

IRISH PAEDIATRIC CRITICAL CARE AUDIT

NATIONAL REPORT 2020

*Including a special chapter on COVID-19 and Paediatric
Inflammatory Multisystem Syndrome (PIMS-TS) 2020-2022*



NOCA National Office of
Clinical Audit

Launch of IPCCA report NOCA conference 31.01.23

Dr Martina Healy
IPCCA Clinical Lead



Tweet us at
[@noc_irl](https://twitter.com/noca_irl)

Data Included

- 1. PICANet dataset:** All children and young people accepted for referral, transported or admitted to designated paediatric intensive care units (PICUs) providing paediatric Level 3 Critical Care in Ireland during 2020. Aggregate data from 2018-2020 included for trend analysis.
- 2. INICUA - ICNARC dataset:** All children and young people admitted to adult ICUs across the Republic of Ireland in 2020.
- 3. HPSC dataset:** All children and young people with a COVID-19+/PIMS-TS diagnosis cared for in PCCUs in ROI from March 2020 – July 2022.

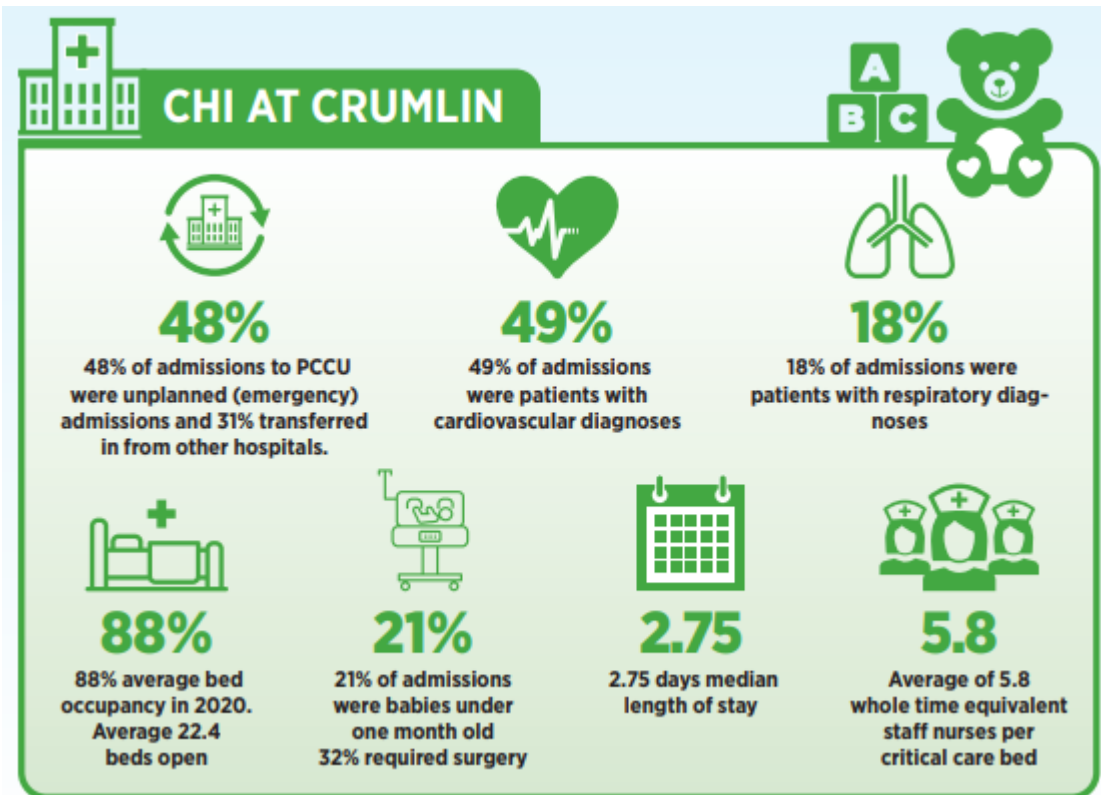
Key Findings

- The total number of admissions of patients to Paediatric Critical Care Units (PCCUs) in 2020 (including children aged 16 years or over) in the Republic of Ireland (ROI) was **1399**, a decrease of **9%** from 2019 (n=1514).
- The total number of admissions of patients to PCCUs in the UK and ROI for 2020 (n=16429) decreased by **19%** (n=3854) from 2019.
- CHI at Crumlin had the **third-highest** number of PCCU admissions (n=968) of all Units in the UK and ROI.
- The ROI rate of admissions was **121.3 per 100,000** population (a decrease from 133.4 in 2019) and is the second-highest rate after Scotland (136.4), the country with the highest rate.
- Just over one-half, **52%** (n=725) of admissions were unplanned in 2020 (a **10%** decrease from 2018).
- **Forty-one percent** (n=565) of admissions were following surgery (a **10%** increase from 2018).

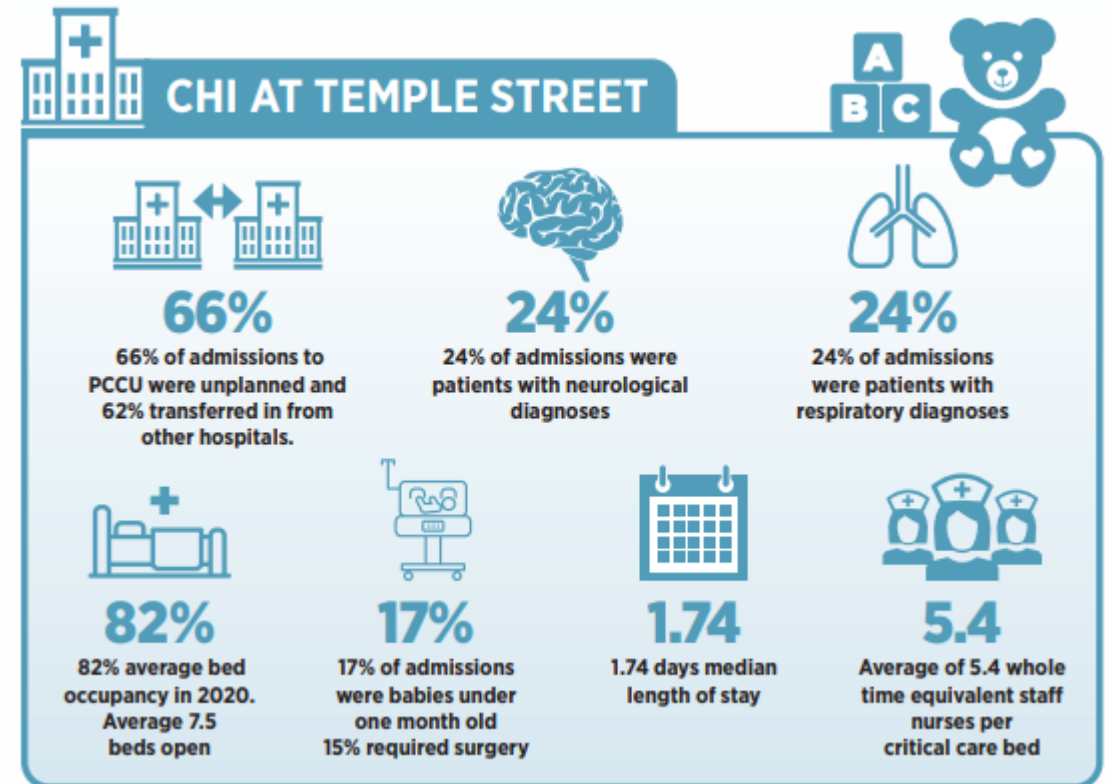
Key Findings

- **Ten percent** (n=444) of patient discharges and **34%** (n=1507) of patient admissions occurred 'Out of Hours' (20:00-07:59) during 2018-2020.
- The number of bed days delivered in ROI in 2020 was **9312** (a decrease of 1,000 bed days from 2019)
 - CHI at Crumlin delivered 7101 bed days and CHI at Temple Street delivered 2211 bed days.
- Infants aged under one year occupied **68%** the of bed days delivered in 2020.
- The annual average rate of unplanned extubation per 1,000 intubated days in 2020 was **2.5** per 1,000 in the ROI (a decrease from 4.2 per 1000 in 2019) and below the acceptable threshold of 5.0 per 1000.
- **Seventy percent** of patients received vasoactive medication while in PCCU.
- There were **25** ECMO runs in 2020 (an increase from 18 in 2018, 22 in 2019).

Key Findings



No. of admissions = 968
58% aged under one year
Bed days delivered = 7101



No. of admissions = 401
37% aged under one year
Bed days delivered = 2211

Key Metrics

- **Timeliness of data submission 2020:**

The completeness of patients' admission data within 3 months of their discharge from the Unit was 48% for CHI at Crumlin and 85% for CHI at Temple St. The target is 100%.

- **Retrieval mobilisation times 2020:**

71% of Irish Paediatric Acute Transport Service (IPATS) journeys to retrieve patients for transfer to PCCU were started within the recommended one hour (18% 0-30mins, 53% 31-60mins).

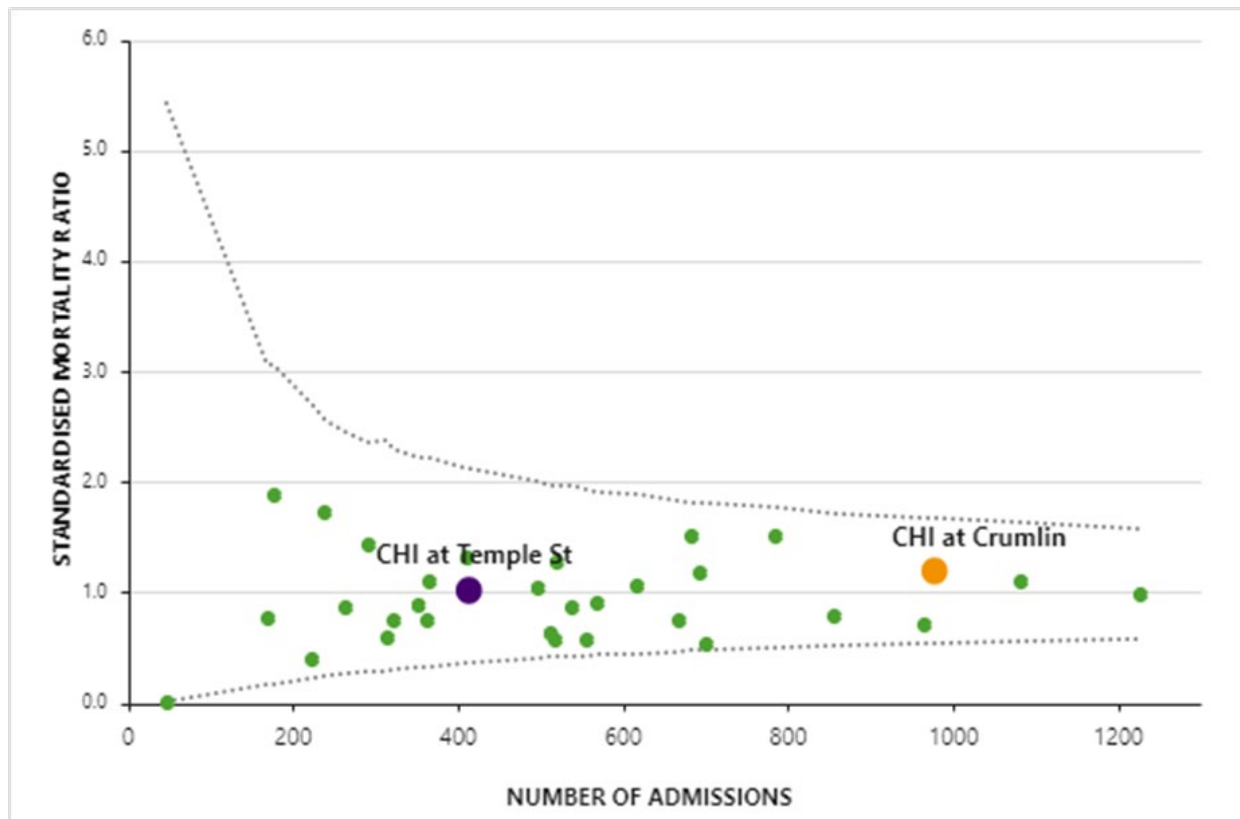
- **Number of qualified nurses per bed 2020:** The recommended standard for nursing levels is 5.5 whole-time equivalent (WTE) nurses per critical care bed.

CHI at Crumlin 5.82 WTE and CHI at Temple St. 5.46 WTE.

- **Emergency readmissions within 48 hours 2020:**

1.7% of patients were readmitted within 48 hours of discharge.

Key Metrics



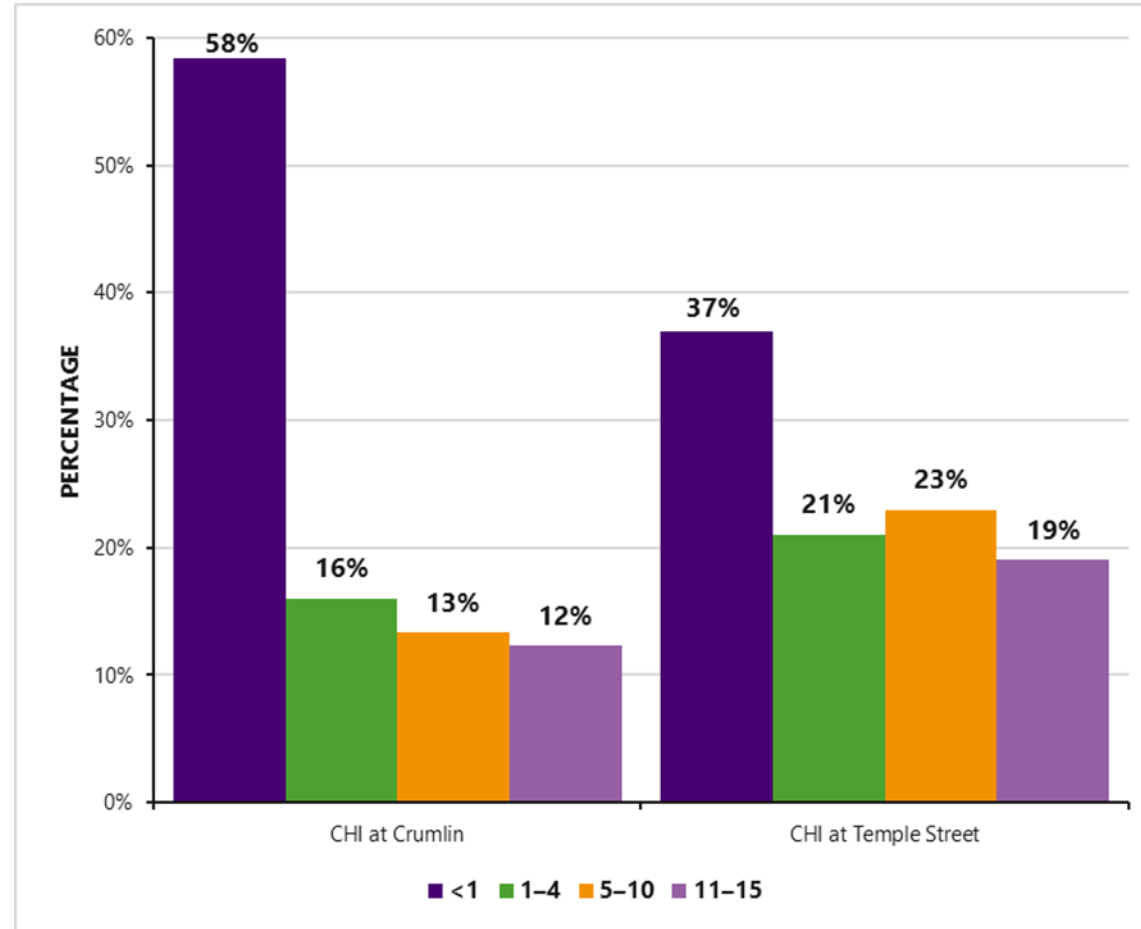
- **Mortality in PCCU 2020:**
96% of patients were discharged alive. Deaths in PCCU account for **21%** of all deaths in the paediatric population in ROI in 2020.
- **Risk- adjusted SMR** benchmarked against all Units in UK: Irish PCCU mortality is within the expected range.

Paediatric Index of Mortality (PIM)

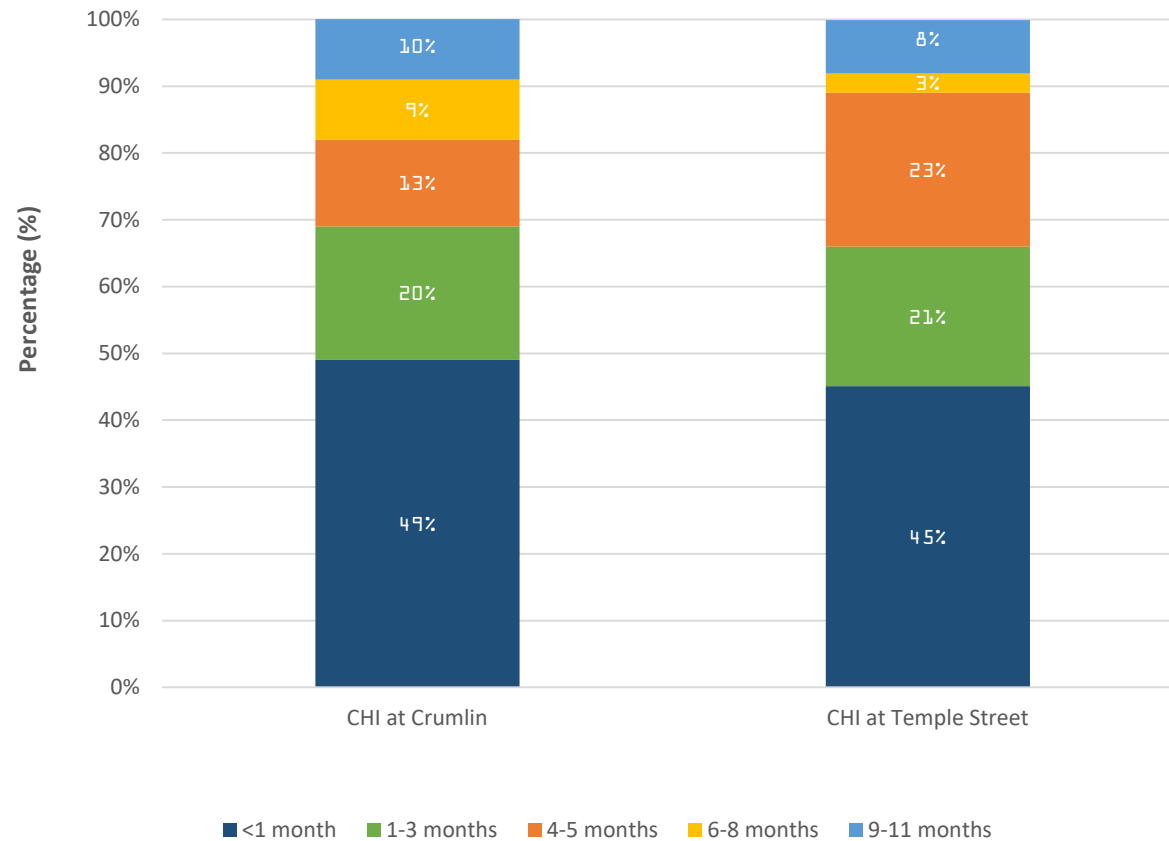
PIM3 risk group	2018		2019		2020	
	N	%	N	%	N	%
CHI at Crumlin						
<1%	321	31	358	35	293	30
1 to <5%	508	50	511	50	508	52
5 to <15%	151	15	128	12	134	14
15 to <30%	36	4	16	2	25	3
≥30%+	7	1	11	1	8	1
Total	1023	100	1024	100	968	100
CHI at Temple Street						
<1%	193	48	235	48	182	44
1 to <5%	151	37	186	38	158	39
5 to <15%	43	11	54	11	52	13
15 to <30%	15	4	11	2	8	2
≥30%+	4	1	4	1	9	2
Total	406	100	490	100	409	100

In 2020, the majority of children admitted to CHI at Crumlin were in the 1 to <5% PIM3 risk group (n=508, 52%), whereas in CHI at Temple Street the majority of admissions were in the lower <1% PIM3 risk group (n=182, 44%).

Age Distribution by Unit 2020



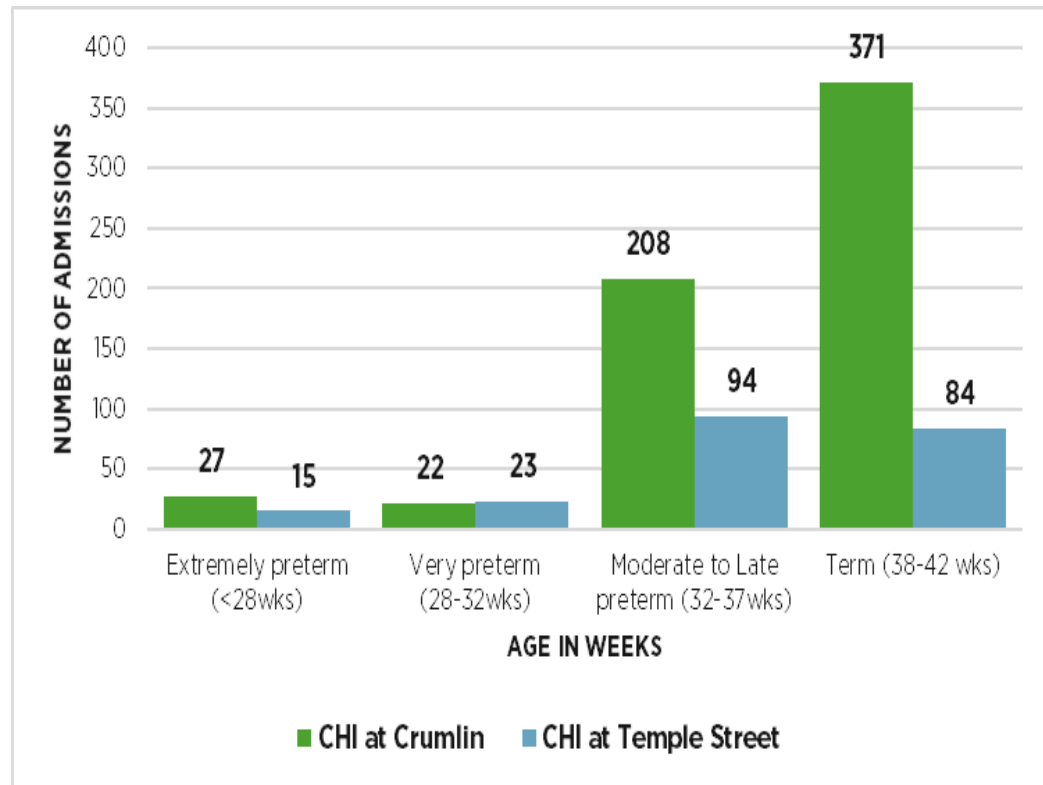
Proportion of bed days for children aged under 1 year 2020



In 2020, children aged under 1 month accounted for the highest proportion of bed days in both Units

In both PCCUs, the median LOS was highest for infants aged under 1 year
 CHI at Crumlin at 3.96 days
 CHI at Temple Street at 2.99 days

Neonatal Admissions by age in weeks 2018-2020



CHI at Crumlin:

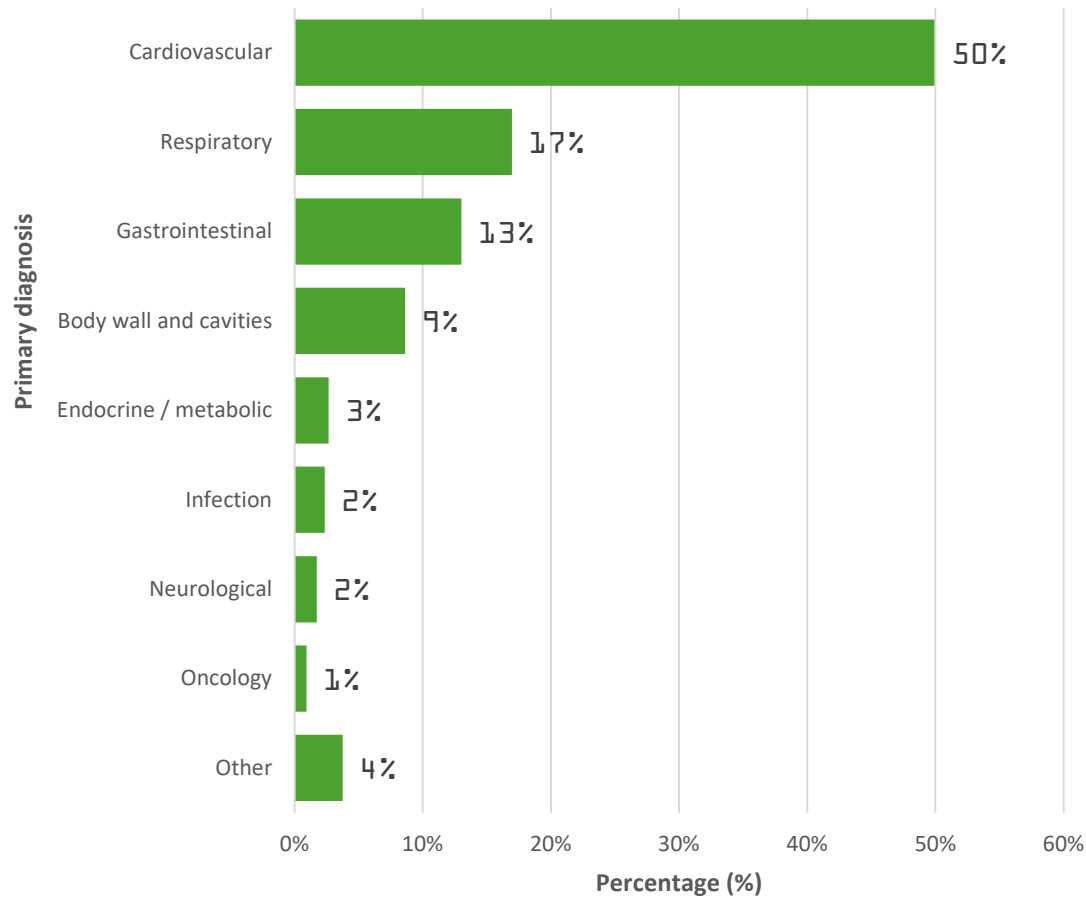
21% of all admissions were neonatal
 Total of 643 neonatal admissions
 40% preterm – 11% of which were aged under 28 weeks
 32% (n=204) required surgery

CHI at Temple St:

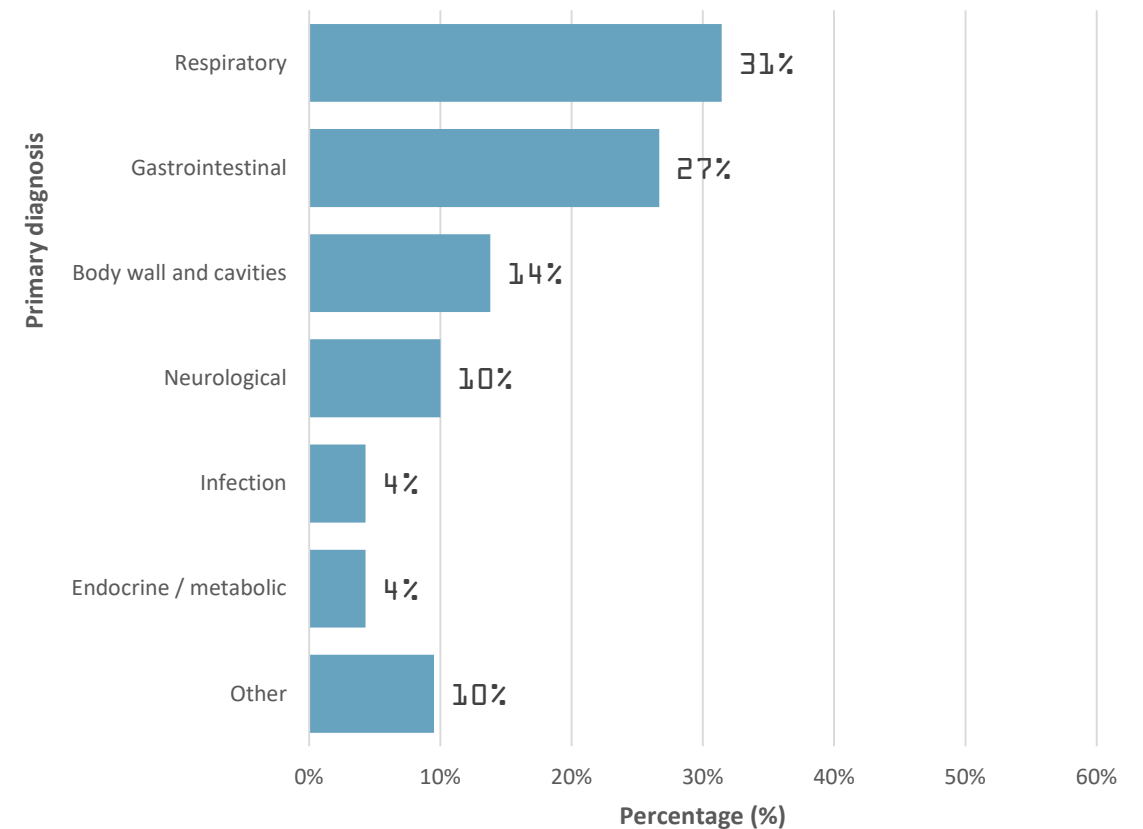
17% of all admissions were neonatal
 Total of 216 neonatal admissions
 61% preterm – 11% of which were aged under 28 weeks
 15% (n=31) required surgery

Neonatal Admissions by primary diagnosis 2018-2020

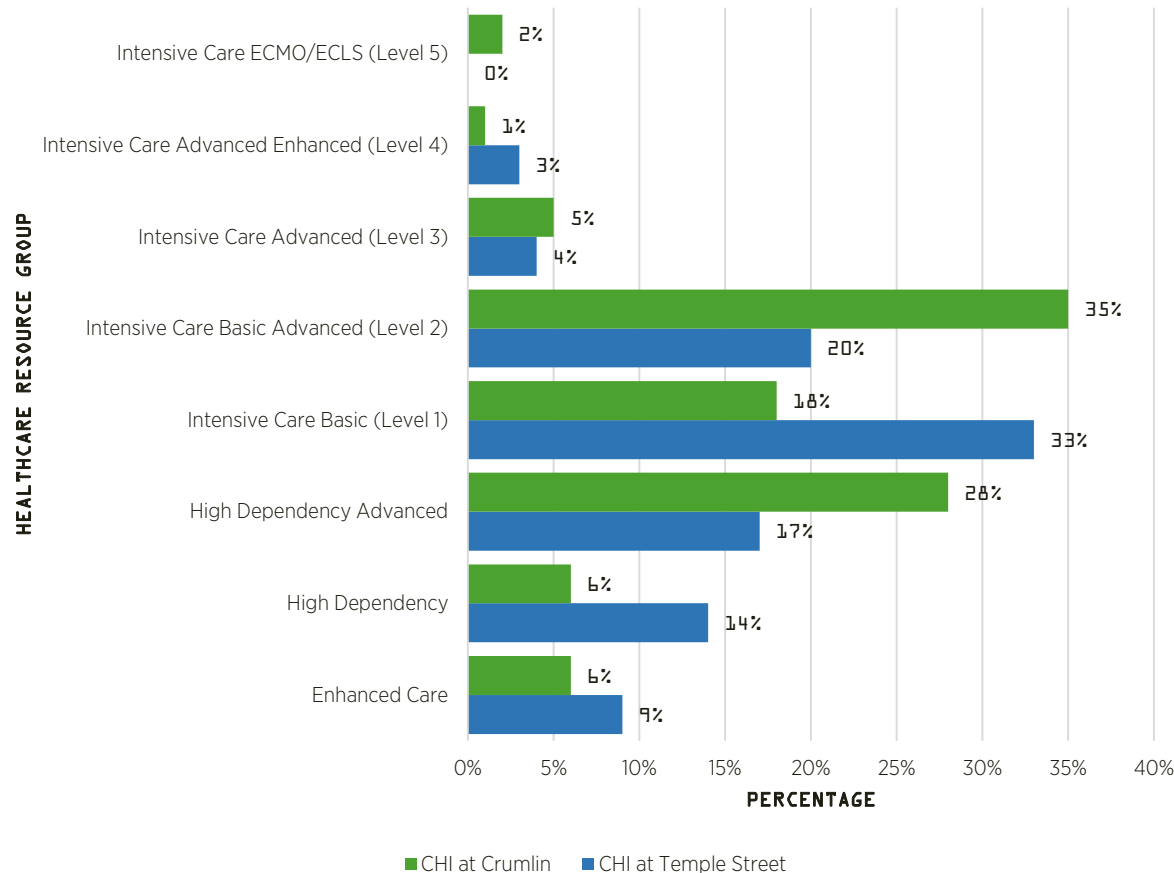
CHI at Crumlin



CHI at Temple Street



Levels of Critical Care Provided



CHI at Crumlin:

8% complex care Levels 3, 4 and 5

CHI at Temple Street:

7% complex care Levels 3 and 4

Complex care requires higher nurse to patient ratios 2:1 and 3:1 (ECMO).

ECMO

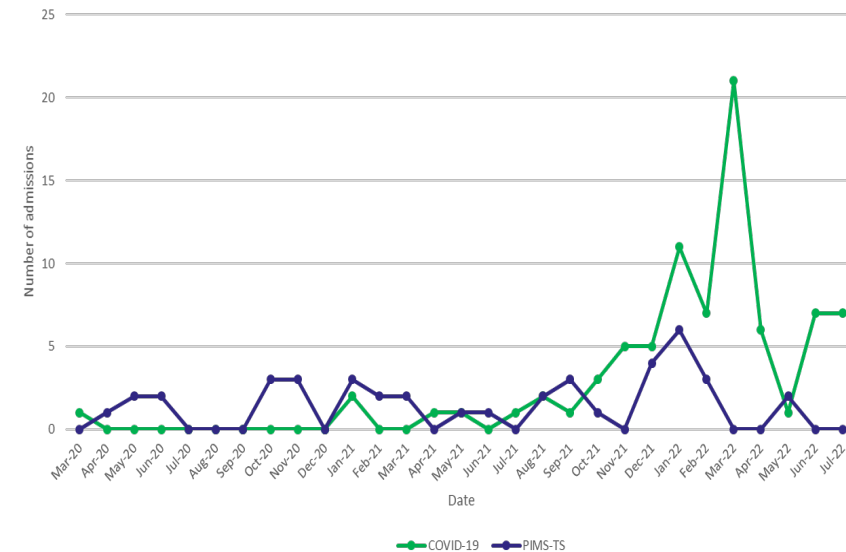
	2018	2019	2020	Total
Cardiac ECMO	13 runs: <ul style="list-style-type: none"> extracorporeal cardiopulmonary resuscitation (ECPR) cardiac surgery 	19 runs: <ul style="list-style-type: none"> ECPR cardiology cardiac surgery 	21 runs: <ul style="list-style-type: none"> ECPR Cardiology Cardiac surgery 	53
Respiratory ECMO	5 Runs: <ul style="list-style-type: none"> airway Repair congenital diaphragmatic hernia (CDH) and persistent pulmonary hypertension of the newborn (PPHN) transferred to Sweden 	3 runs: <ul style="list-style-type: none"> CDH transferred to Sweden CDH + Tetralogy of Fallot- ECMO in CHI at Crumlin 	4 Runs: <ul style="list-style-type: none"> PPHN + Meconium aspirate transferred abroad CDH - ECMO in CHI at Crumlin 	12
Total ECMO: Cardiac and Respiratory	18	22	25	65
Total ECMO days in CHI at Crumlin	92	118	148	358
Total ECMO days abroad	40	37	13	90
Total bed stay abroad	72 days	43 days	17 days	132 days
Survival to decannulation	89%	91%	92%	
Survival to discharge	78%	82%	68%	

Admissions to Adult ICUs

Parameter	2019	2020	2020 Adult ICUs	Patients (<1 year)	Patients (1-6 years)	Patients (7-16 years)	Total (n)	Mean LOS (hours)	Ventilated (n)
Patients <16 years old	111	68	Beaumont Neuro ICU	0	0	2	2	50	0
Age, mean (median; interquartile range (IQR))	7.5 (8; 2, 13)	9 (12; 5,14)	Mater (MMUH) ICU	0	0	1	1	184	1
Age <1 year	18	5	Tallaght ICU	0	0	1	1	18	0
Age 1 to 6 years	44	16	Galway ICU	3	11	13	27	21	6
Admissions after surgery	34	7	Limerick ICU	0	0	1	1	14	0
Admissions with sepsis	22	11	Waterford ICU	0	1	4	5	42	1
Invasive ventilation	20 (18%)	21 (31%)	Mullingar ICU	0	0	1	1	7	1
Unit LOS; mean (median; IQR) (hours)	27 (18; 12,24)	38.5 (16; 10, 32)	Wexford ICU	0	0	4	4	40	2
Unit survivors	110 (99%)	67 (99%)	St Vincent's ICU	0	0	1	1	574	1
Hospital survivors	107 (96%)	65 (96%)	Cork CT ICU	0	0	1	1	4	1
			Cork GICU	0	0	10	10	46	5
			Letterkenny ICU	2	2	2	6	14	3
			University Hospital Kerry	0	2	6	8	29	0

COVID-19/PIMS-TS 2020-2022 (n=123)

Parameter	COVID-19	PIMS-TS
Patients <16 years old (n)	82	41
Discharge status (alive) (n)	81	41
CHI at Crumlin (n)	46	31
CHI at Temple Street (n)	36	10
Mechanically ventilated (n)	33 (40%)	9 (22%)
Age (median)	4.0 years	10.0 years
Unit LOS (median)	3.0 days	4.0 days
Hospital LOS (median)	9.0 days	8.0 days



- March 2020-October 2021 majority of PIMS-TS (Delta variant in origin)
- October 2021- July 2022 majority of COVID-19+ (Omicron variant in origin)
- SARS-CoV-2 vaccine rollout in children under 12 years of age may have influenced these patterns.

RECOMMENDATIONS

Recommendation 1 – For NOCA

A comprehensive dataset should be developed locally, in addition to PICANet data, to accurately reflect the complexity and acuity of the ROI PCCU patient population and the scope of practice to enable accurate audit and reporting.

What action should be taken?

- An IPCCCA data collection and reporting tailored to the actual patient cohort admitted to PCCUs in the ROI should be developed. This dataset should reflect the complexity and acuity of the ROI PCCU population. Currently, data are collected and uploaded at a local hospital level. An agreed extension to the NOCA audit dataset would allow for enhanced reporting.
- A staffing census should be developed on a phased basis to capture nursing, medical, and health and social care profession resources to measure against Irish standards.

RECOMMENDATIONS

Recommendation 2- For Adult ICUs

Adult Intensive Care Units caring for children should ensure the recommendations outlined in the Model of Care for Paediatric Critical Care are adhered to. Any child requiring treatment in an adult critical care unit should be discussed with the National Paediatric Critical Care Network to decide if stabilisation and transfer to a PCCU is required or that the child can be safely cared for locally.

What action should be taken?

- In the event of a child becoming unexpectedly ill, there may be occasions where only a very short period of intensive care is required that does not necessitate transfer to PCCU. This is acceptable on the condition that there is a suitable facility within the hospital, such as adult critical care; there are staff with appropriate competencies; and the episode will only last a few hours. Adult ICUs caring for children should ensure the recommendations outlined in the Model of Care for Paediatric Critical Care are adhered to (section 6.4: Indications for transfer to Level 3S PCCU).

- University Hospital Galway could consider establishing a regional PHDU. The recommended staffing and equipment requirements for a Level 1 regional PHDU in a Model 4R hospital are outlined in the Model of Care for Paediatric Critical Care.

RECOMMENDATIONS FOR CHI

Recommendation 3

Paediatric Critical Care Units should improve timeliness of audit data submission to meet the quality standard.

What action should be taken?

- Hospital management should ensure there is dedicated audit resourcing available. Audit nursing should have sufficient time to focus on data submission and validation. The more timely data submission requirements may require extra resourcing. Contingency planning should be in place to cover for staff absence/sick leave, and training provided if necessary.
- PCCUs should review data collection workflow processes and procedures to ensure that data are submitted within a 2-month period in order to meet PICANet Metric 1: timeliness of data submission as per the 2021 PCCS Quality Standards. PCCUs need to critically evaluate how they can improve more timely submission and should liaise with PICANet for shared learnings from Units with good practices.

RECOMMENDATIONS FOR CHI

Recommendation 4

Paediatric Critical Care Units should monitor and review out-of-hours and delayed discharges.

What action should be taken?

- PCCUs should review their out-of-hours and delayed discharges and aim to decrease the number of these discharges:
 - Were these delayed discharges following the decision to discharge?
 - Were delays due to a lack of a stepdown/ward bed?
 - Were patients discharged without being fully ready, as a PCCU bed was needed for an urgent admission?

RECOMMENDATIONS FOR CHI

Recommendation 5

A National Respiratory Paediatric Extracorporeal Life Support (ECLS) Programme should be progressed in Children's Health Ireland.

What action should be taken?

- The ECLS programme in CHI at Crumlin should be extended to provide care for respiratory patients requiring ECMO.
- This service should be progressed on a limited basis for a small cohort of patients. Children born with CDH (less than 10 per year) would be an ideal subgroup to commence this service. There should be an increase in staffing in addition to the current cardiac ECMO programme inclusive of medical, nursing, and health and social care profession staff.

Updates on previous recommendations

- CHI will transition to a NICU and PICU model with NICU governance under neonatology. Over the next 2 years a process of recruitment of new posts and reconfiguration of shared maternity hospital posts will assist with achieving the required staffing levels.
- The process of extending IPATS was initiated and, as of January 2022, the service now operates 7 days per week (Monday-Sunday, 10:00-16:00). The fellowship in paediatric critical care retrieval medicine (FCCRM) commenced in January 2022.
- NOCA met with PICANet in May 2022 to discuss data quality issues and take any necessary actions. Data validation visits planned for 2023.
- Work commenced in April 2022 on the future scope of the IPCCCA and will be completed in 2023. The review of governance for the audit was completed in August 2022.

