



**CRITICAL  
CARE**



**Building a Better Health Service**

CARE COMPASSION TRUST LEARNING



**National Clinical &  
Integrated Care Programmes**

Person-centred, co-ordinated care

**NATIONAL ADULT CRITICAL CARE CAPACITY AND ACTIVITY**

**CENSUS REPORT 2019**

Acute Operations Division, HSE and Critical Care Programme, National  
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## **1. National Adult Critical Care Bed Capacity Census 30<sup>th</sup> September 2019**

On 30<sup>th</sup> September 2019 the National Adult Critical Care Capacity Census process identified an operational complement of 255 adult critical care (Level3 ICU and Level2 HDU) beds. Following resource allocation in successive HSE *National Service Plans* and following concerted hard work of clinicians and administrators alike, in 2019, there was a net increase of six adult ICU beds across Ireland. This builds on the addition of eight beds in 2018 and on the addition of seven ICU beds in 2017. Accordingly, with resource allocation and owing to the success of the national Critical Care Nursing Workforce Planning initiative, *Career Pathway*, launched by Minister Harris Sept 2017, adult ICU capacity has increased by twenty-one beds in the three-year period 2017, 2018 and 2019.

However, the 2019 Census also reports an additional nineteen adult ICU beds remain '*non-operational, commissioned critical care beds (funding allocated)*'. Although each Hospital/Group is enabled with the critical care nursing *Career Pathway* to recruit Ireland's nursing graduates immediately on graduation, regrettably, currently, there is a HSE employment pause.

Despite the HSE employment pause, employment derogations have been sought using 'work-arounds' and granted on an item-by-item basis for required ICU clinical posts. This critical care prioritization leads to critically ill patient survival and the collaboration of administration officials in this regard is gratefully acknowledged.

CRITICAL CARE BED CAPACITY CENSUS SEPTEMBER 2019	<u>CRITICAL CARE SERVICE Unit</u> (following <i>National Standards 2011</i> , Joint Faculty of Intensive Care Medicine of Ireland)							
	Level 3s ICU Beds	Level 3 ICU Beds	Level 2 HDU Beds	Critical Care Bed Capacity 2019	ICM <i>National Standard</i> outlier	Non-operational, commissioned critical care beds 2019 (funding allocated)	Bed spaces available (not commissioned 2019)	Critical Care Bed Capacity 2018
<b>RCSI Hospital Group</b>								
Cavan ICU		2	2	4			1	4
Drogheda ICU		5	3	8		1	4	8
Beaumont General ICU		9		9			2	9
Beaumont HDU			8	8 (+8)				0
Beaumont Neuro ICU	8			8			1	8
Connolly Hospital ICU		4		4		1		4
<b>Dublin Midlands Hospital Group</b>								
Naas ICU		4		4		1		4
Portlaoise		2		2	ICM			2

ICU					National Standard outlier			
Tullamore ICU		4		4			3	4
Tallaght ICU		9	2	11				11
Tallaght PACU			3	3				3
St James' Burns ICU	2			2				2
St James' ICU/HDU		20	0	20 (+1)			0	19
St James' CT KS ICU	7			7 (+1)			1	6
<b>Ireland East Hospital Group</b>								
Mater ICU/HDU	17		15	32		4	2	32
Mullingar ICU		5	1	6 (-1)				6
Navan ICU		2		2	ICM National Standard outlier			2
St Vincents ICU/HDU		10	6	16				16
Kilkenny ICU		4		4	Clinical Governance arrangement TBC			4
Wexford ICU		5		5				5
<b>South-South West</b>								



<b>Hosp Group</b>								
UHLimerick ICU/HDU		10	8	18 (+1)	ICM National Standard outlier	0	10	17
<b>TOTAL</b>				<b>255</b>		<b>20</b>		<b>249</b>

Census Table Legend

- National Standards JFICMI - in scope*
- National Standards JFICMI - outlier*

Table. CRITICAL CARE BED CAPACITY CENSUS AT 30<sup>TH</sup> SEPTEMBER 2019

**Critical Care Capacity Census 2019- methodology note**

On the behalf of HSE Acute Operations, Critical Care Programme completes an annual critical care bed capacity Census and collates each Hospital's critical care (ICU and HDU) bed capacity and staffing (medical and nursing) Establishment as well as critical care activity profile measurement. Thus, the Census reports critical care bed capacity (see table above) and critical care activity profile (see figure below), both as at 30th September 2019.

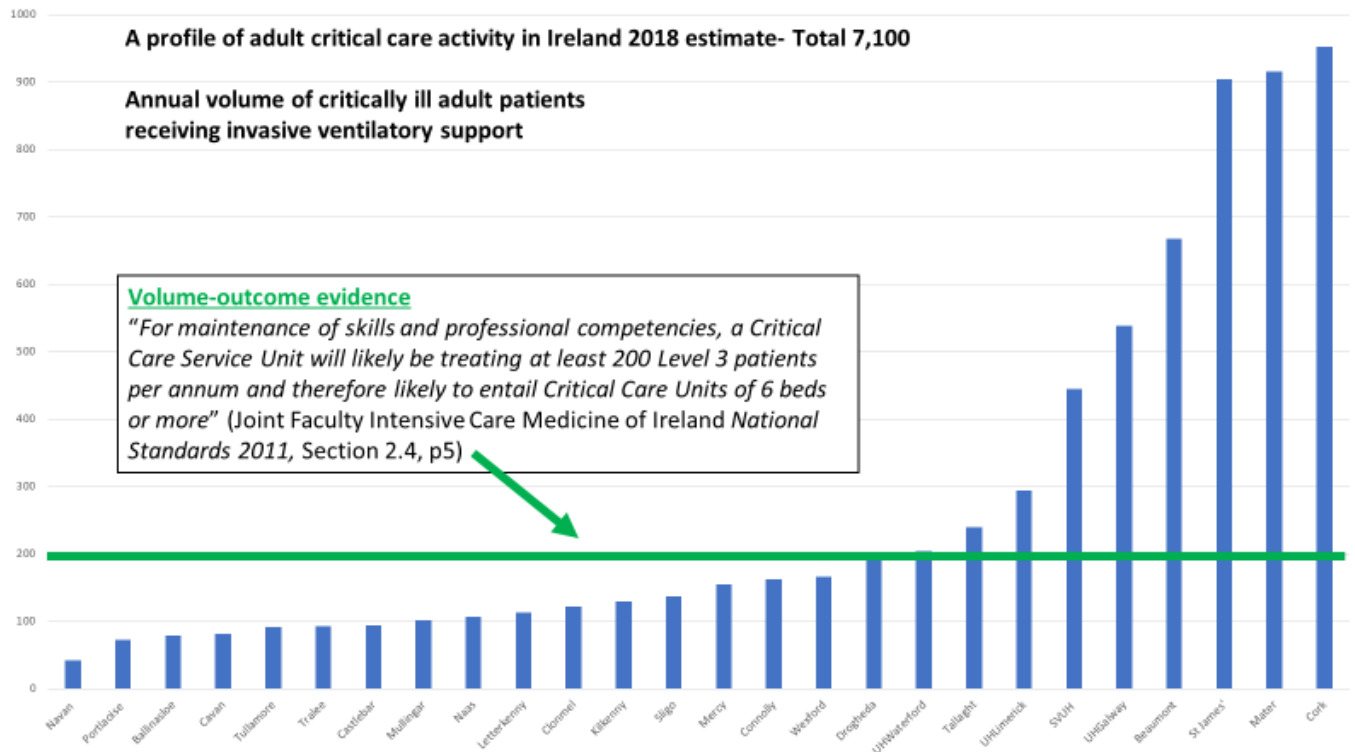
As part of Census procedure, each hospital's Census return is verified locally and countersigned by the Hospital CEO, Hospital Clinical Director, Hospital Director of Nursing, Hospital ICU Director, Hospital ICU CNMIII, Hospital Group CEO, Hospital Group Chief Clinical Director and Hospital Group CDoN- eight signature verifications. This co-signed individual Hospital critical care capacity and activity profile report is thus collated, reconciled and validated centrally on behalf of Acute Operations by CCP Census Working Group and subsequently approved by Acute Operations for circulation.

Thus, the annual adult national critical care (ICU and HDU) commissioned bed capacity and activity profile is ascertained by the Critical Care Census process.

The *National Standards for Adult Critical Care Services 2011*, Joint Faculty of Intensive Care Medicine of Ireland (JFICMI), the Office of Nursing and Midwifery Services Directorate (ONMSD), HSE and the Therapy Professionals Group, HSE, respectively, define the medical, nursing and therapy professional staff requirements to commission a Critical Care Service. Accordingly, for Critical Care Nursing professional staff nurse requirements ONMSD has advised the critical care nursing staff workforce requirement to commission a Level 3 ICU bed and a Level 2 HDU bed is 5.6 x WTE and 2.8 x WTE, respectively, at the least.

## 2. National adult critical care activity measurement

HSE Acute Operations requests the annual profile of adult ICU activity in Ireland. Activity is estimated using the self-reported comparator measure- a care episode of invasive ventilatory support for a critically ill adult patient, any duration. Census 2019 repeats this and finds just over 7,100 critically ill adult patients received invasive ventilatory support in Ireland in 2018 (as self-reported by Hospital providers to 2019 Census process). This self-reporting method is now being replaced by activity information obtained from Irish National ICU Audit (INICUA) from the National Office of Clinical Audit (NOCA).



Graph. A profile of 2018 adult critical care activity in Ireland (as self-reported to the 2019 Census).



The profile shows over a twenty-fold difference in activity between hospital ICUs in Ireland. From an iso-resource allocation standpoint there is evidence of operational inefficiency in low volume ICUs.

(Data limitation- It should be noted the measure is a crude comparator as noninvasive ventilatory support and other invasive organ supports (e.g. continuous renal replacement therapy, pharmacologic and mechanical circulatory supports, nutritional supports etc.) are also delivered to critically ill patients and for long durations in ICUs in Ireland.)

### **3. National adult critical care bed capacity requirements**

- a. Critical care volume-outcome evidence
- b. *DH Capacity Review 2018*
- c. Critical care resource allocation in recent HSE *National Service Plans*
- d. *Estimates / HSE National Service Plan 2021*
- e. Evidence from a critical care access evaluation study

#### **3a. Critical care volume-outcome evidence**

The body of evidence in the intensive care medicine literature- and in other acute care literatures- supports a volume-outcome relationship (Nguyen, *Chest* 2015). The evidence finds that as volumes decrease, outcomes worsen. Arising from patients' needs for specialty services, and in line with the volume-outcome evidence base, critical care capacity provision and expansion is required at scale at hospital centers or 'hubs'.

The implication of volume-outcome evidence for critical care is critical care capacity expansion at small hospitals, with small volumes, is not supported by Critical Care Programme. The activity profile above shows that seven very small hospitals in Ireland operate critical care services at very small volumes (<100 patient invasive ventilatory support episodes p.a.) with Portlaoise Hospital and Navan Hospital operating at the smallest volumes. A further seven small hospitals operate at small volumes (100-150 care episodes p.a.). A total of fourteen hospitals operate at less than 150 care episodes p.a. in Ireland.

The professional body for Intensive Care Medicine in Ireland (Joint Faculty Intensive Care Medicine of Ireland, JFICMI) identifies an ICU activity level required for intensive care medicine skills and practice maintenance.

*“For maintenance of skills and professional competencies, a Critical Care Service Unit will likely be treating at least 200 Level 3 patients per annum and therefore likely to*

*entail Critical Care Units of 6 beds or more”* (Joint Faculty Intensive Care Medicine of Ireland *National Standards 2011*, Section 2.4, p5).

Of note, in line with volume-outcome evidence, in recent times, in its *Investigation of Portlaoise Hospital*, the healthcare regulator HIQA has found it is “*not assured that critical care services are sustainable in Portlaoise Hospital*” (HIQA Portlaoise 2015 p103; HIQA Portlaoise 2016 p87).

Very small ICU volume hospitals are inefficient in terms of activity output against resource input (iso-resource consumption).

In terms of the considerable mix of unscheduled critically ill patients with multi-specialty acute, complex and severe conditions presenting to adult ICUs today during undifferentiated ‘open-take’, where ICU Consultant daily sessions are missing, generally, very small ICU volume hospitals are associated with increased mortality (Gershengorn, JAMA 2017).

Accordingly, where ICU Consultant daily sessions are missing, the continued operation of very small volume ICUs (<100 care episodes p.a.) is recommended to be discontinued.

### **3b. Department of Health Capacity Review 2018**

In 2018, the *Health Service Capacity Review Report* was published by the Department of Health. The 2018 *Capacity Review* recommends increased acute care capacity and, in particular, recommends a step-change 80% increase in national adult critical care bed capacity\*.

(\*An adult critical care capacity increase from 240 beds to 430 beds is recommended by 2031. Department of Health *HEALTH SERVICE CAPACITY REVIEW 2018: REVIEW OF HEALTH DEMAND AND CAPACITY REQUIREMENTS IN IRELAND TO 2031 Main Report*, Section 8.2 *Recommendations*, Section

8.2.1 *Baseline Recommendations, Table 28 Summary of Capacity Requirements with no Service Reconfiguration, 'Acute Care' 'Sector' 'ACC' (Adult Critical Care) Beds, p106).*

Of note, throughout, the *Capacity Review* did not identify clinical specialty services nor a requirement to develop clinical specialty services at any level, regional or supraregional/national with the exception of the National Trauma Strategy and the National Maternity Strategy.

### **3c. Critical care resource allocation in recent HSE National Service Plans 2017-20**

#### 1) HSE National Service Plan 2018

NSP 2018 follows the volume-outcome evidence for critical care-

*“Following the organisation of hospitals into Hospital Groups, it is clear that critical care capacity building is required in the ‘hub’ hospitals to meet the on-going and increasing critical care requirements of complex, multi-specialty, severely critically ill patients”* (p51).

Subsequently, successive HSE *National Service Plans* recognize a national adult critical care capacity building strategy is required in the specialty ‘hub’ hospitals.

Similarly, in its *Adult Critical Care ‘hub-and-spoke’ Model of Care*, Critical Care Programme recommends a critical care capacity building strategy at specialty ‘hub’ hospitals.

#### 2) HSE National Service Plan 2019

NSP 2019 identifies an additional national adult critical care capacity increase of sixteen beds is required-

*"Winter 2019 / 2020 – Plan and prepare for a further increase in acute bed capacity of 202 beds (including 16 critical care beds) across 14 locations, to be operational by quarter 1, 2020.*

*Continue to commission additional high dependency unit beds in the Mater... Hospital (MMUH) and Cork University Hospital (CUH),..."* (p68)

### 3) HSE National Service Plan 2020

NSP 2020 identifies critical care as one of the “*Specialist Services*” and references the ongoing commissioning of critical care capacity at CUH ICU first allocated in NSP 2017 and NSP 2018.

*“Specialist Services*

*Develop and improve national specialist services*

• *Continue the development of critical care services at Cork University Hospital (CUH) with the opening of four high dependency unit beds in 2020” (p66).*

Although, the 2018 Department of Health *Capacity Review* did not identify clinical specialty services or a requirement to develop these at any level, national or regional, happily, HSE *National Service Plan 2020* now identifies critical care as a “*Specialist Service*” (p66).

Also, HSE Commissioning has identified Critical Care in its acute specialty commissioning category- the other two of three Commissioning categories being Unscheduled and Scheduled.

### **3d. Critical Care Programme input into 2021 DH / HSE Estimates / National Service Plan 2021 for national adult critical care capacity building**

#### 1) Successful critical care capacity commissioning and operation ongoing

It has been shown now in successive annual HSE Critical Care Census Reports that, in three consecutive calendar years, 2017-2019, the excellent Critical Care Nursing Workforce Planning initiative, *Career Pathway*, has delivered incremental critical care capacity increases at ‘hub’ hospitals centers to support specialty services. Adult critical

care capacity has increased by twenty-one beds in the three Census years, 2017, 2018 and 2019.

2) Multi-annual critical care capacity development strategy

Accordingly, Critical Care Programme recommends and advocates HSE continues its multi-annual incremental adult critical care capacity increases year-on-year at ‘hub’ hospital centers providing specialty services at volume. Thus, using *Career Pathway*, multi-annual critical care capacity development is achievable with ‘new-money’, revenue and capital.

Critical Care Programme does not support a ‘big-bang’ approach where a huge increase of 190 beds is ‘packed’ into a couple of years e.g. years 2029, 2030 and 2031 down the road. This latter approach is not feasible or achievable, does not plan to meet the needs of critically ill patients in Ireland today and does not represent a sustainable capacity development strategy.

Rather Critical Care Programme advocates the former strategy- feasible year-on-year (multi-annual) incremental critical care capacity increases to meet the need for vulnerable critically ill patients across Ireland.

3) Current national adult critical care capacity revenue and capital requirements for Estimates 2021

As identified above, the 2018 *Capacity Review* did not identify a national specialty service provision requirement or strategy.

However, in the modern day with an increasing demographic, increased critical care capacity provision, capacity and new build, is required to meet the specialty needs of critically ill patients in specialty centres.

Accordingly, Critical Care Programme has provided the prioritised National Adult Critical Care Capacity Requirements, tabulated below, to HSE Acute Hospitals Capital Strategy process in 2018, to HSE Commissioning Acute Specialties and to HSE Estimates / National Service Plan 2021 process.

In line with the 'hub-and-spoke' *Adult Critical Care Model of Care*, Critical Care Programme does not support additional capacity resource allocation to Tullamore or Tralee on grounds of limited activity.



## National Adult Critical Care Bed Capacity Commissioning Requirements 2021

Priority	Hospital Group	Hospital	National / supra-regional critical care specialty service provision	Employment revenue funding 2021	Minor capital funding 2021	Major capital funding 2020
1.	RCSIHG	Beaumont Hospital	Level3s Critical Care- Neurocritical Care, Kidney Transplant Critical Care	Three additional general and neuro ICU beds		New ICU/HDU block build-existing facilities not built for purpose
2.	DMHG	StJames Hospital	Level3s Critical Care- Cardiothoracic Critical Care, Burns Unit	Three additional general ICU beds, six extra HDU beds	New HDU proposal	Complete ICU renovation/rebuild
3.	DMHG	Tallaght	Level3 Critical Care	Three additional general ICU beds	New HDU proposal- no existing HDU	New ICU build
4.	IEHG	St Vincent's	Level3s Critical Care- Liver Transplant	Three additional general ICU beds	New HDU proposal- no existing HDU	
5.	IEHG	Mater	Level3s Critical Care- Cardiothoracic Critical Care, Extra-Corporeal Life Support ECLS	Additional ICU/HDU beds		National Isolation Unit
6.	SSWHG	CUH	Level3s Critical Care- Neurocritical Care, Cardiothoracic Critical Care	Note- revenue funding allocated NSP 2018 to open CUH ICU beds 13, 14, 15, 16	ICU expansion proposal, HDU build proposal- no existing HDU	CUH critical care block build
7.	ULHG	UHL	Level 3 Critical Care	One ICU bed		
8.	SaoltaHG	UHG	Level3s Critical Care- Cardiothoracic	One ICU bed		

Table. Current national adult critical care capacity revenue and capital requirements for Estimates 2021

### 3e. Evidence from a critical care access evaluation study

Critically ill patients with brain injuries from neurological conditions (e.g. trauma, intracranial haemorrhage, CNS infection etc) require time-critical access to neuro-specific interventions at a neuro-specialty centre for survival and outcome (Patel 2005; Harris 2015).

A retrospective neuro-specialty ICU access study\* found for a consecutive cohort of fifty-one critically ill 'neuro' patients requiring ICU care at a neuro-specialty centre, that

four of fifty-one patients (7.5%) did not gain access to the ICU at a time when the ICUs were shown to be overcrowded in the neuro-centre. While the forty-seven patients who gained access to neuro-ICU received many timely neuro-specialty interventions to good effect, the four critically ill patients who did access the neuro-ICU, did not receive the required neuro-interventions required for outcome. The evidence is clear that critically ill patients who do not access neuro-centres have decreased survival. Accordingly, increased neuro-ICU capacity resource is required for critically ill patients with brain injuries from neurological conditions.

\*NIHR Research Bulletin Spring 2020 (accepted for publication); *Access of neuro critically ill patients to neuro-critical care in Ireland- does lack of capacity cause an access 'lottery'?* R Sweeney, P O'Halloran, P Corr, D Nolan, M Power; Beaumont Hospital, Dublin (also poster presentation CAI Congress 2018).

#### 4. Ongoing HSE/HPSC ICU Influenza Surveillance- 2018-2019 season

On behalf of HSE, HPSC publishes an excellent annual Influenza Season Summaries and the weekly *Influenza Surveillance in Ireland–Weekly Report*.

The annual HPSC ICU influenza surveillance shows considerable seasonal variation in volumes of patients with influenza admitted to ICU, seasonal influenza subtypes and patient effects.

<b>Influenza season (year)</b>	<b>NVRL-positive Influenza patients admitted to ICU-adults</b>	<b>NVRL-positive Influenza patients admitted to ICU-children</b>	<b>Influenza serotypes</b>
<b>2014-15</b>	60	9	Influenza A(H3) 47% Influenza A(H1) 16% Influenza A (not subtyped) 16% Influenza B 20%
<b>2015-16</b> late season ‘spike’	125	36	Influenza A(H1) 68% Influenza B 18% Influenza A (not subtyped) 11%
<b>2016-17</b>	37	14	Influenza A(H3N2) 45% Influenza A (not subtyped) 23% Influenza B 11% No influenza A (H1N1) reported
<b>2017-18</b>	152	39	Influenza B- 48% Influenza A(H3N2) 16% Influenza A(H1N1) 7% Influenza A (not subtyped) 27%
<b>2018-19</b>	133	26	Influenza A(H1N1) 87% Influenza A(H3N2) 13%
<b>2019-2020</b>			

Table. Source. HSE HPSC Annual Influenza Epidemiological Reports

<https://www.hpsc.ie/a-z/respiratory/influenza/seasonalinfluenza/surveillance/influenzasurveillancereports/seasonsummaries/>

Interrogation of the data shows some tendencies or patterns. In the 2009-2010 Influenza Pandemic, a younger cohort of ICU influenza patients was recorded with 8 mothers, increased length of ICU stay and 5 ECMO episodes. In the 2009-10 Influenza Pandemic, 27 ICU patients with influenza A (H1N1) died. In the 2015-16 season, 11 patients received ECMO. In the 2018-19 season, two patients received ECMO. No mothers were admitted to ICU in 2018-19 season. In 2009-10 Influenza Pandemic the ICU length of stay measure was 12 days; in 2018-19 LoS was 7 days. This comparison is based on data in the *HPSC Annual Epidemiological Report for Influenza and Other Seasonal Respiratory Viruses, 2018/2019* (Table 5. Summary of confirmed influenza cases admitted to critical care units and reported to HPSC, 2009 pandemic period to 2018/2019, in Ireland. P21).

HSE Acute Operations Major Surge Committee structure is tasked with seasonal influenza surge preparedness planning.

Ends