

What a difference a day makes - The impact of bundled ICU pricing for newborns

Stuart Bowhay¹

¹ Children's Health Queensland Hospital & Health Service

With a 2018-19 budget of \$42.3 million, the Critical Care Management team at Queensland Children's Hospital (QCH) recognise a sound knowledge of activity-based management is a key factor in managing and understanding the performance of the Paediatric Intensive Care Unit.

The high cost of treating patients in Intensive Care Units (ICU) is recognised in the 2018-19 National Efficient Price Determination through the provision of a price adjustment based on the time a patient spends in ICU. This adjustment is applied to all patients utilising ICU except those assigned a Major Diagnostic Category (MDC) of 'Newborns and Other Neonates' (Neonates), where the AR-DRG price is inclusive of a 'Bundled ICU' component.

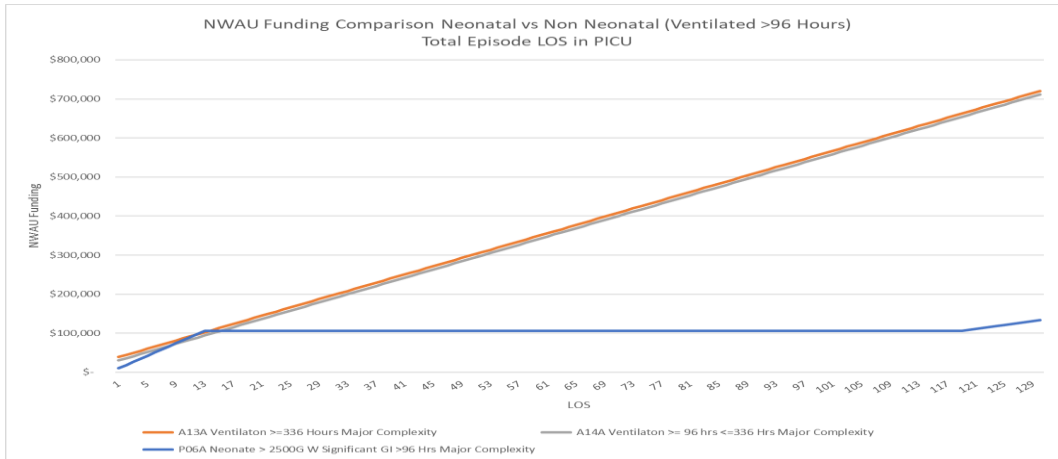
This differential model for patients requiring treatment in Intensive Care Unit (ICU) with neonates funded on a bundled, semi-fixed price and non-neonates funded on a variable rate determined by the length of stay in ICU creates issues in understanding productivity and efficiency as the level of funding is impacted by the proportion of neonates and associated ICU bed utilisation which is subject to variation.

QCH - PICU Utilisation (Hours) for Discharged Patients by Financial Year

Major Diagnostic Category	ICU Funding Type	2015/16	2016/17	2017/18	2018/19 (6 months)
15 Newborns & Other Neonates	Bundled in AR-DRG Price	24,329	28,527	33,481	19,941
All Other MDC	Actual utilisation (Hourly rate)	144,843	178,052	151,834	84,515
Total PICU Hours		169,172	206,579	185,315	104,456
Newborns & Other Neonates % of Total		14.4%	13.8%	18.1%	19.1%

The high variability in length of stay in ICU for neonatal patients (including patients who do not require ICU) compromises the veracity of the 'bundled ICU' component of the DRG price.

This issue is most evident for long stay, complex patients receiving ventilatory support where age* is a prime factor in determining the level of funding received with neonatal patients significantly impacted despite being managed under the same model of care as their non-neonatal equivalents.



*The Neonatal MDC is not defined exclusively based on primary diagnosis but on the assignment logic of age (<28 days) or Age < 1 year and Admission weight <2500 grams or Age < 1 year and specified low birth weight/ immaturity diagnoses.

Analysis of QCH neonatal activity shows 17.2% of patients required PICU and 83.1% of PICU hours were covered by two DRGs; P02Z and P06A.

Queensland Children's Hospital Neonatal Activity July 2016 to December 2018

Patient Separations

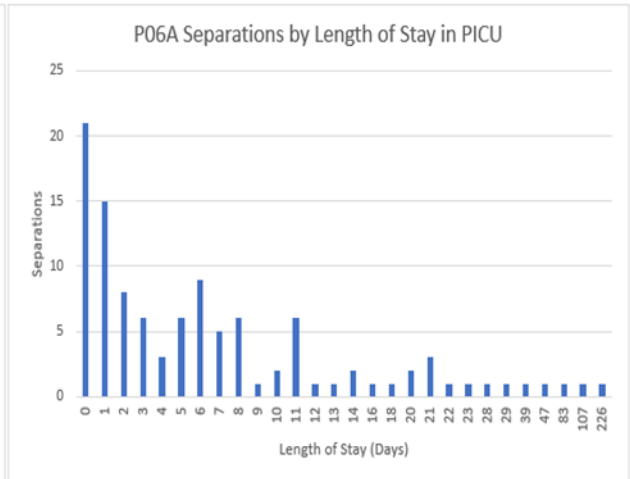
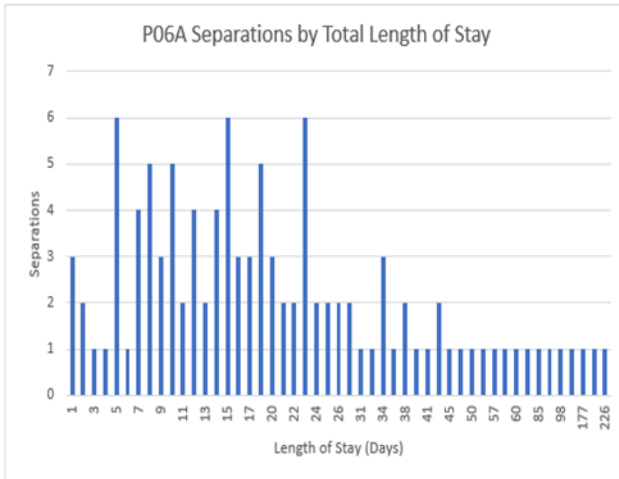
AR-DRG	PICU Stay- No	PICU Stay - Yes	Total	% requiring PICU Stay	Total PICU Hours	% of Total PICU hours
P02Z CARDIOTHORACIC AND VASCULAR PROCEDURES FOR NEONATES	-	109	109	100.0%	41,383	50.5%
P06A NEONATE, ADMWT >=2500G W SIGNIFICANT GI/VENT>=96HRS, MAJOR COMPLEXITY	19	89	108	82.4%	26,715	32.6%
Other Neonatal DRGs	1,825	185	2,010	9.2%	13,850	16.9%
Total Neonatal DRGs	1,844	383	2,227	17.2%	81,949	100.0%

Patient Average Length of Stay

AR-DRG	PICU Stay- No	PICU Stay - Yes	Total	Min Length of Stay (Days)	Max Length of Stay (Days)	Max PICU Length of Stay (Days)
P02Z CARDIOTHORACIC AND VASCULAR PROCEDURES FOR NEONATES	-	38.94	38.94	4	386	380
P06A NEONATE, ADMWT >=2500G W SIGNIFICANT GI/VENT>=96HRS, MAJOR COMPLEXITY	10.84	31.35	27.74	1	226	226
Other Neonatal DRGs	2.21	9.16	2.85	1	151	22
Total Neonatal DRGs	2.30	22.79	5.82	1	386	380

The length of stay distribution for AR-DRG P06A at QCH of 1 to 226 days is reflective of the wide range in the 2018-19 Price Determination (lower bound 13 days, upper bound of 119 days) is indicative of a wide underlying casemix which is supported by a regrouped sample of 31 separations with neonatal logic excluded.

Note: 21 of 108 Separations (19.4%) required no PICU stay.



QCH Sample Casemix Regrouped excluding Neonatal Logic

DRG	DRG Description	Separations
801B	GIS UNRELATED TO PRINCIPAL DIAGNOSIS, INTERMEDIATE COMPLEXITY	1
A13A	VENTILATION >=336HOURS, MAJOR COMPLEXITY	1
A14A	VENTILATION >=96HOURS & <336HOURS, MAJOR COMPLEXITY	8
A14B	VENTILATION >=96HOURS & <336HOURS, INTERMEDIATE COMPLEXITY	1
B02A	CRANIAL PROCEDURES, MAJOR COMPLEXITY	1
D66A	OTHER EAR, NOSE, MOUTH AND THROAT DISORDERS, MAJOR COMPLEXITY	1
E01A	MAJOR CHEST PROCEDURES, MAJOR COMPLEXITY	2
E02A	OTHER RESPIRATORY SYSTEM GIS, MAJOR COMPLEXITY	1
E40A	RESPIRATORY SYSTEM DISORDERS W VENTILATOR SUPPORT, MAJOR COMPLEXITY	1
E41A	RESPIRATORY SYSTEM DISORDERS W NON-INVASIVE VENTILATION, MAJOR COMPLEXITY	1
F09A	OTHER CARDIOTHORACIC PROCEDURES W/O CPB PUMP, MAJOR COMPLEXITY	2
F19A	TRANS-VASCULAR PERCUTANEOUS CARDIAC INTERVENTION, MAJOR COMPLEXITY	3
F19B	TRANS-VASCULAR PERCUTANEOUS CARDIAC INTERVENTION, MINOR COMPLEXITY	1
G02A	MAJOR SMALL AND LARGE BOWEL PROCEDURES, MAJOR COMPLEXITY	1
G02B	MAJOR SMALL AND LARGE BOWEL PROCEDURES, INTERMEDIATE COMPLEXITY	3
K62A	MISCELLANEOUS METABOLIC DISORDERS, MAJOR COMPLEXITY	1
R61A	LYMPHOMA AND NON-ACUTE LEUKAEMIA, MAJOR COMPLEXITY	1
T01A	INFECTIOUS AND PARASITIC DISEASES W GIS, MAJOR COMPLEXITY	1
Total		31

In comparison to non-neonates, the current model underfunds those neonatal patients who have received ICU care and overfunds those patients who have not.

Example - Underfunded Activity

DRG	Age on Adm (Days)	Length of Stay	PICU Hours	NWAU	Regrouped DRG	NWAU	NWAU Variance from Neonatal DRG	\$ Variance from Neonatal DRG
P06A	26	226	5,429	75.75	A13A	245.08	169.33	\$ 848,688
P06A	37	202	1,989	63.49	A14A	121.79	58.30	\$ 292,181
P06A	17	57	537	21.09	A14A	49.19	28.10	\$ 140,838
P06A	1	54	338	21.09	A14A	40.45	19.36	\$ 97,053
P06A	2	48	235	21.09	A14A	35.93	14.84	\$ 74,390

Example - Overfunded Activity

DRG	Age on Adm (Days)	Length of Stay	PICU Hours	NWAU	Regrouped DRG	NWAU	NWAU Variance from Neonatal DRG	\$ Variance from Neonatal DRG
P06A	5	23	69	21.09	G02B	8.6913	(12.39)	(\$62,121)
P06A	6	11	-	17.92	F19A	4.6987	(13.22)	(\$66,273)
P06A	4	22	-	21.09	F19B	6.8538	(14.23)	(\$71,331)
P06A	19	23	-	21.09	E02A	6.1844	(14.90)	(\$74,686)
P06A	9	23	9	21.09	F09A	6.1592	(14.93)	(\$74,812)

Conclusion

Analysis of QCH activity indicates considerable variation in underlying casemix and associated resource utilisation of patients grouped to AR-DRG P06A.

Complex, long stay patients that require significant time in ICU and are typically transferred from other hospitals to specialist paediatric, quaternary facilities are significantly underfunded while less complex patients that do not require treatment in ICU are overfunded.

It is recommended IHPA consider unbundling the ICU component of the DRG price for Newborns and Other Neonates to provide consistency for all patients treated in an ICU and create a more transparent and equitable model.

