
Not Stated	-	-	-	-	17.9% (14)	17.9% (14)
Total at Discharge	1.3% (1)	1.3% (1)	73.1% (57)	5.1% (4)	19.2% (15)	100.0% (78)

For TLU clients discharged in 2012, the trend seems consistent with 2011 except for the reduced portion of missing data (27% to 19% for both pre-admission and post-discharge data).

The trend was that unlike the inpatient setting of care, most of the TLU clients at discharge returned to the same type of pre injury accommodation.

Chart 7.4.C – Discharge Accommodation: Community (2012)



The proportion of available data increased for 2012 discharges for the community setting of care with 17% and 18% missing data for pre-admission and post-discharge, respectively.

As expected of community clients, there hardly shows any difference between pre-admission and post-discharge in the proportion of clients living in a private residence.

However, as shown in the data summary table, a small proportion of clients move from a private residence to other types of accommodation at discharge (76.7% clients living in a private residence at start of EOC and 63.7% clients staying in the same type of accommodation).

Section 8 – NSW BIRP Total Clients

For the first time the BIRD Report includes the total caseload of BIRP services by counting both the clients admitted and discharged in the same year and clients who were neither admitted nor discharged in the reporting year. For the purpose of these reports, the latter are called ‘continuing or registered clients’.

Continuing clients will have a range of injury dates, be involved in different settings of care and receive differing levels of rehabilitation program intensity. The combination of clients admitted or discharged in the calendar year with the continuing clients provides the total client numbers for all included BIRP services for that calendar year.

Chart 8 – Total Clients of BIRP Services

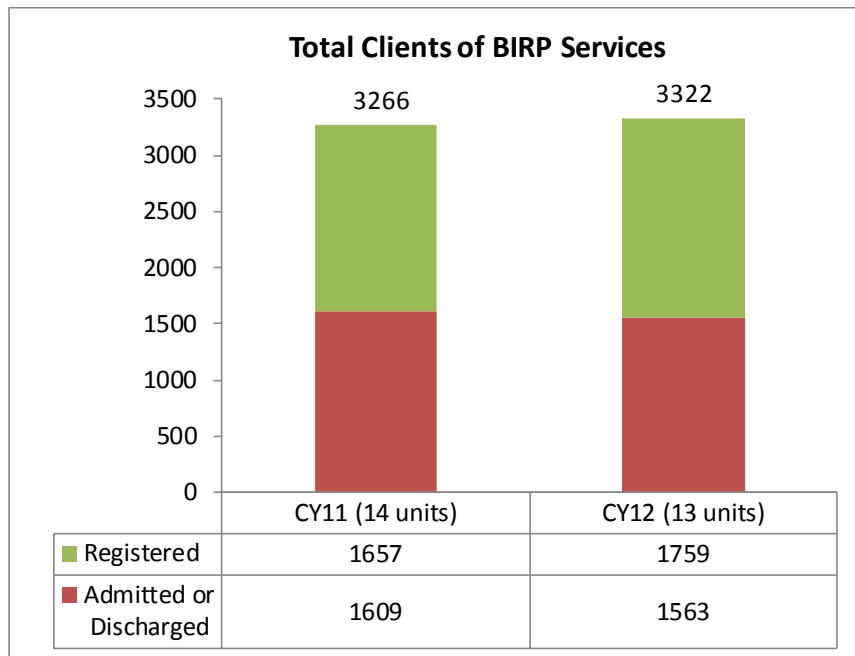


Chart 8 provides the number of total distinct clients either admitted or discharged in the calendar year and the number of ‘continuing clients’ in the respective calendar year.

In the 2011 calendar year, there were a total of 3,266 BIRP clients in the 14 BIRPs consisting of 1,609 distinct clients that were either admitted to or discharged from an episode of care and an additional 1657 continuing clients.

In the same way in 2012 there were a total of 3,322 clients in the 13 BIRPs. 1563 clients were either admitted or discharged, with an additional 1759 continuing clients for the year.

BIRD will seek to better understand ‘continuing’ clients by exploring available data and including this information in future reports.

Section 9 – Inpatient Outcomes

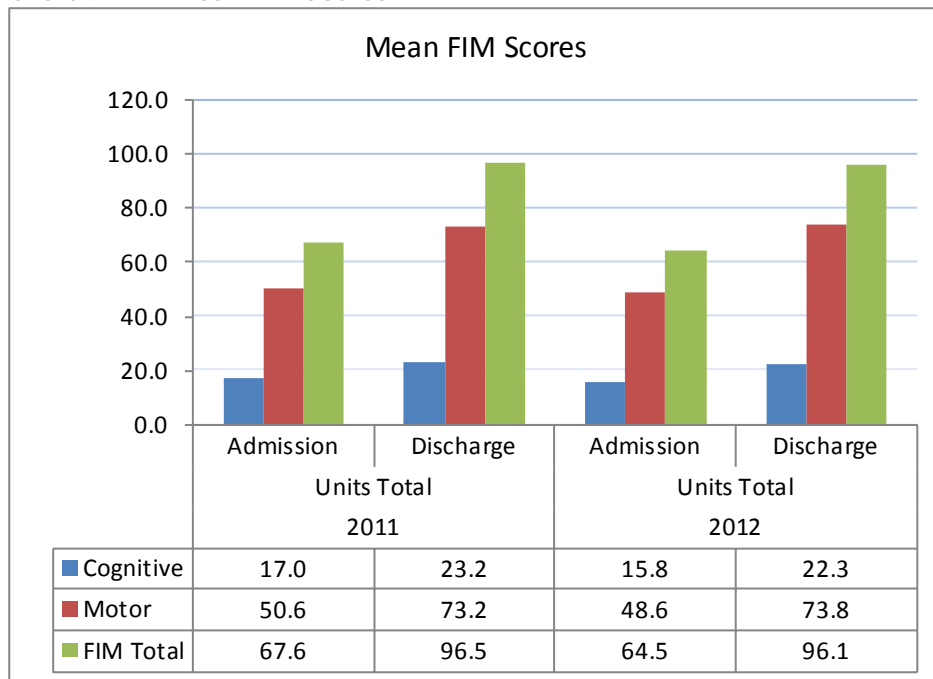
This section presents adult inpatient outcomes for 2011 and 2012 in terms of admission and discharge FIM scores from the three adult Inpatient BIRP units for 126 episodes of care that ended in 2011 and 153 episodes of care that ended in 2012.

Chart 9.1.A – Summary of FIM Scores

Scores	Stats	CY 11		CY 12	
		Admission	Discharge	Admission	Discharge
Cognitive	Mean	17.0	23.2	15.8	22.3
	Median	19	25	16	24
Motor	Mean	50.6	73.2	48.6	73.8
	Median	56.5	85.5	53	85
Total FIM	Mean	67.6	96.5	64.5	96.1
	Median	75.5	111	68	107

Chart 9.1.A shows average and median scores of cognitive, motor and the total FIM scores. Chart 9.1.B graphically shows the mean increase of cognitive and motor scores at discharge.

Chart 9.1.B – Mean FIM Scores



The score of cognitive skills improved on average by more than 5 points (29%) in 2011 and by 6.5 points (41%) in 2012. For motor skills, the score increased on average by more than 22 points (43%) in 2011 and by 25 points in (51%) 2012.

Overall, the pattern of Admission and Discharge FIMs across the 2 years is similar. Clients admitted to the BIRP Adult Inpatient setting of care improve in the motor and cognitive domains during their rehabilitation between admission and discharge.

INPATIENT OUTCOMES

The legend in the following charts represents the length of stay groups. Across different charts the symbols will change with the day groupings remaining the same.

Charts 9.2.A and 9.2.B show the spread of total FIM score change at discharge for length of stay groups.

Chart 9.2.A – Scatter Plot of Total FIM Scores (2011)

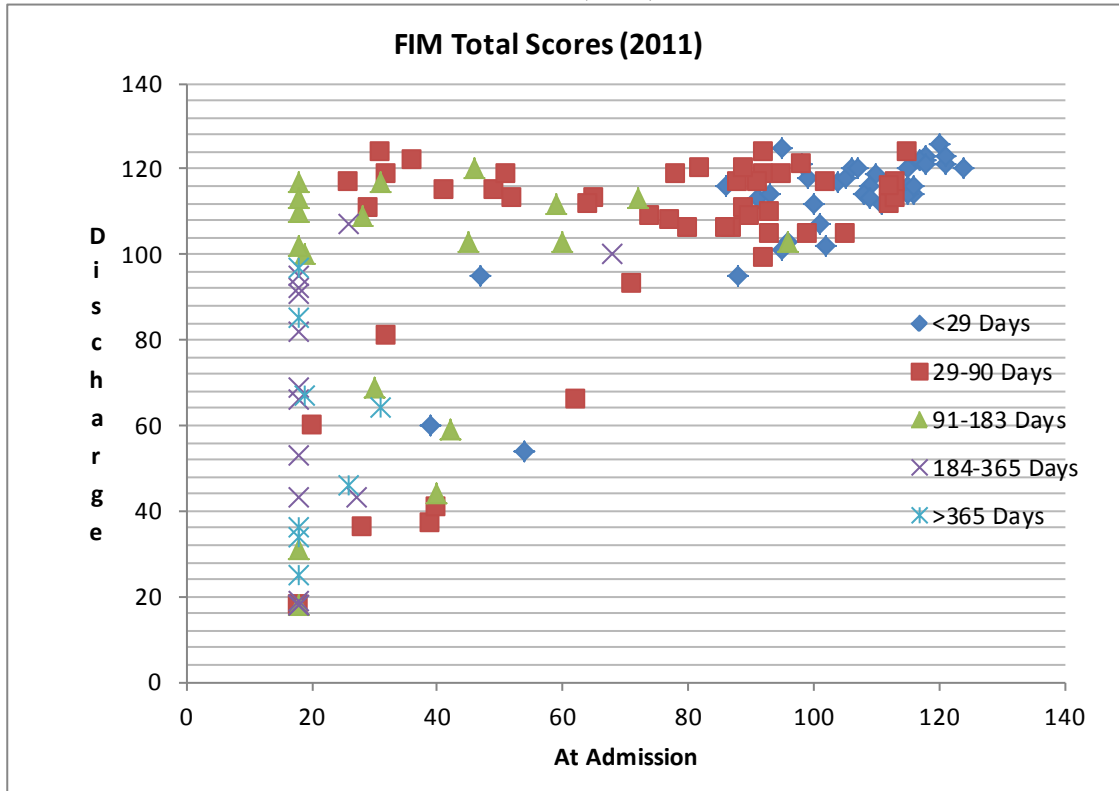
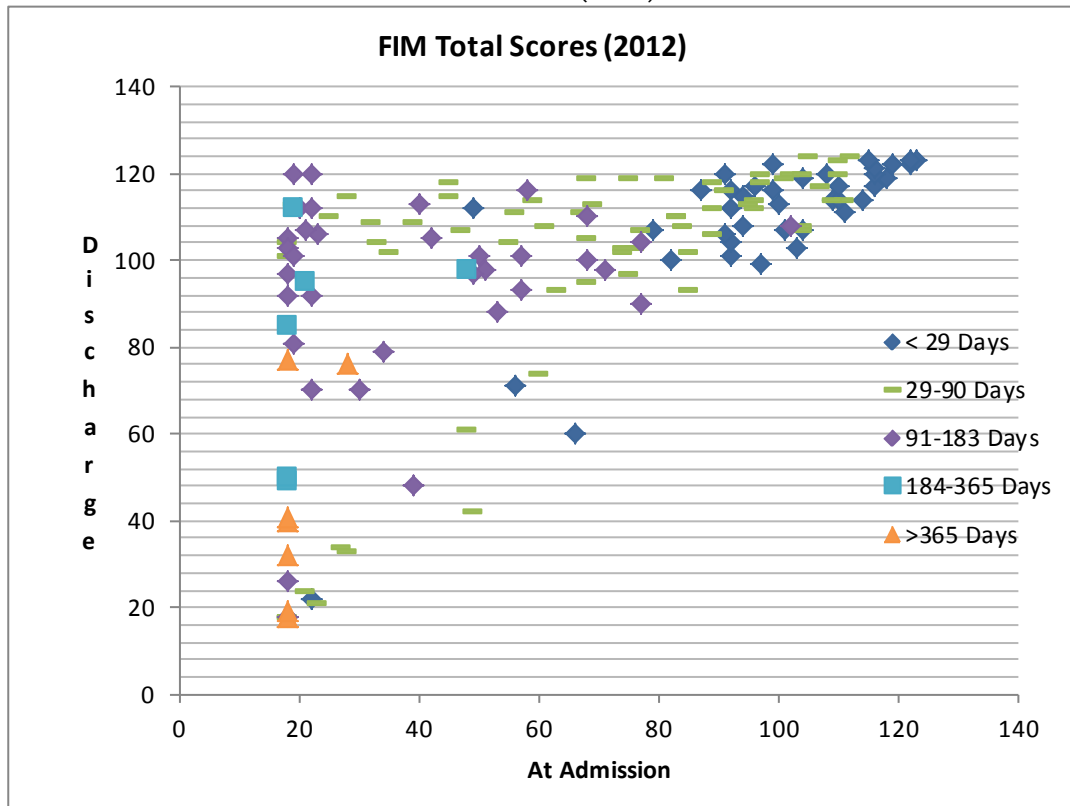


Chart 9.2.B – Scatter Plot of Total FIM Scores (2012)

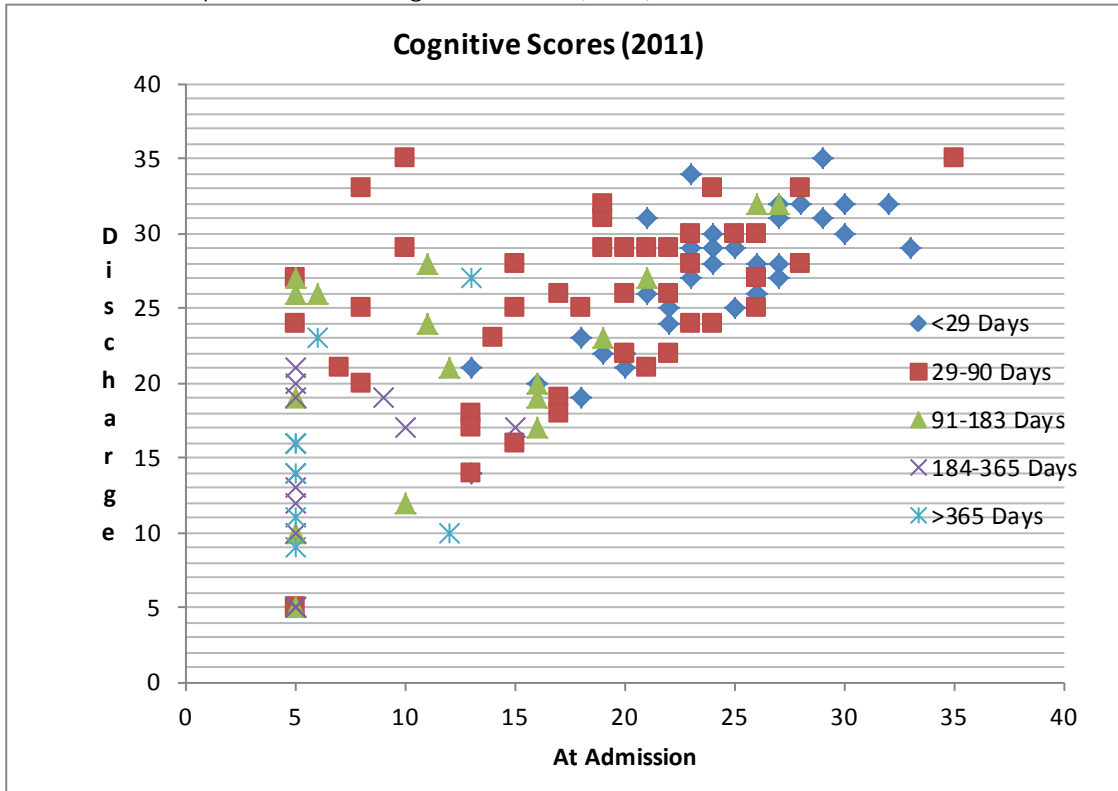


Charts 9.2.A & B show that people with the longest length of stay (LOS) generally arrive with the lowest total FIM scores. People arriving with mid-range or higher total FIM scores tend to have shorter LOS. Some people who arrive with the lowest possible total FIM scores achieve a substantial change during their rehabilitation although they tend to stay the longest.

The following 9.3.charts show the spread of FIM score changes at discharge for length of stay groups for the cognitive and motor domains, respectively.

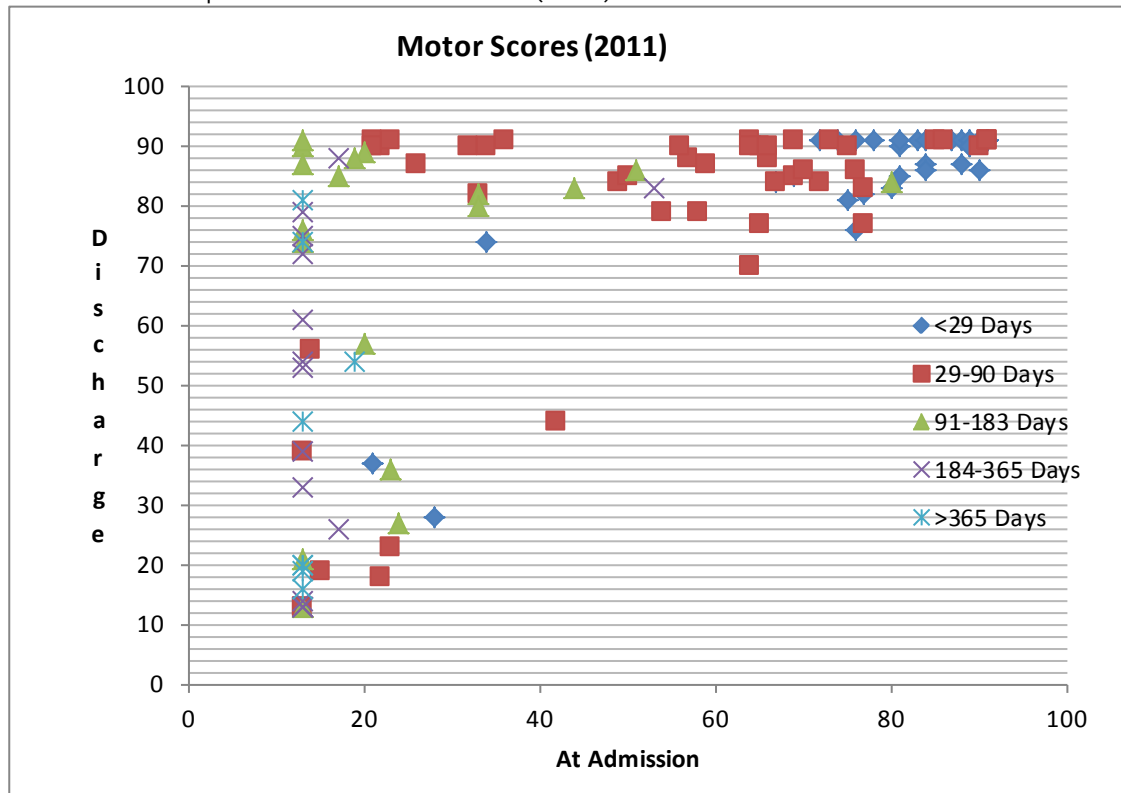
INPATIENT OUTCOMES

Chart 9.3.A – Improvement of Cognitive Skills (2011)



Score Change	No of EOCs	%
Negative	3	2.38%
0	20	15.87%
1-3	25	19.84%
4-6	32	25.40%
7-9	15	11.90%
10-12	10	7.94%
13-15	8	6.35%
16-18	4	3.17%
19-21	5	3.97%
22-24	2	1.59%
25	2	1.59%

Chart 9.3.B – Improvement of Motor Skills (2011)



Score Change	No of EOCs	%
Negative	3	2.38%
0	21	16.67%
1-5	20	15.87%
6-10	14	11.11%
11-20	16	12.70%
21-30	13	10.32%
31-40	11	8.73%
41-50	6	4.76%
51-60	4	3.17%
61-70	14	11.11%
More	4	3.17%

Chart 9.3.A shows that more than 50% of episodes of care led to a FIM cognitive score increase up to 9 points and the rest up to 24 points from a possible 35 points.

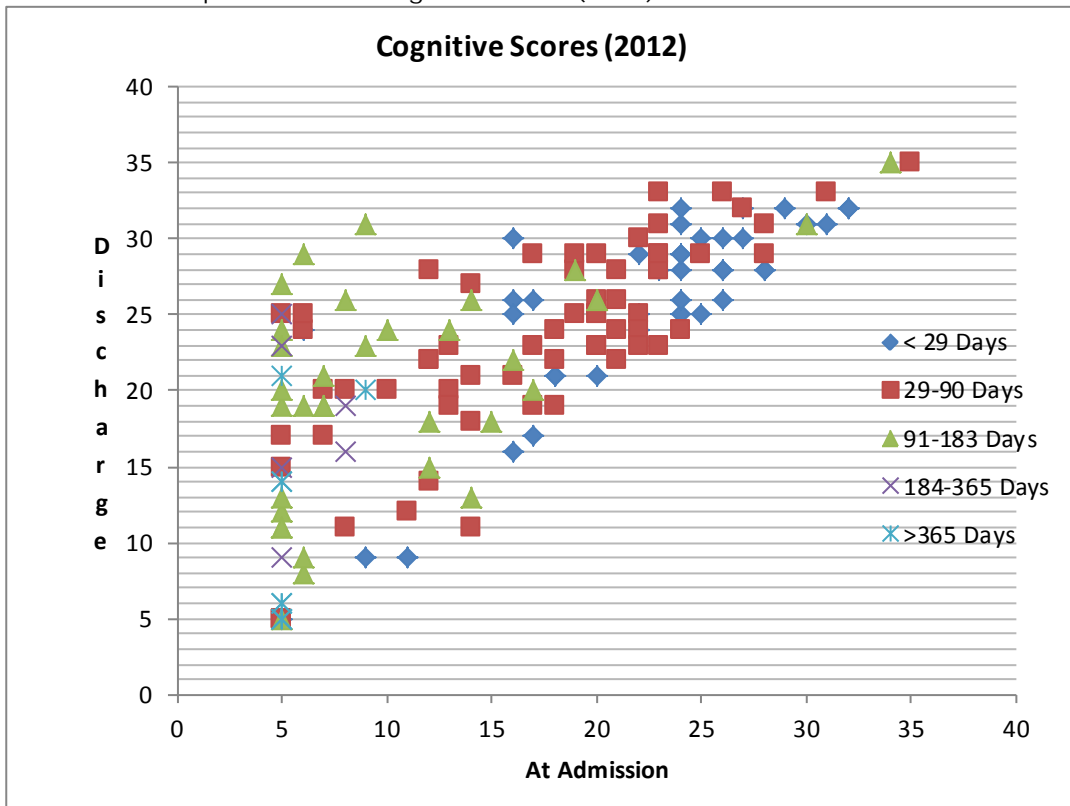
Similarly, Chart 9.3.B shows that about 50% of the episodes of care resulted in a FIM motor score increase of up to 30 points and the rest up to 78 points from a possible 91 points.

Overall, charts 9.3.A & B show that a large proportion of people makes very significant motor improvements and often approach or achieve the maximum FIM motor score of 91 at discharge. However, only a small number of patients achieve maximum cognitive scores at discharge, reflecting the greater impact that TBI often has on cognitive function. There is also a trend of improved outcomes for patients with shorter lengths of stay, which likely reflects less severe injury.

INPATIENT OUTCOMES

The following charts 9.4.A & B shows that a similar pattern to 2011 appears to emerge for inpatient episodes of care that ended in 2012.

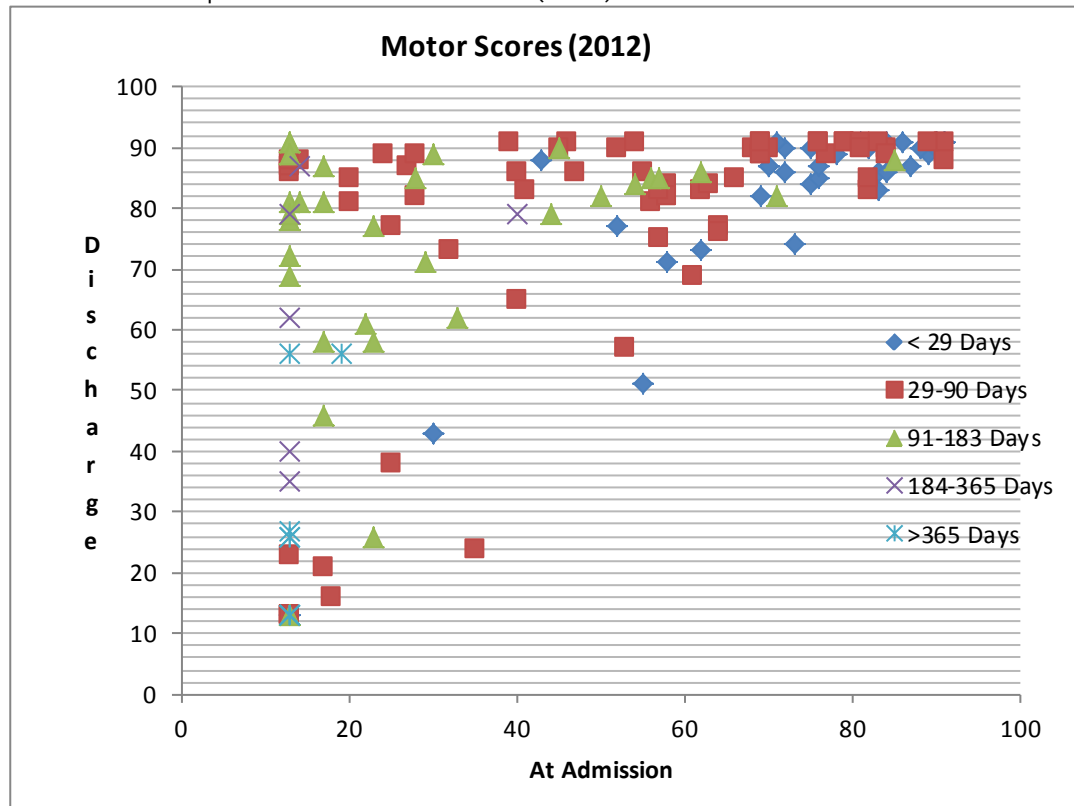
Chart 9.4.A – Improvement of Cognitive Skills (2012)



Score Change	No of EOCs	%
Negative	3	2.0%
0	21	13.7%
1-3	37	24.2%
4-6	31	20.3%
7-9	19	12.4%
10-12	19	12.4%
13-15	9	5.9%
16-18	7	4.6%
19-21	4	2.6%
22-24	3	2.0%
25	0	0.0%

INPATIENT OUTCOMES

Chart 9.4.B – Improvement of Motor Skills (2012)



Score Change	No of EOCs	%
Negative	4	2.61%
0	21	13.73%
1-5	17	11.11%
6-10	11	7.19%
11-20	29	18.95%
21-30	20	13.07%
31-40	10	6.54%
41-50	11	7.19%
51-60	9	5.88%
61-70	12	7.84%
More	9	5.88%

INPATIENT OUTCOMES

Chart 9.5.A – Achieved Maximum FIM Scores

Year	Total No of EOC	Cognitive =35	Motor=91	FIM Total =126
2011	126	3	33	1
2012	153	2	26	0

In 2011, 3 out of 126 episodes of care achieved the maximum cognitive score, but 33 achieved the maximum motor score. The percentages of patients achieving maximum cognitive and motor scores were similar in 2012. These results demonstrate that cognitive recovery is not as complete as motor recovery following TBI.

Chart 9.5.B – Inpatient Rehab Efficiency

Year	No of EOC	Rehab Efficiency	Average FIM Score Difference	Average LOS (days)	Rehab Efficiency2	Median FIM Score Difference	Median LOS (days)
2011	126	0.28	28.9	104	0.71	35.5	50.0
2012	153	0.34	31.6	94	0.80	39.0	49.0

The rehabilitation efficiency in Chart 9.5.B, 'Rehab Efficiency' was calculated by dividing the average difference in total FIM scores between admission and discharge by average LOS (days) - 0.28 for 2011 and 0.34 for 2012.

Rehab Efficiency2 was calculated by dividing the median difference in total FIM scores between admission and discharge by median LOS (days) - 0.71 for 2011 and 0.80 for 2012.

These numbers seem low compared with the efficiency the corresponding years of Australian Rehabilitation Outcome Centre (AROC) annual reports present. The reports give for all brain dysfunction, stroke and neurological conditions, the overall efficiency of 0.8, 0.8 and 0.7, respectively.

There are a number of reasons why the efficiency scores are different to AROC data so direct comparisons cannot be made. AROC presents mixed diagnostic groups, there are differences with how length of stay (LOS) is determined for the rehabilitation episode and the specialised brain injury units are weighted towards accepting the most complex and severe.

Abbreviations

1. MDS/CDS	Minimum dataset/clinical data set
2. BIRD	Brain Injury Rehabilitation Directorate (ACI network)
3. BIRP	NSW Brain Injury Rehabilitation Program
4. EOC:	Episode of Care
5. SOC:	Setting of Care
6. TLU:	A Transitional Living Unit or Program in an adult BIRP
7. TBI:	Traumatic Brain Injury
8. Non-TBI:	Non- Traumatic Brain Injury
9. PTA:	Post Traumatic Amnesia
10. MVA:	Motor Vehicle Accident usually involving car/motor bike/truck
11. MVA Related:	Includes driver/passenger/paedestrian/cyclist
12. Non-MVA:	Traumatic Brain Injury not related to motor vehicle accidents
13. DOI:	Date of Injury
14. FIM:	Functional Independence Measure

NSW Trauma Hospitals

This report refers to the following hospitals as NSW major and regional trauma hospitals, respectively.

Major Trauma Hospitals	Regional Trauma
CANBERRA	GOSFORD HOSPITAL
JOHN HUNTER	WOLLONGONG HOSPITAL
LIVERPOOL	ALBURY HOSPITAL
ROYAL NORTH SHORE	BROKEN HILL HOSPITAL
ROYAL PRINCE ALFRED	COFFS HARBOUR HOSPITAL
ST GEORGE	DUBBO HOSPITAL
ST VINCENT'S	GOULBURN HOSPITAL
WESTMEAD	LISMORE HOSPITAL
JOHN HUNTER CHILDREN'S	ORANGE HOSPITAL
CHILDREN'S WESTMEAD	PORT MACQUARIE HOSPITAL
SYDNEY CHILDREN'S	TAMWORTH HOSPITAL
	WAGGA WAGGA HOSPITAL