

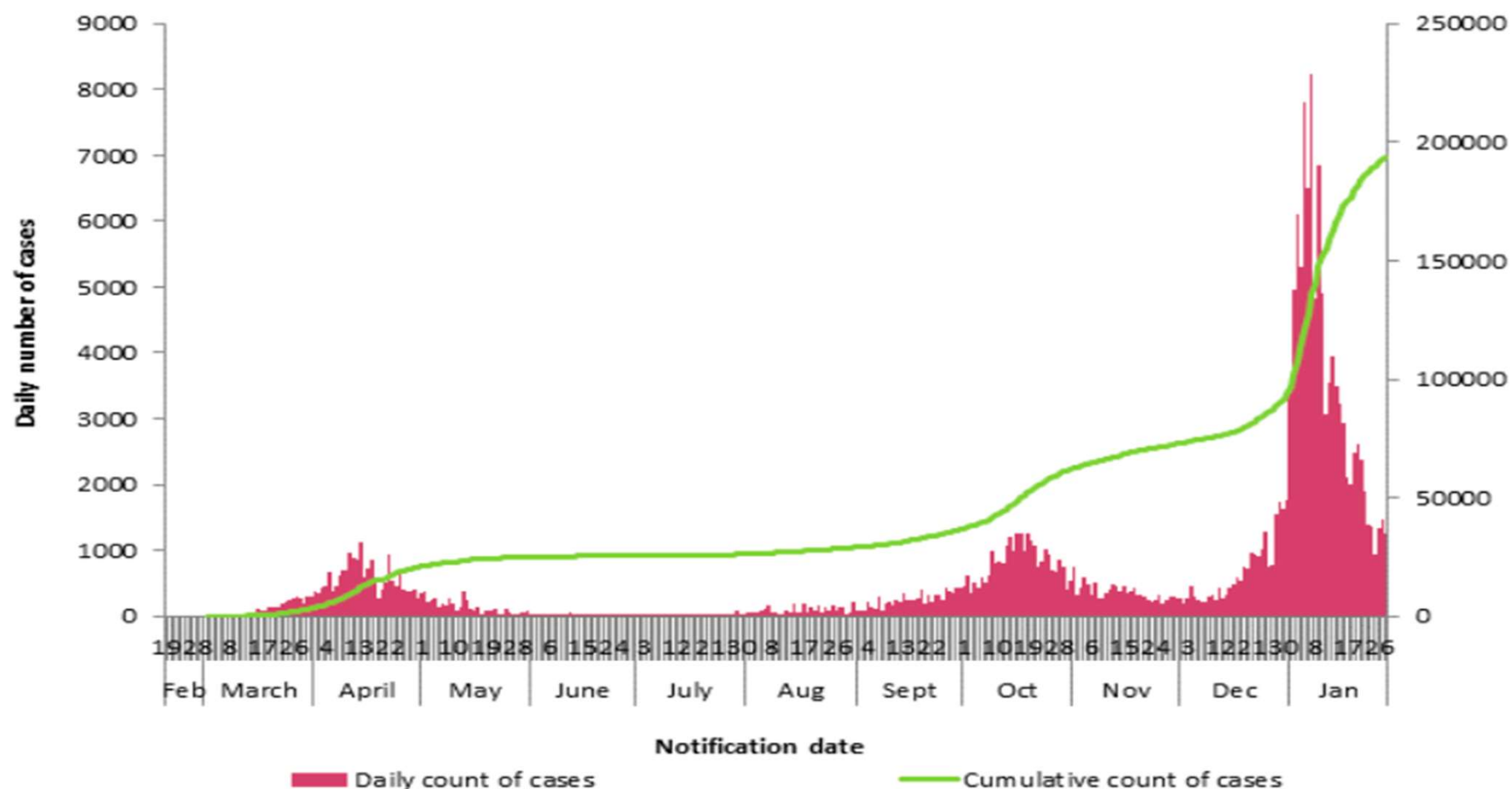
COVID-19 in Ireland; how ICU responded

Rory Dwyer
ICU Consultant, Beaumont Hospital

**Clinical Lead, NOCA ICU Bed
Information System**

February 2nd, 2021





Number and cumulative number of confirmed COVID-19 cases notified in Ireland by notification date

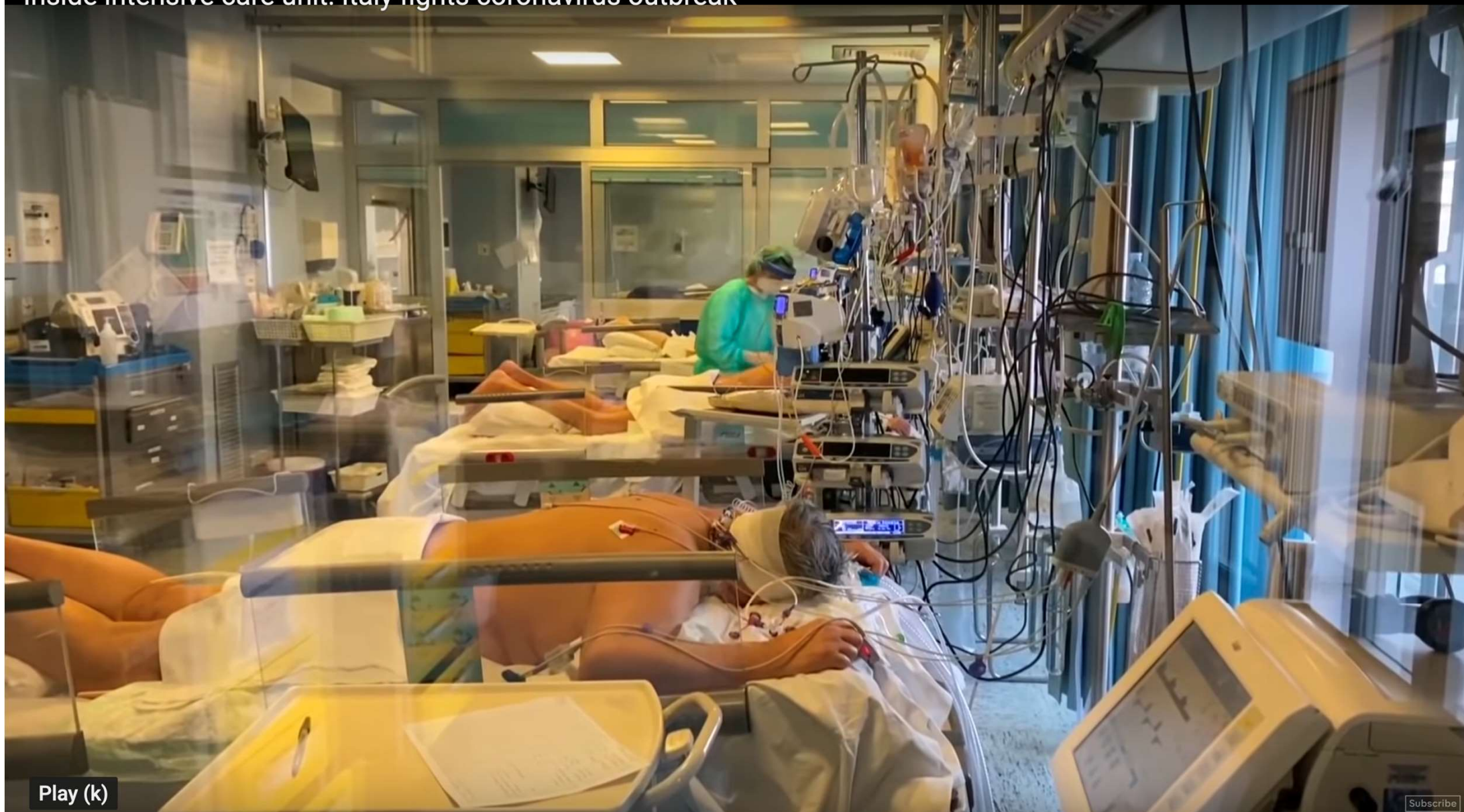


RTÉ ONE 

RTÉ News

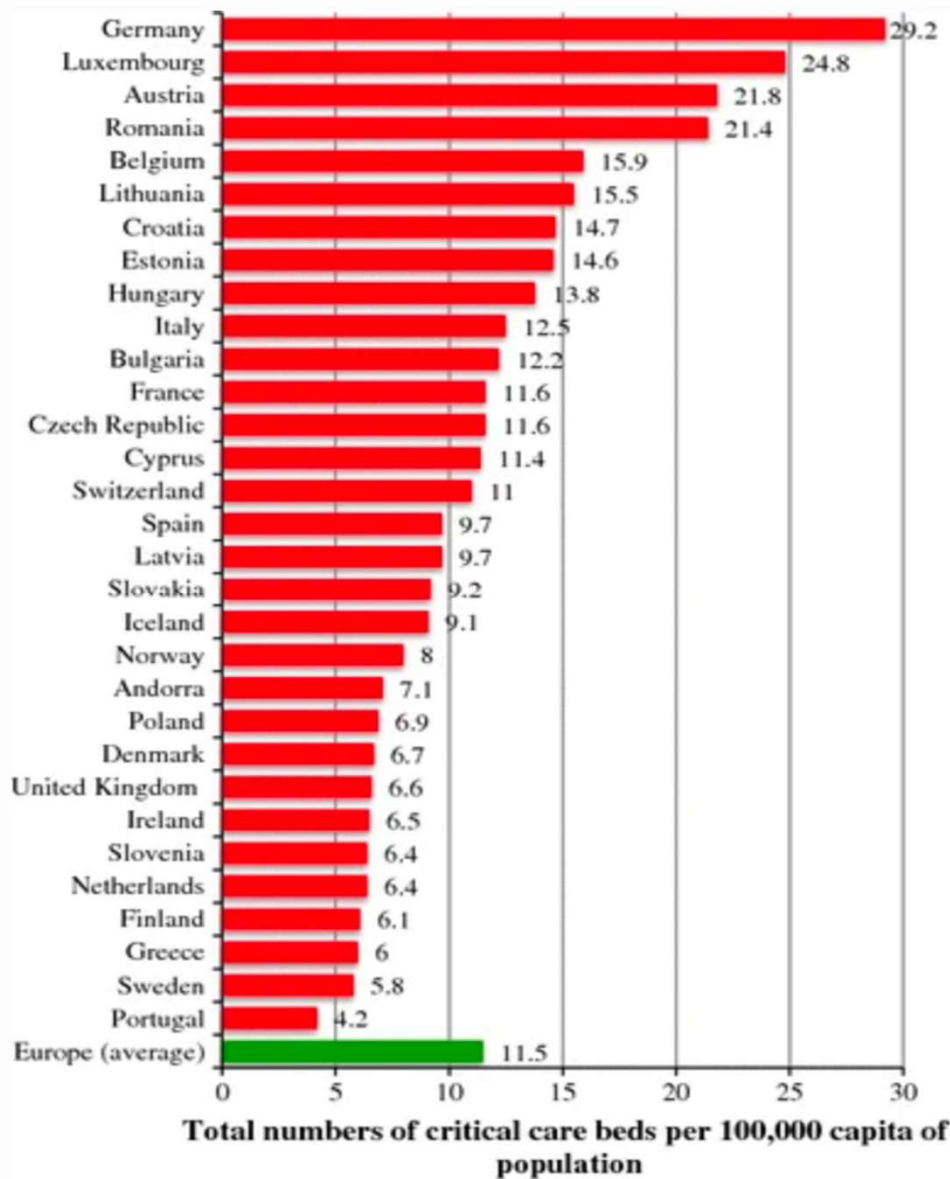
Pioneer

Inside intensive care unit: Italy fights coronavirus outbreak



Play (k)

Subscribe



**Ireland; 256 ICU/HDU beds
= 5.2 critical care beds / 100,000**
(NOCA/ CCP census March 2020)

Rhodes, Intensive Care Medicine, 2012

Bed occupancy 2019

Overall national bed occupancy = 90%

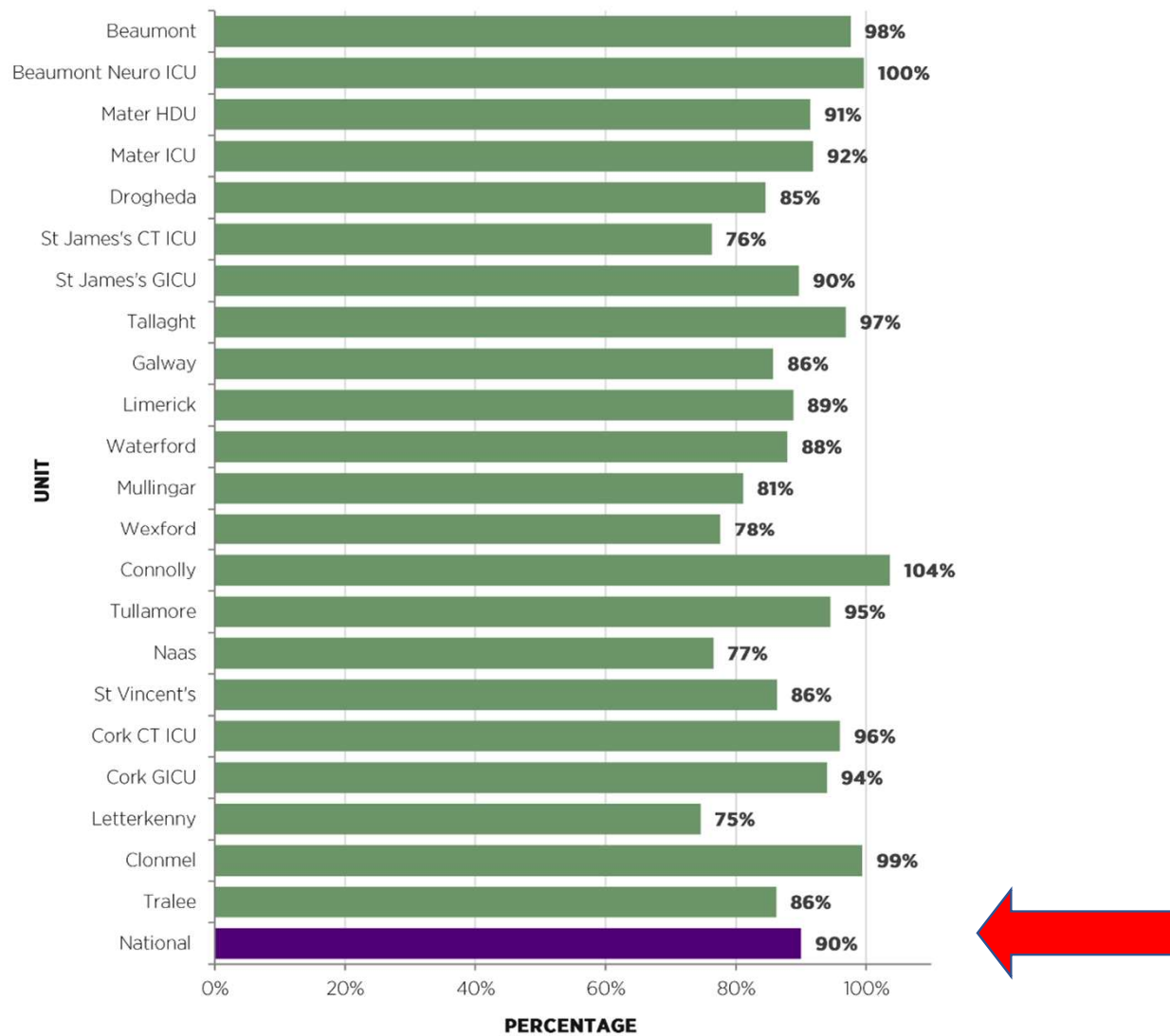


FIGURE 3.1C: BED OCCUPANCY IN 2019 (BED DAYS OCCUPIED AS A PERCENTAGE OF UNIT BED DAYS AVAILABLE)



Leo Varadkar said he was concerned about admission rates to intensive care

“As long as we have the ventilators, there's a lot that have arrived already and some more that are coming, we can expand our ICU capacity.

RD2

RD3

March 29th

ICU capacity

The HSE is preparing for a surge of coronavirus cases with 1,200 critical care beds but is unsure by how much the State's intensive care unit (ICU) capacity will be exceeded when the pandemic peaks here, possibly in mid-April.



HSE chief executive Paul Reid said the possibility of existing ICU beds being full in just over two weeks was "a very significant concern". File photograph: Gareth Chaney/Collins

The State's highest-ranking healthcare officials, at a briefing on Sunday morning, said there were up to 1,200 ICU beds in the country's public and private hospitals. But they were unable to say by how much ICU capacity in the system could be exceeded by in a surge of severe Covid-19 infections.

Slide 8

RD2 Rory Dwyer, 03/09/2020

RD3 Rory Dwyer, 03/09/2020

Expansion of ICU capacity

- Bed spaces with supply of piped gases
- Equipment; ventilators, monitors, syringe pumps, etc
- Staffing; cancel leave, redeployment, upskilling





CRITICAL CARE

National Clinical Programme for Critical Care

COVID-19: Principles & Guidance

Supporting the role of Critical Care Nurses in response to an immediate surge in Critical Care capacity and increased requirements of the Critically Ill patient during the pandemic.



Seirbhís Sláinte
Níos Fearr
á Forbairt

Building a
Better Health
Service



ICU bed capacity Census, May 2020

R Dwyer, Clinical Lead, NOCA ICU Audit and ICU Bed Information System

B Marsh, Chair, NOCA ICU Audit Governance Committee

M Power, Clinical Lead, HSE Critical Care Programme

Risk matrix: green normal care. Yellow, orange, red increasing risk respectively:

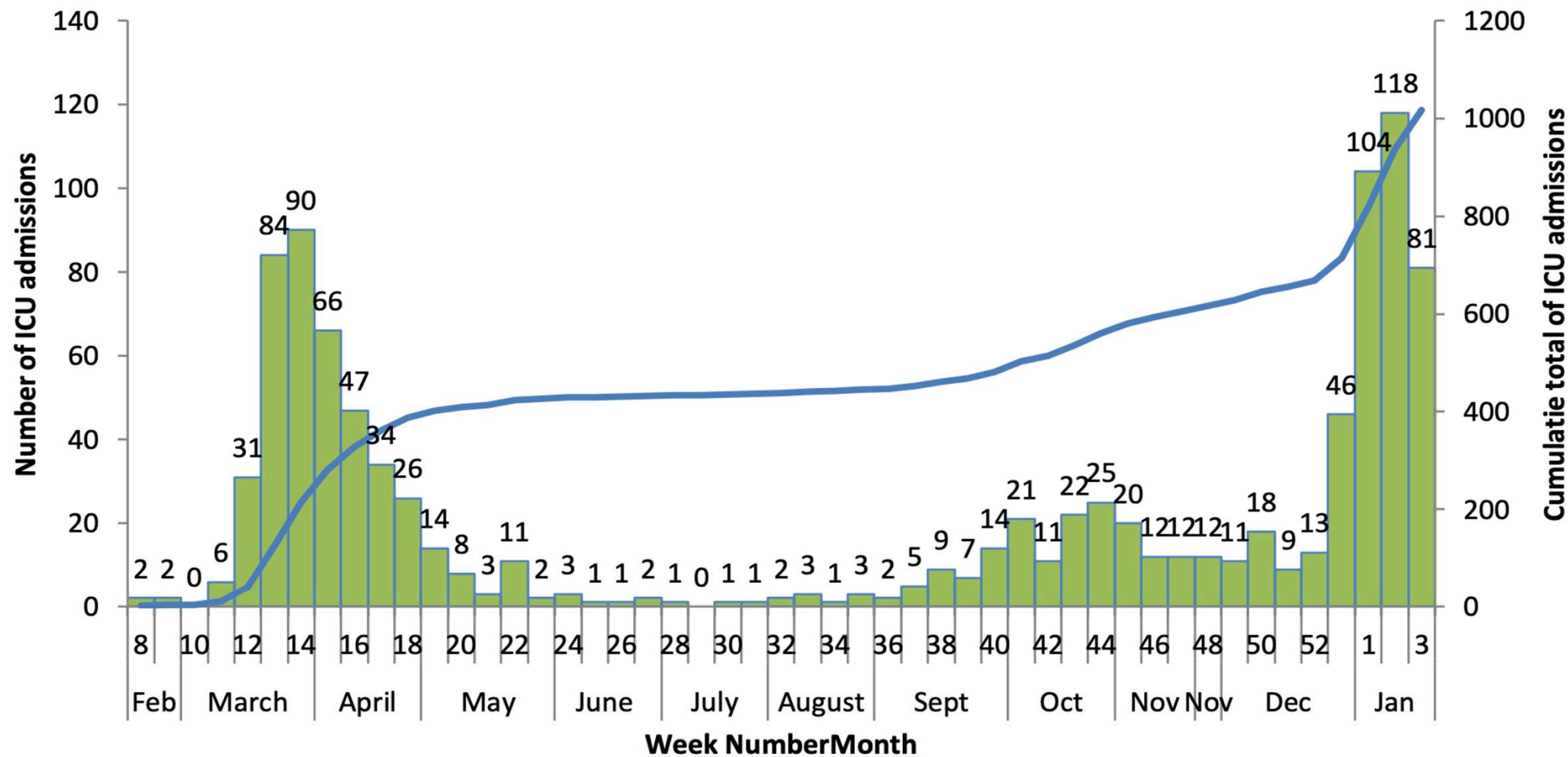
Baseline Capacity	Quality of care sustained in ICU and HDU
Surge 1 escalation	Quality of care sustained in ICU/ HDU by redeployment of staff but a significant impact on other hospital Departments
Surge 2 escalation	Quality of care impacted in ICU / HDU and a major impact on other hospital Departments
Surge 3 escalation	Quality of care in ICU/ HDU seriously impacted and an overwhelming impact on other hospital Departments

Adult Critical Care bed capacity; Baseline, Surge 1, Surge 2 and Surge 3 (May 2020).



	HSE hospitals	Private hospitals	
Baseline ICU (Level 3) beds	204	35	
Baseline HDU (Level 2) beds	51	10	
TOTAL	255	45	
Surge 1 ICU (Level 3) beds	308	35	Total 399
Surge 1 HDU (Level 2) beds	46	10	
TOTAL	354	45	
Surge 2 ICU beds	446	51	Total 536
Surge 2 HDU beds	38	3	
TOTAL	484	54	
Surge 3 ICU beds	577	68	Total 690
Surge 3 HDU beds	34	11	
TOTAL	611	79	

Appendix A: Adult cases of COVID-19 admitted to ICU by week of admission in Ireland, from 16.02.2020 to 23.01.2021 ^{18 19 20}



Health Protection Surveillance Centre (HPSC)

Hospital	Unit	Total No. Beds	Open/Staffed Beds	Occupied Beds	Invasively ventilated (n)	Ready for Discharge	Reserved Beds	Available Beds	Last Updated
Beaumont	ICU	12	8	7	6	-	-	1	02/02/2021 10:04:11
	HDU	8	6	5	4	-	-	1	02/02/2021 09:58:31
	RICU	9	8	9	8	-	-	-	02/02/2021 10:07:22
	OFFUNIT	6	6	5	4	-	-	1	02/02/2021 08:53:42

External Hospital Unit Summary View

National ICU Bed Information System

National Status (All critical care units & off-unit occupancy figures)

Type of Bed	Open/Staffed Beds	Occupied Beds	Invasively ventilated (n)	Cleared For Discharge	Reserved/ Assigned Beds	Available Level 3 Beds	Available Level 2 Beds	Closed Beds	Last Updated
Adult (Public)	338	<u>316</u>	191	<u>13</u>	6	<u>15</u>	<u>1</u>	51	02/02/2021 11:58:41
Paediatric	30	<u>23</u>	16	<u>1</u>	2	<u>5</u>	<u>0</u>	0	02/02/2021 11:58:41
Private	45	<u>34</u>	6	<u>8</u>	17	<u>-7</u>	<u>1</u>	0	02/02/2021 11:58:41

Summary of COVID information ..

National ICU Bed Information System

National Current COVID Status

Admissions of COVID-confirmed patients in last 24 hrs (8AM - 8AM)	Confirmed-COVID cases under care of ICU team; in-Unit or off-Unit (n)	Confirmed-COVID cases invasively ventilated (n)	Confirmed-COVID; deaths under care of ICU team in last 24 hrs (8am-8am) (n)	COVID-confirmed patients discharged to ward in last 24 hrs (8am-8am) (n)	Suspected-COVID cases under care of ICU team; in-Unit or off-Unit (n)	Suspected COVID cases invasively ventilated (n)	Last updated
13	207	131	7	8	16	4	02/02/2021 11:58:41

Summary of COVID Admissions/Discharges ..

National ICU Bed Information System

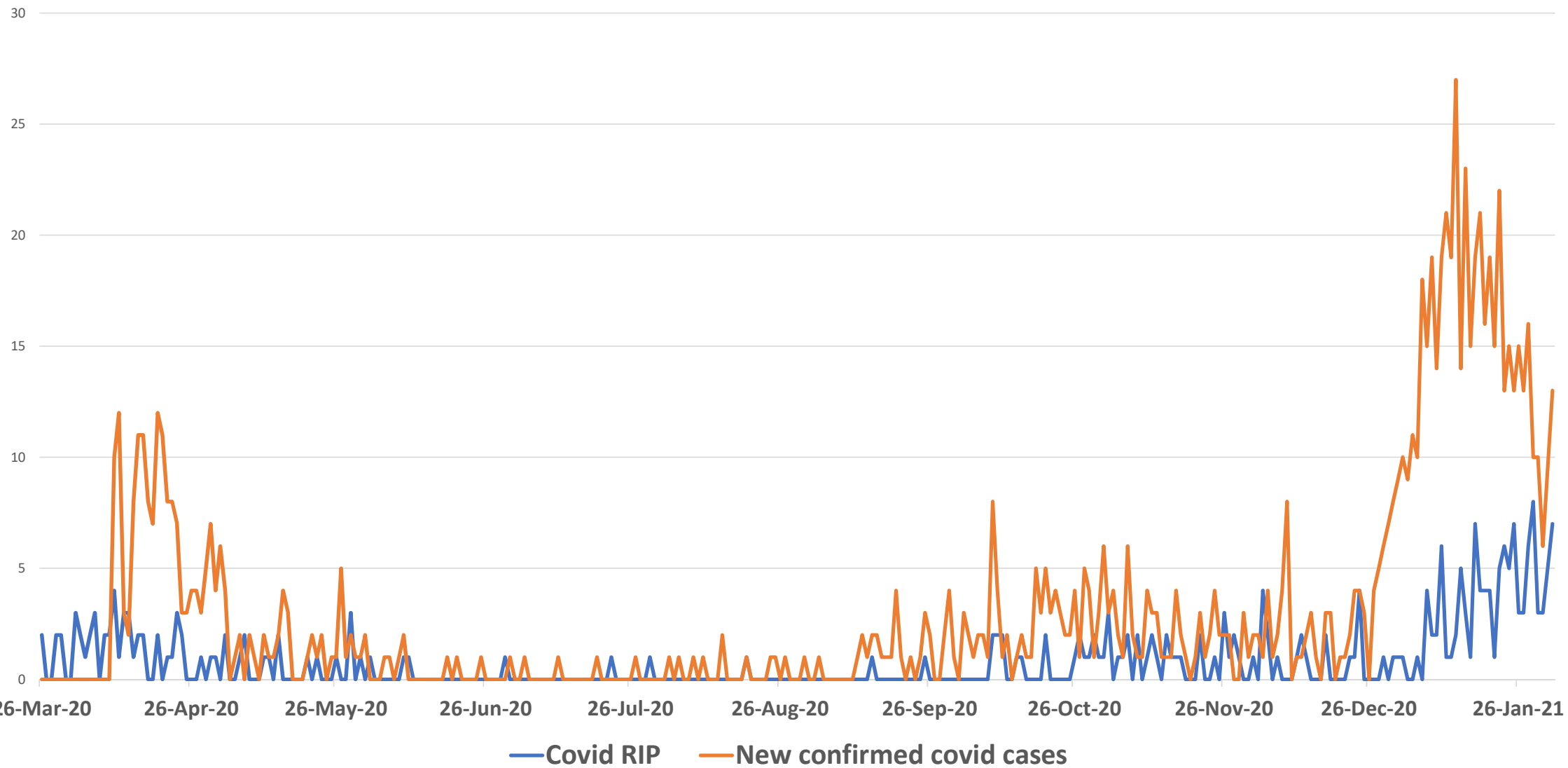
National Summary of Interventions ..

Total Occupied Beds	Invasively ventilated patients (n)	Intermittent HD in last 24 hrs (n)	CRRT (n)	Last updated
373	213	2	44	02/02/2021 11:58:41

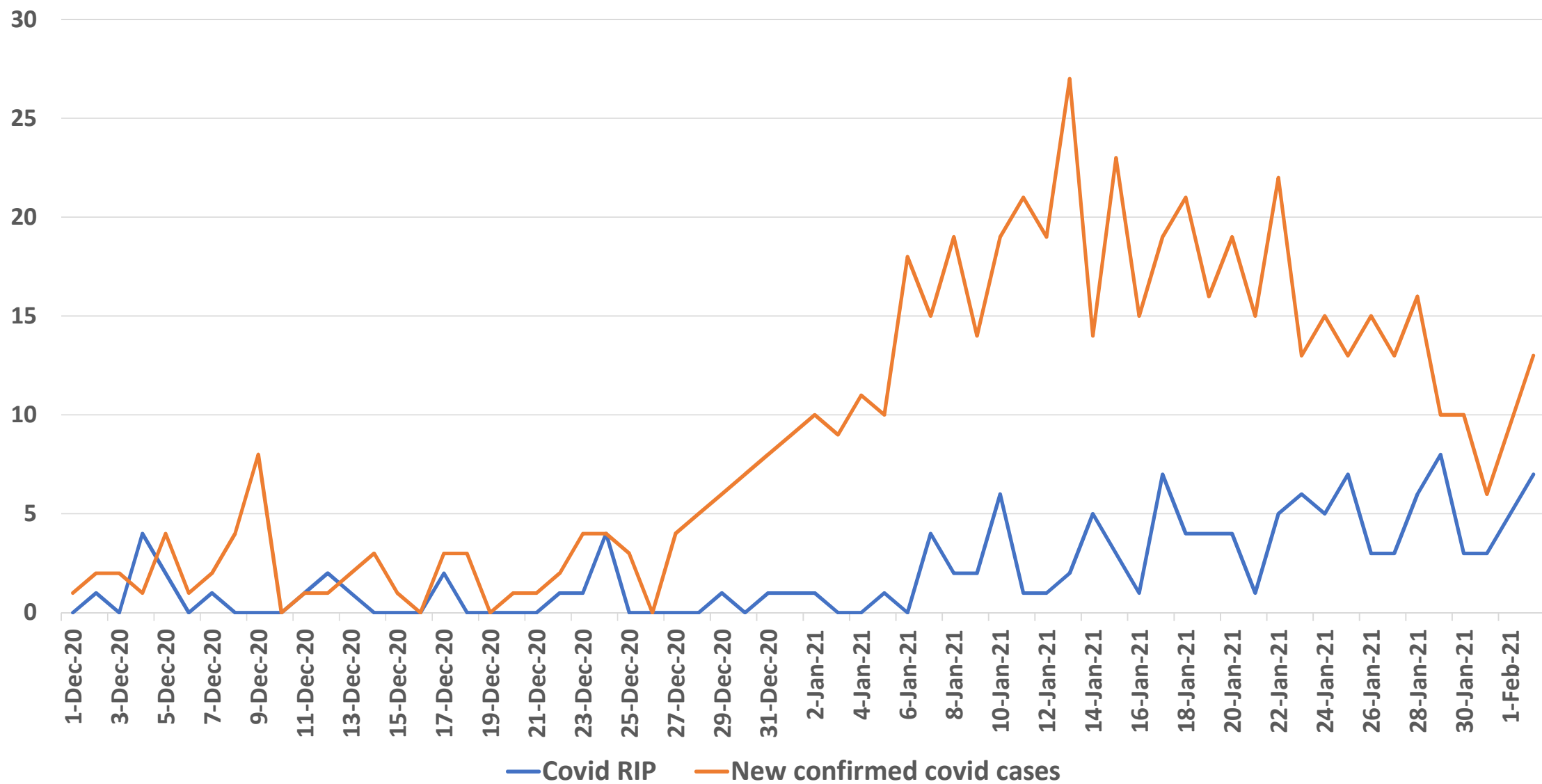
Summary of Interventions - by Hospital/Hosp Group.

Hospital	Total Occupied Beds	Invasively ventilated patients (n)	Intermittent HD in last 24 hrs (n)	CRRT (n)	Last updated
Midlands Hospital Group					
St James	34	23	0	5	02/02/2021 11:06:09
Tallaght (TUH)	14	10	0	5	02/02/2021 11:44:32
					02/02/2021

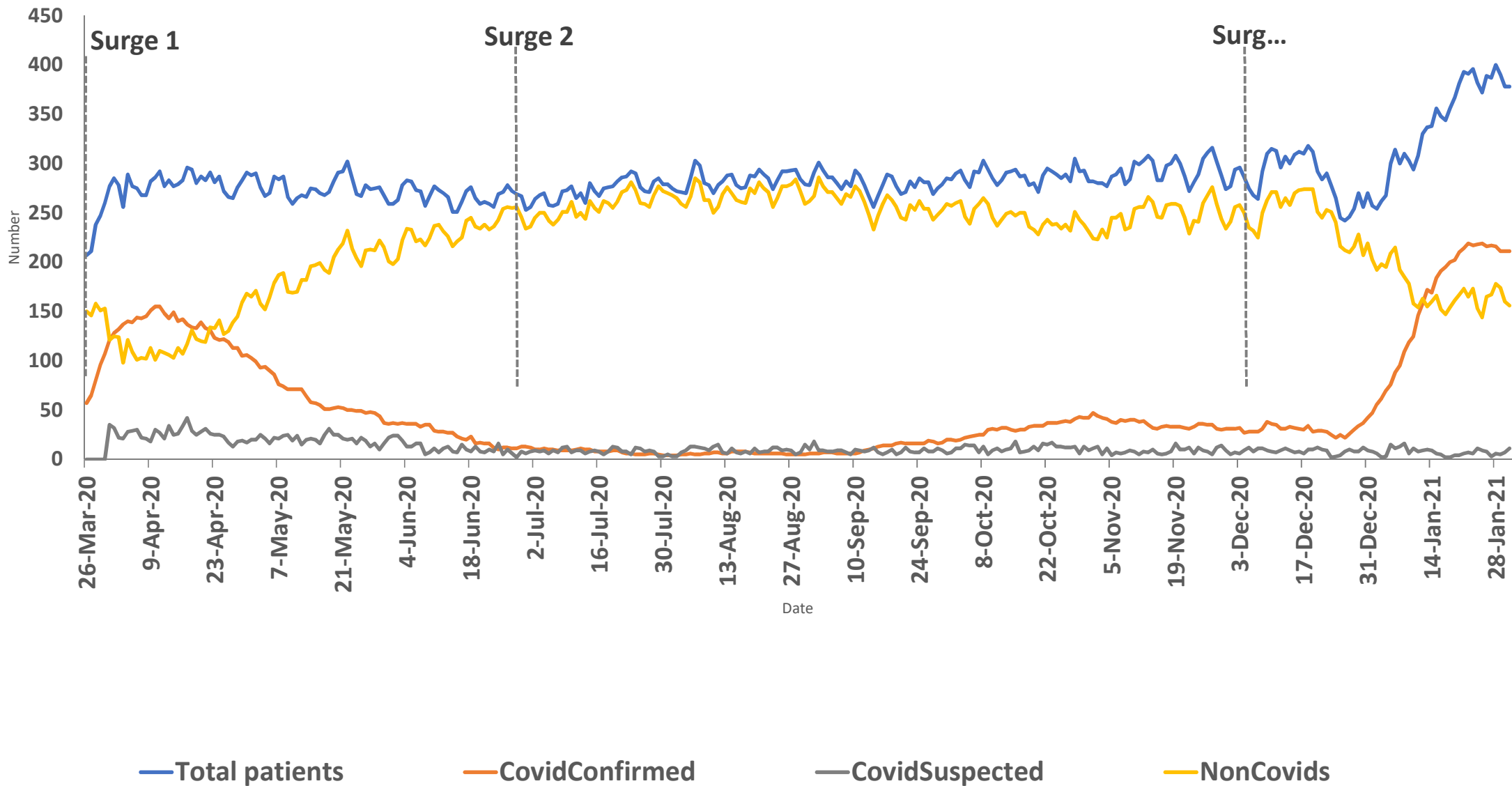
New COVID admissions and deaths March-January



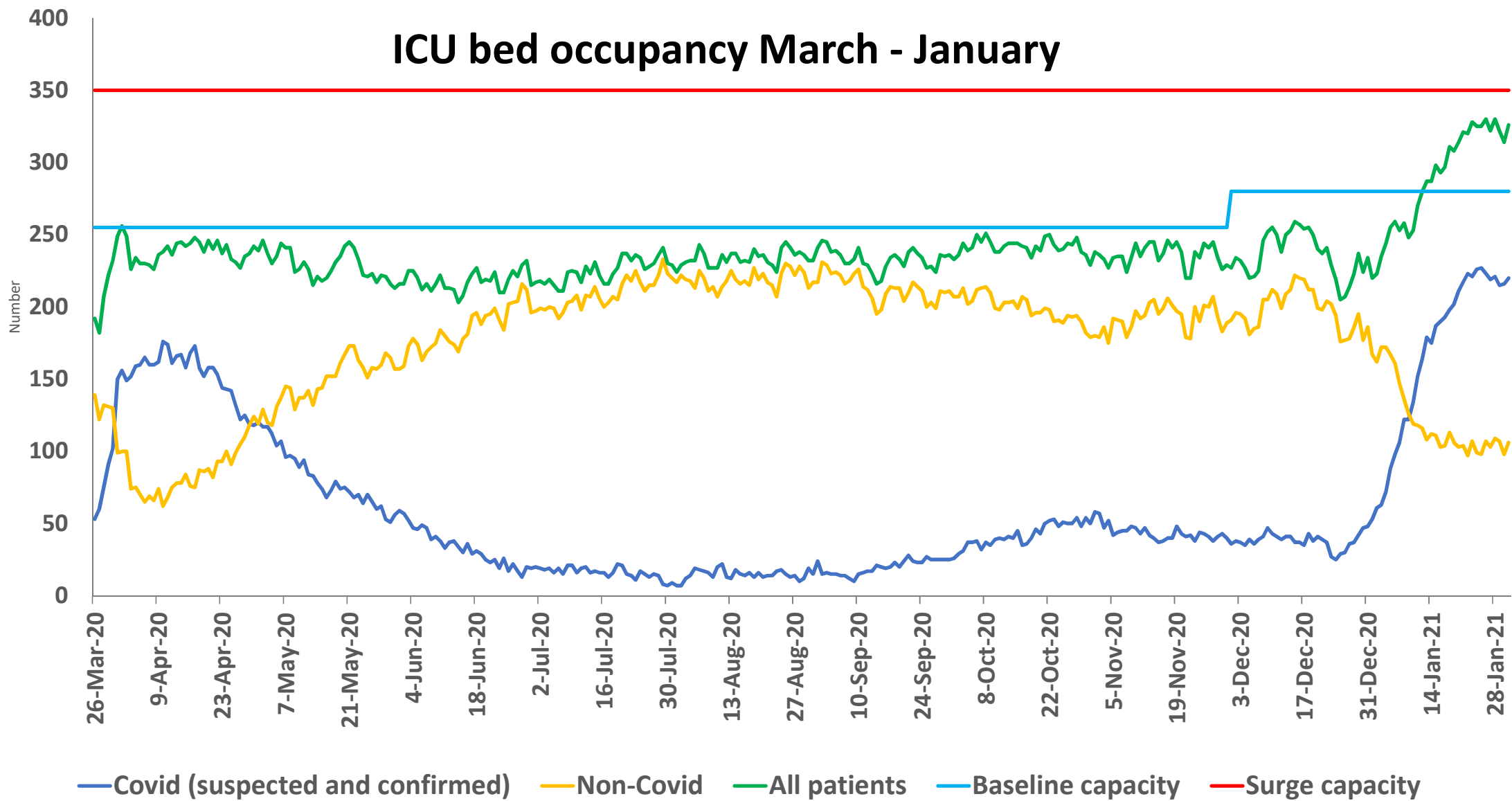
COVID new admissions and deaths December - January

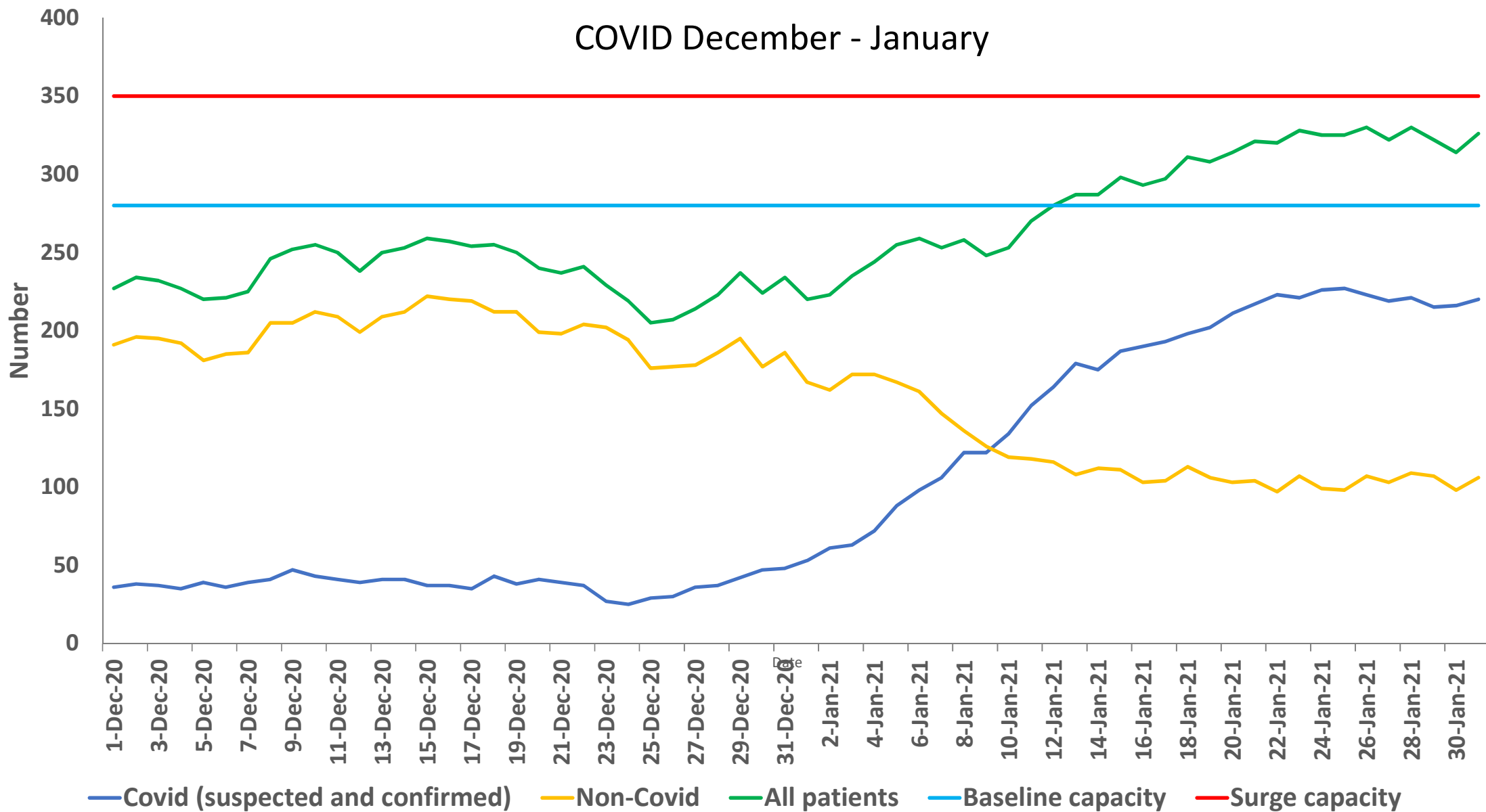


ICU activity during COVID; March - January

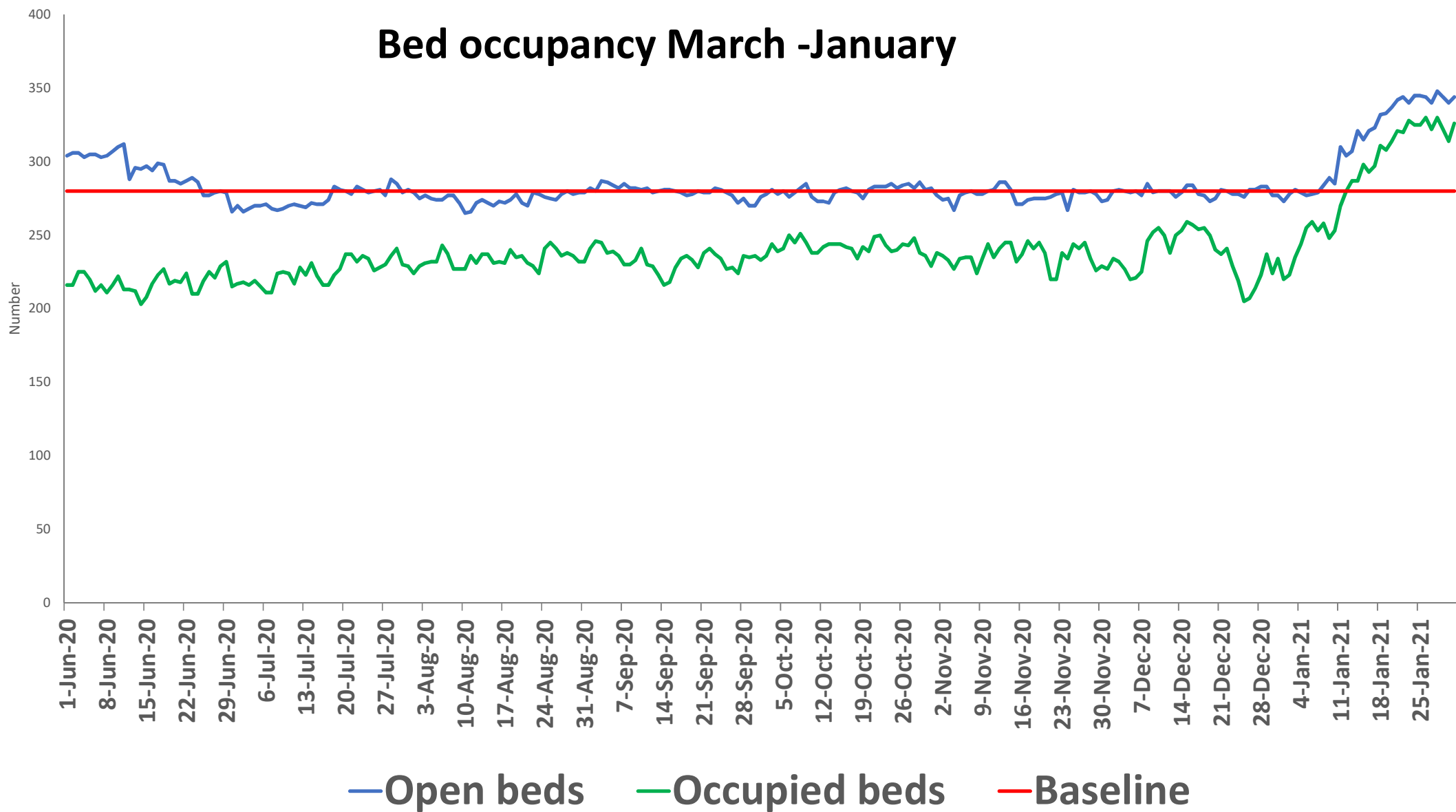


ICU bed occupancy March - January

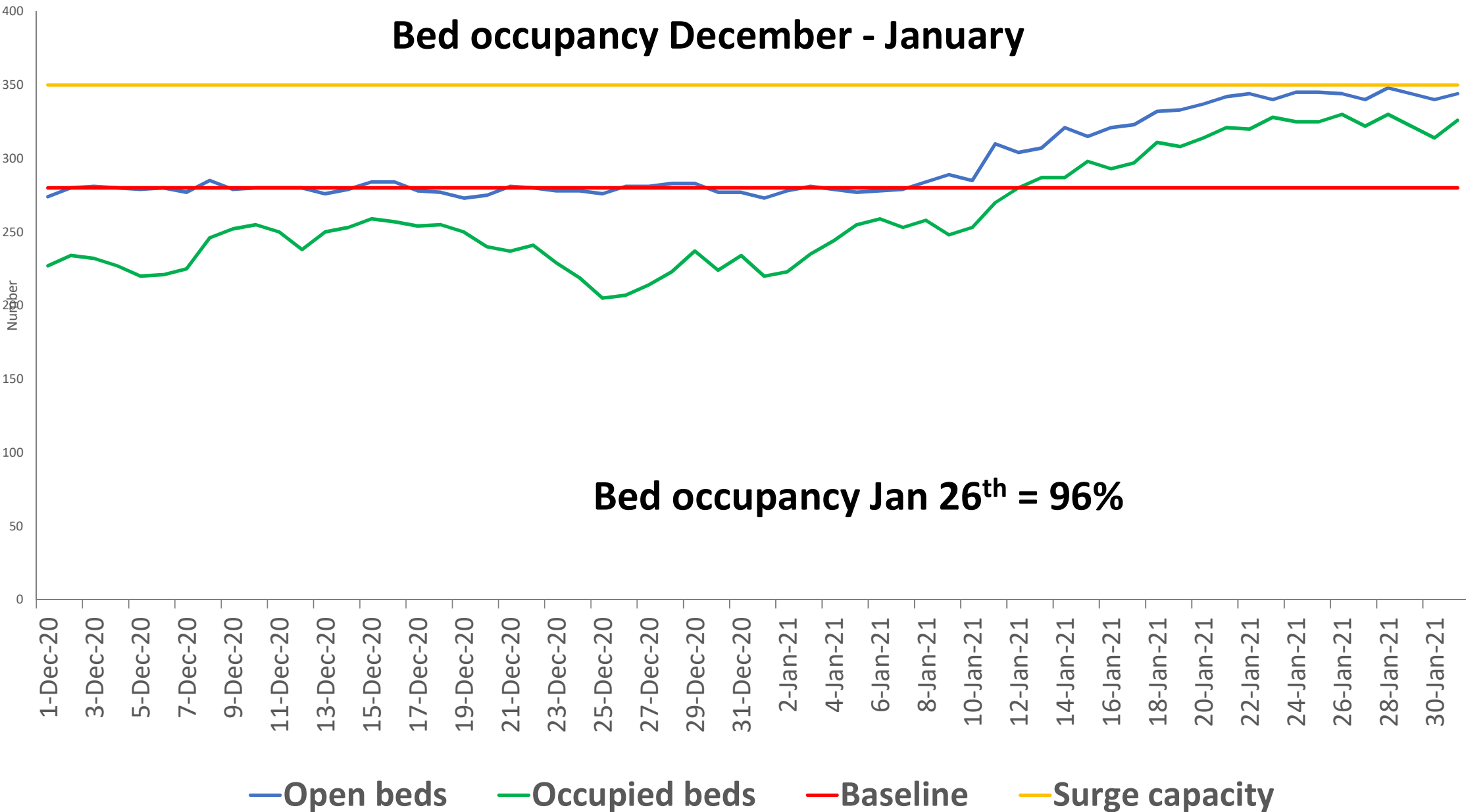




Bed occupancy March -January



Bed occupancy December - January



— Open beds

— Occupied beds

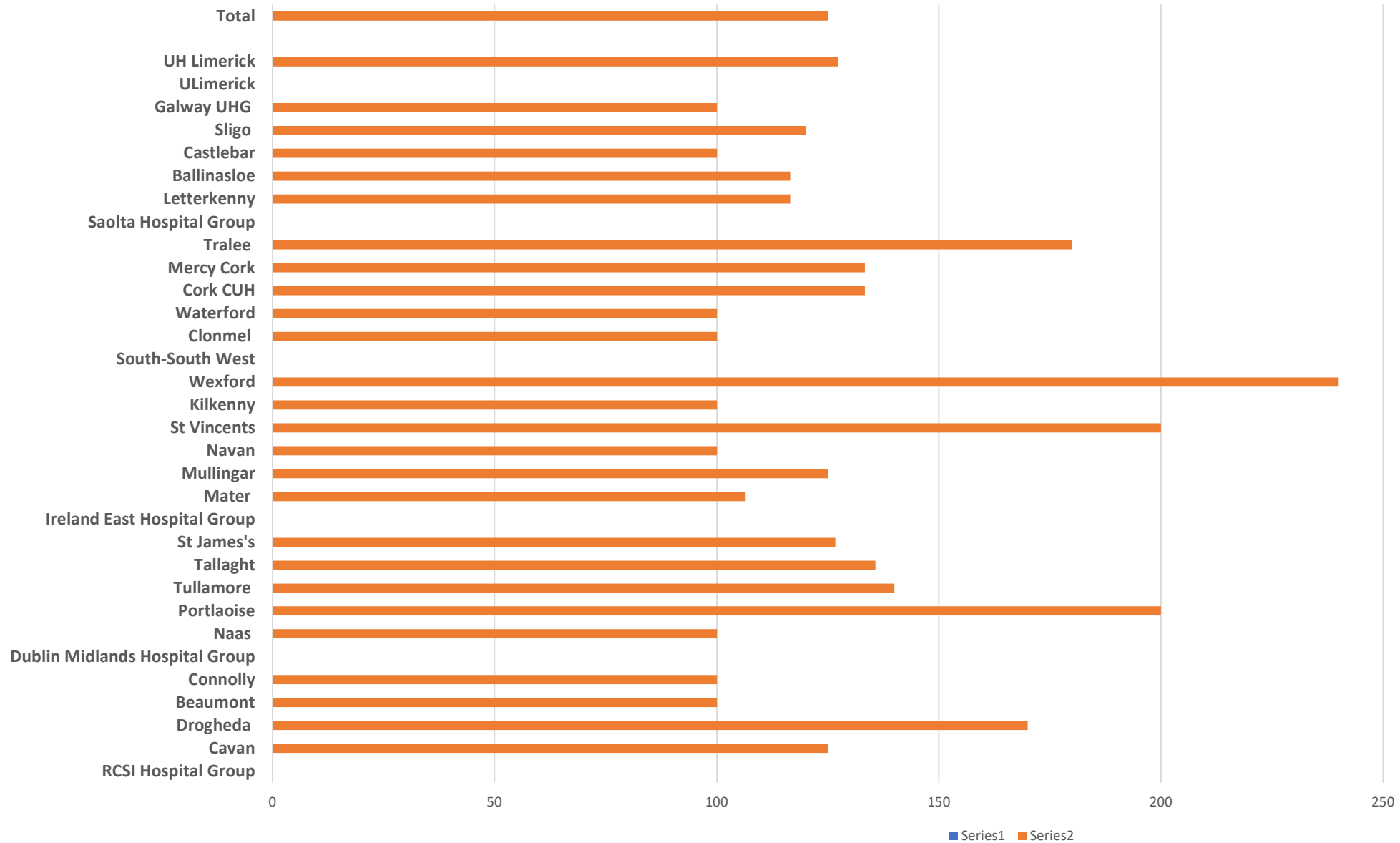
— Baseline

— Surge capacity

Geographical Spread of COVID-19 Confirmed Cases and Suspected Cases across Acute Hospital Sites as at 31/01/2021 20:00



Percentage of baseline ICU capacity open in Surge 3 on January 21st



Risk matrix: green normal care. Yellow, orange, red increasing risk respectively:

Baseline Capacity	Quality of care sustained in ICU and HDU
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**HSE daily ICU
Operational
Group meeting.**

**Chair; Dr Vida
Hamilton**

HSE Acute Operations Critical Care Major Surge Working Group - Actions 01/02/2021 & Agenda 02/02/2021

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Agenda 02/02/2021:

- **Situation report; NOCA**
- **Staffing report; Una (Critical Care Programme)**
- **Nursing staffing; Derek and Eileen (CCP and DON group)**
- **Retrieval; Dermot/ David (MICAS/NAS/ CCRS)**
- **Dialysis; Bairbre/ Ronnie (HSE)**
- **Advanced oxygen devices on ward; Ger/ Ronnie (HSE)**
- **O2; Damien (HSE)**
- **AOB: ICU Drugs Update – Fionnuala King**
- **Actions**

*Actions arising – updates from owners

External Hospital Unit Summary View

National ICU Bed Information System

National Status (All critical care units & off-unit occupancy figures)

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Summary of COVID information ..

National ICU Bed Information System

National Current COVID Status

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**CRITICAL
CARE**

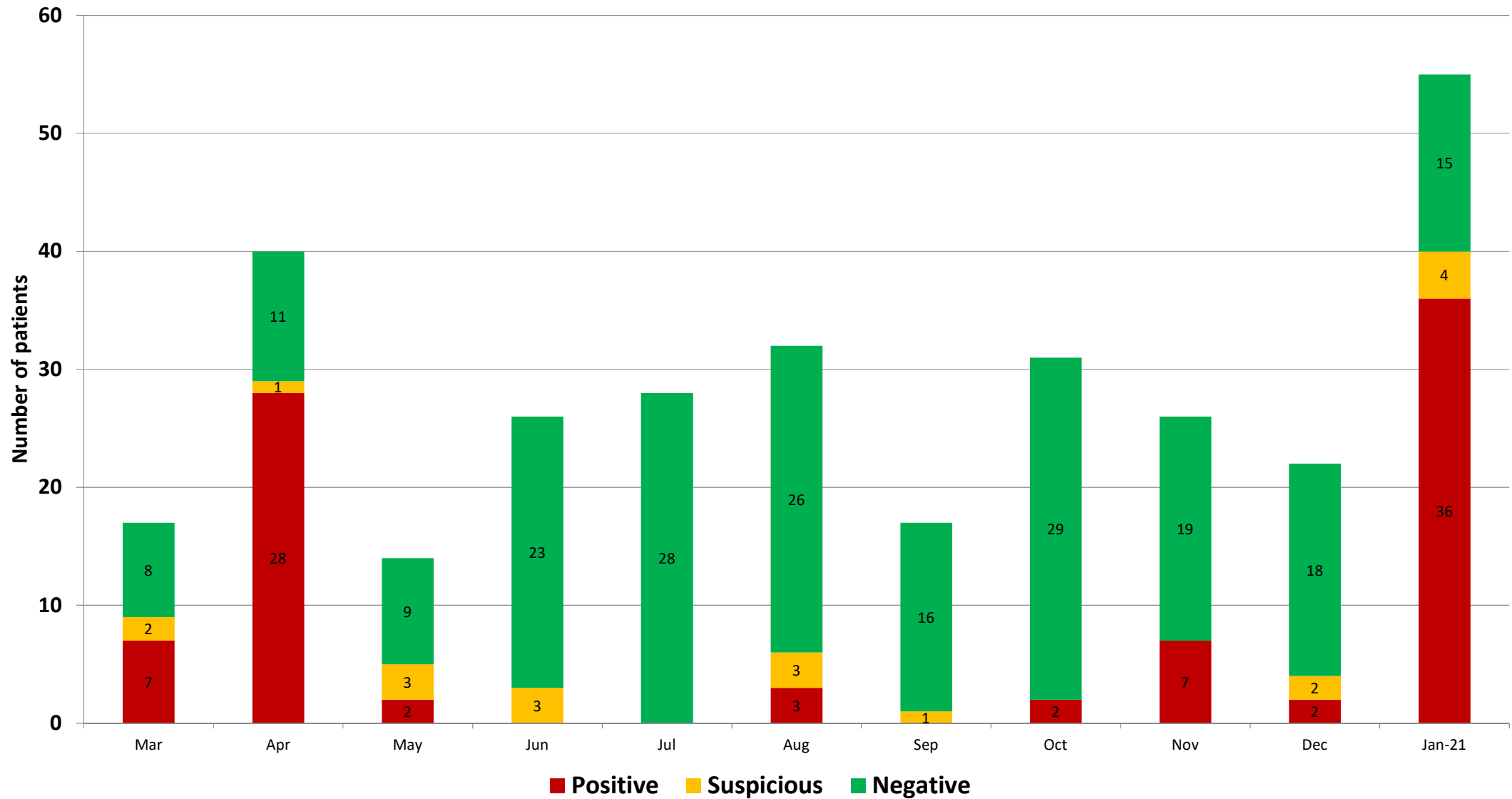


**CRITICAL
CARE**

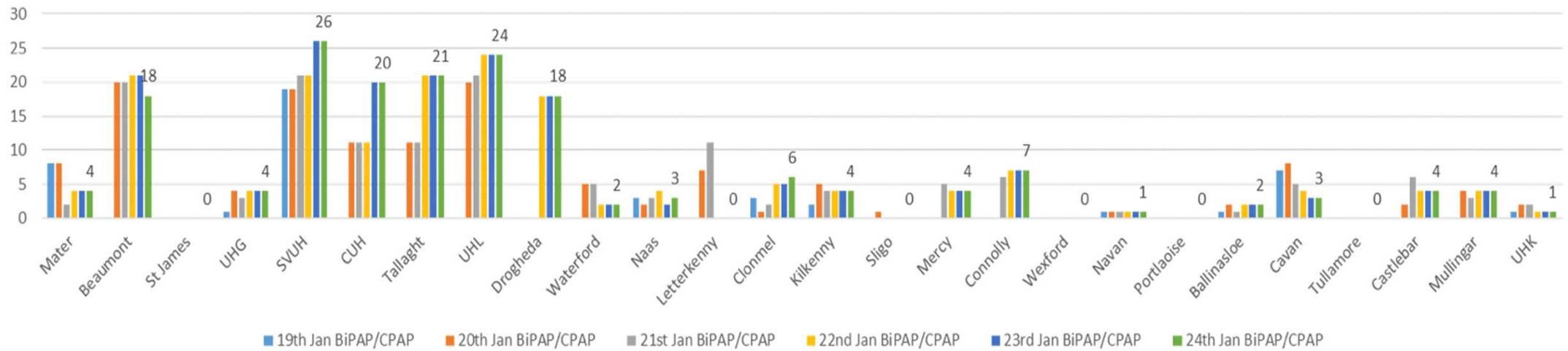
**HSE Acute Operations Situation Report
on Hospitals currently with no available ICU Beds – 1st February 2021**

Hospital	Existing Permanent Critical Care Capacity	Additional Surge Critical Care Capacity	Additional Critical Care Nursing Staff (numbers)
St. Vincent's	17	6 surge can go to 7 in PACU & 24 in St. Josephs – total surge capacity 49	25 patients 14 Covid – 11 non Covid 1 query 16 Ventilated – 1 NIV 8 self-ventilating (8 dialysis) 20 ICU nurses – 3 scrub nurses - 1 PACU 1 eye and ear re-deployed 2 HCAs No HDU Excellent Re-deployment ongoing. 10 Medical Students currently being trained as HCAs

MICAS ICU transport service

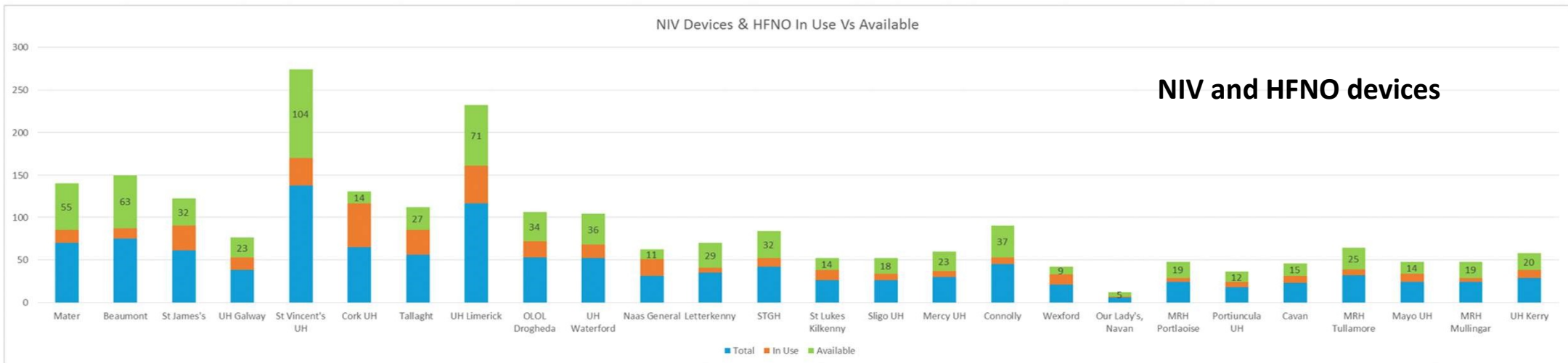


BiPAP/CPAP Usage over last 5 days

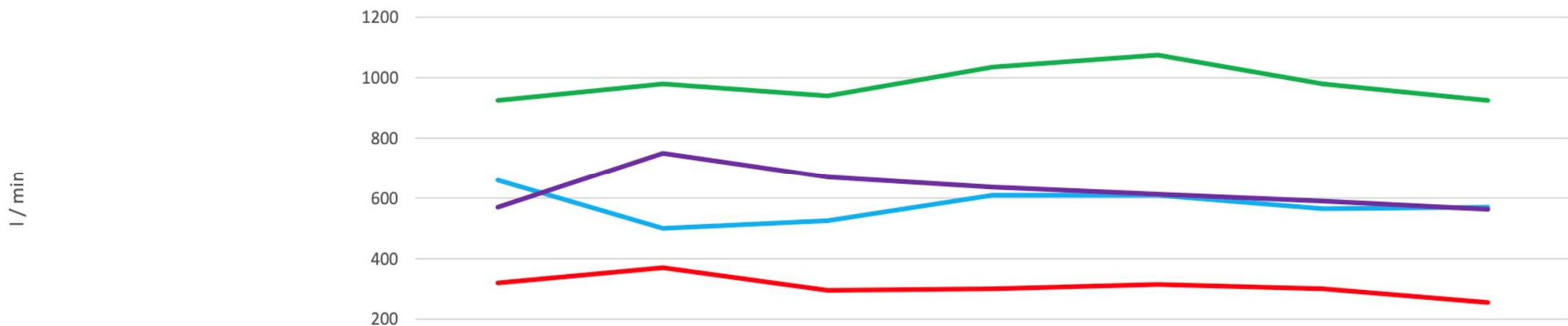


NIV Devices & HFNO In Use Vs Available

NIV and HFNO devices



Daily report on O2 usage and supply



Oxygen Capacity - Daily Report

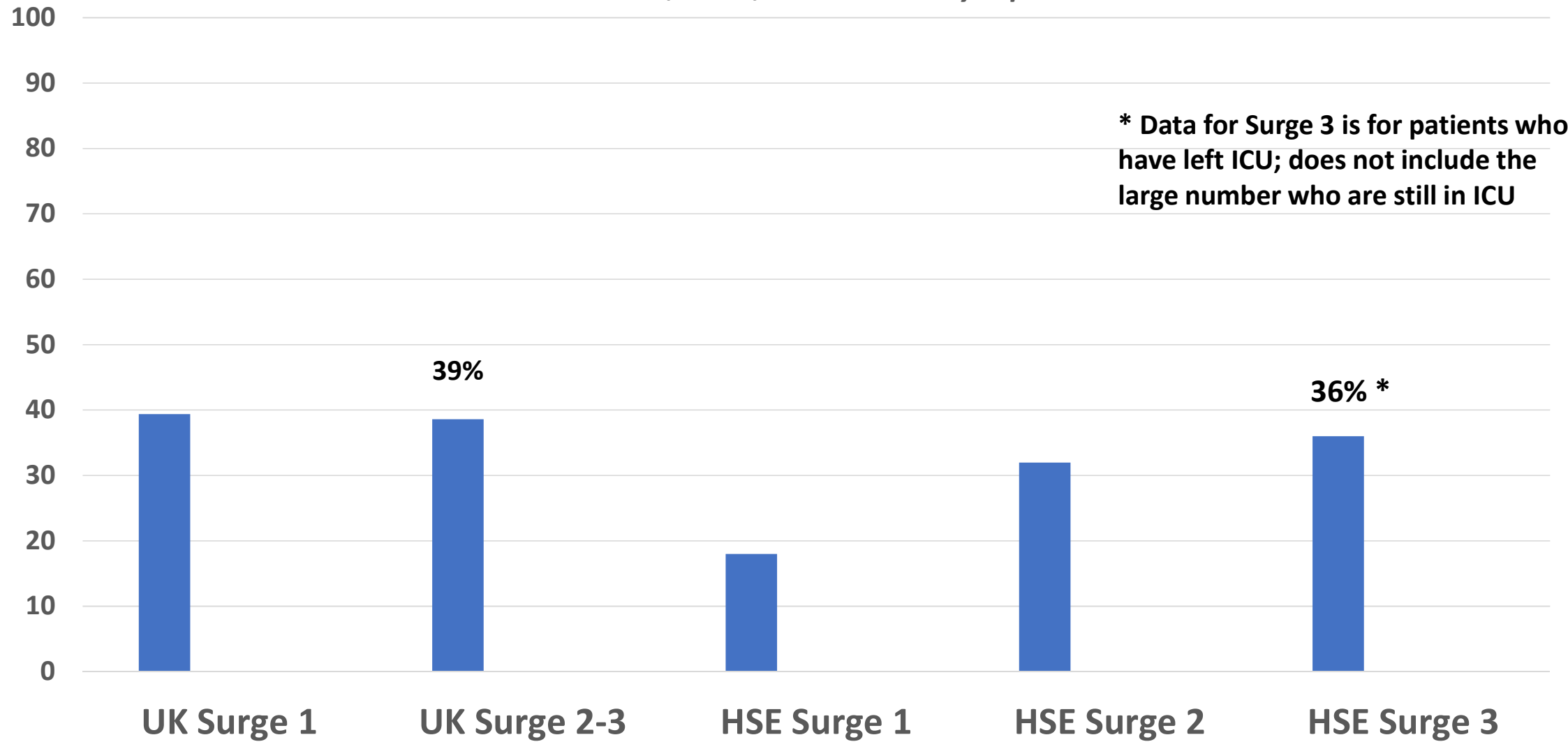
Last Update Date: 24th January 2021 @ 18:30h

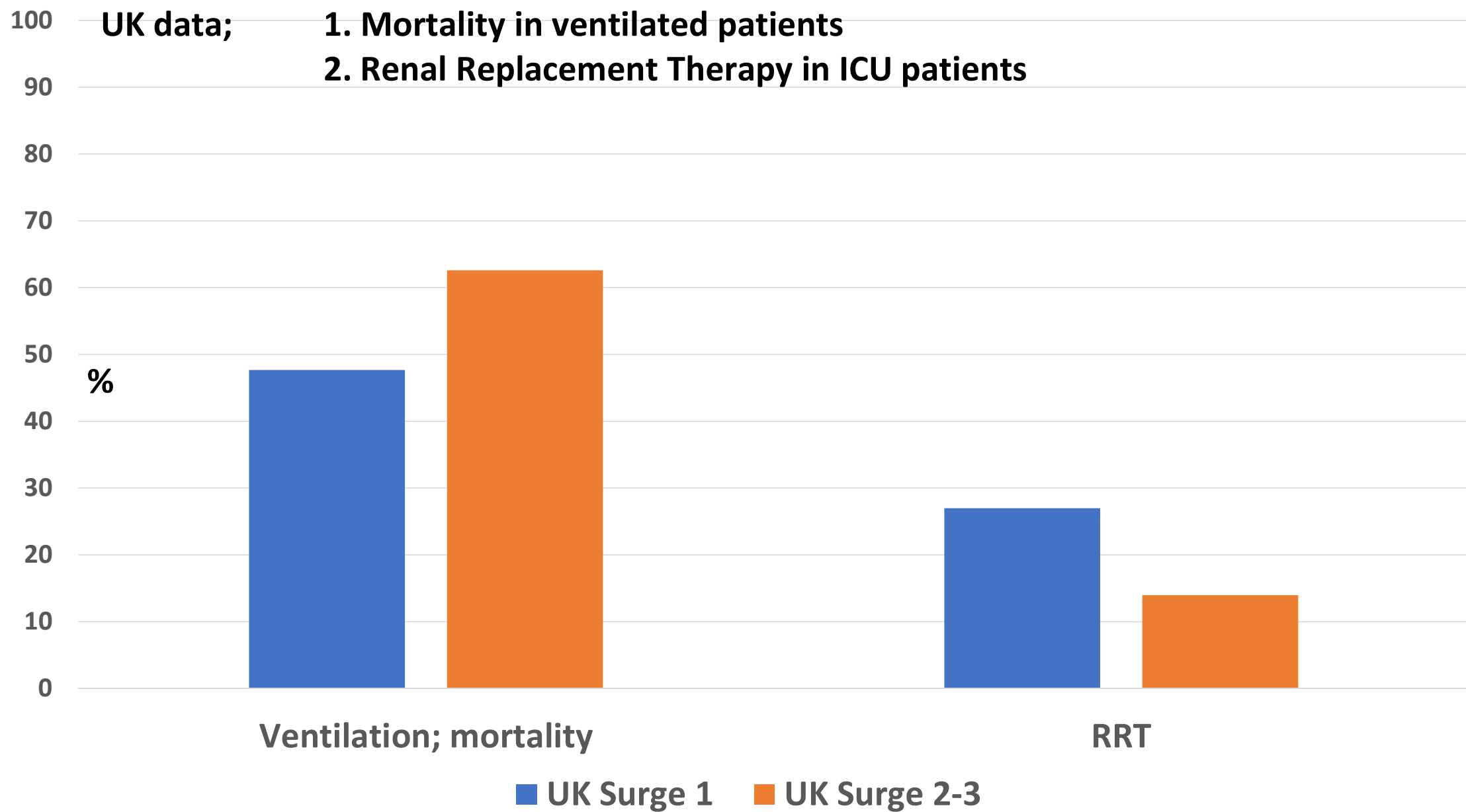
Source	24th Jan				23rd Jan	Change in Flow Rate
	BOC Advised System Capacity (l/min)	Adjusted continuous output (l/min) (see note 1)	Current Flow Rate (l/min) (see note 2)	Current Flow Rate (% of Max Output)		
Hospital Group / Hospital						
RCSI Group						
CAVAN GENERAL HOSPITAL	1500	1200	255	21%	300	-15%
OUR LADY OF LOURDES HOSPITAL DROGHEDA	2500	2000	570	29%	565	1%
BEAUMONT HOSPITAL (Main Tank)	2500	2000	710	36%	730	-3%
BEAUMONT HOSPITAL (New Unit)	833	667	215	32%	250	-14%
CONNOLLY HOSPITAL (VIE)	1667	1333	380	29%	410	-7%
CONNOLLY HOSPITAL (Oxygen 93)	N/A	490	183	37%	180	2%
Dublin Midlands Hospital Group						

ICU Mortality %

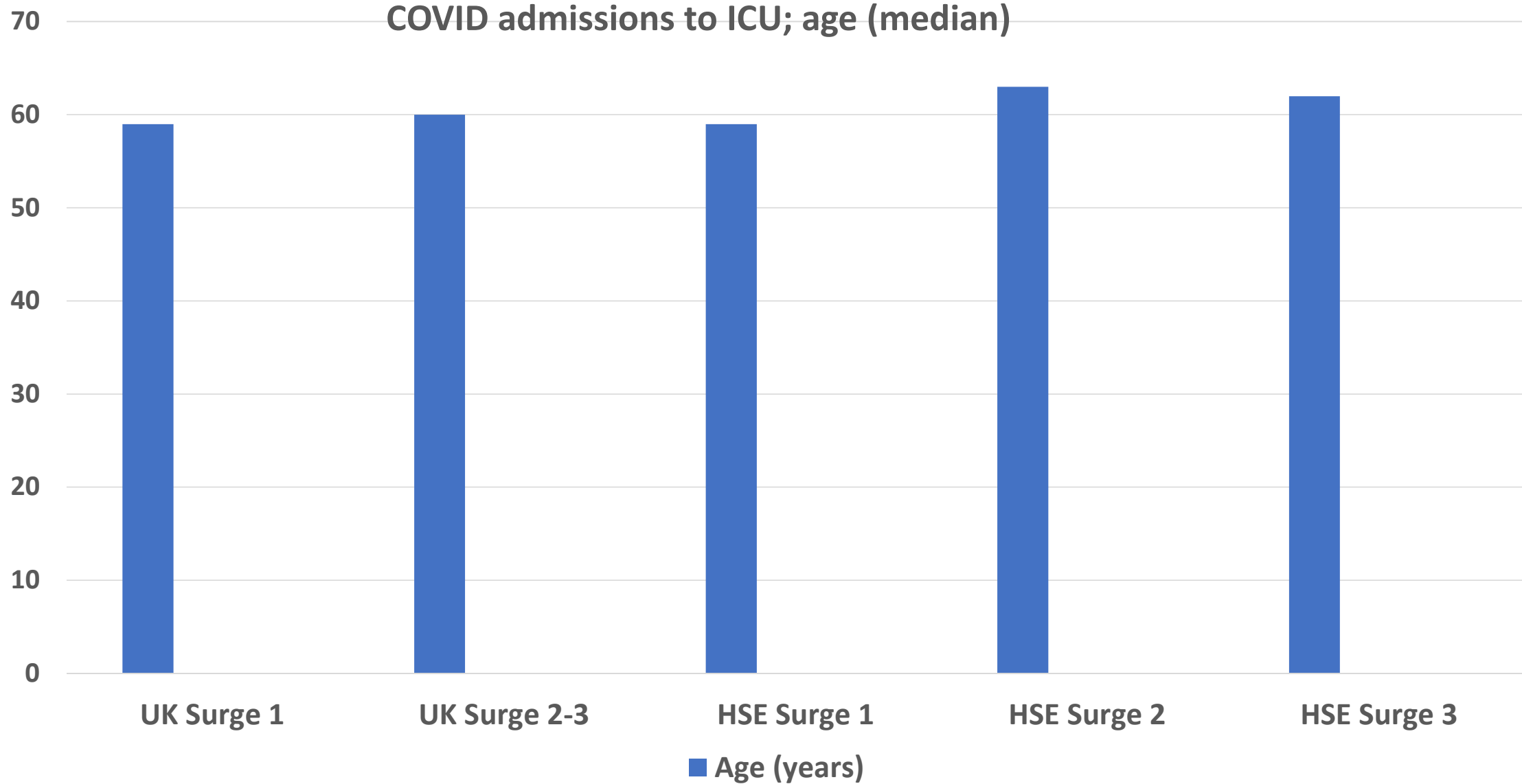
Source; HPSC, ICNARC weekly report *

* Data for Surge 3 is for patients who have left ICU; does not include the large number who are still in ICU

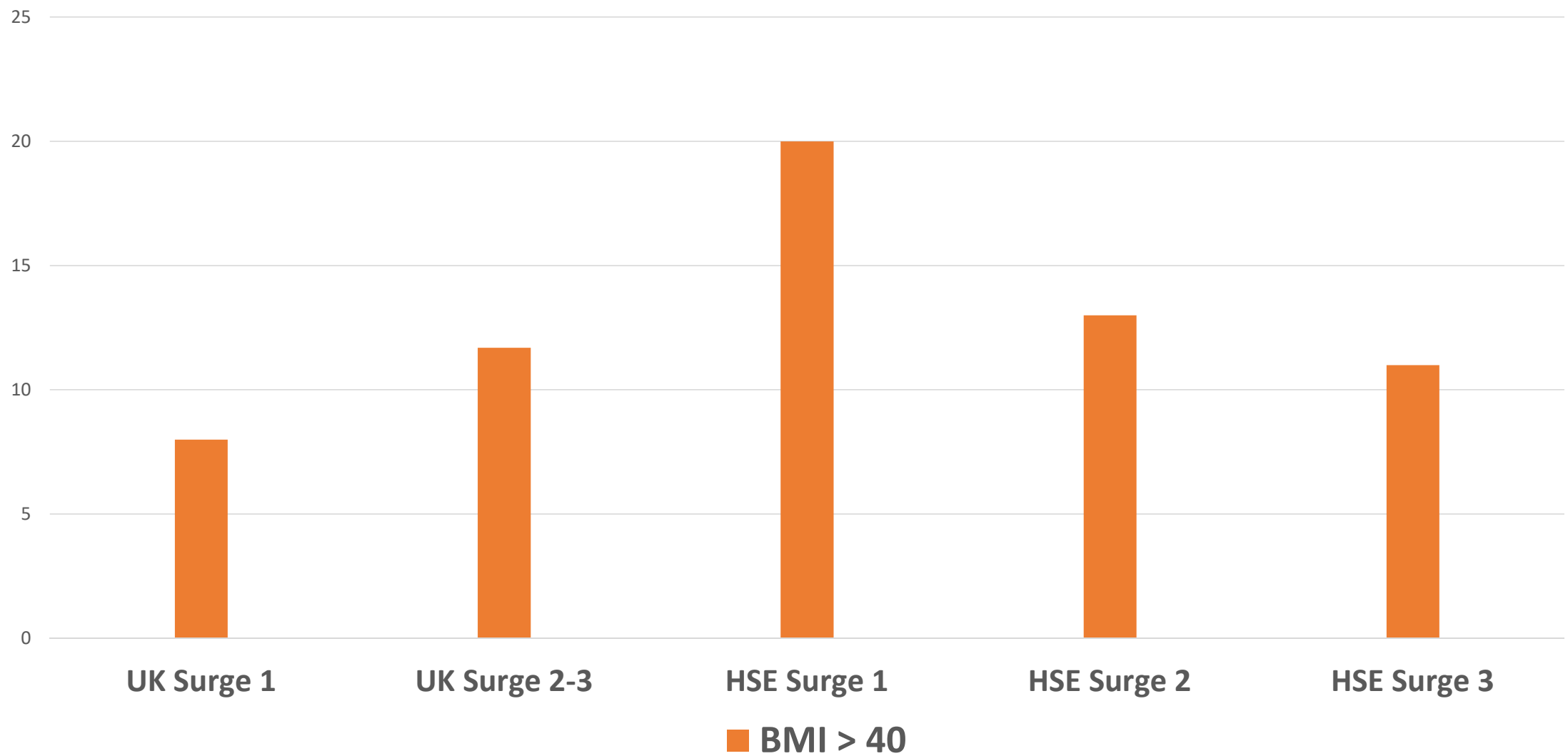




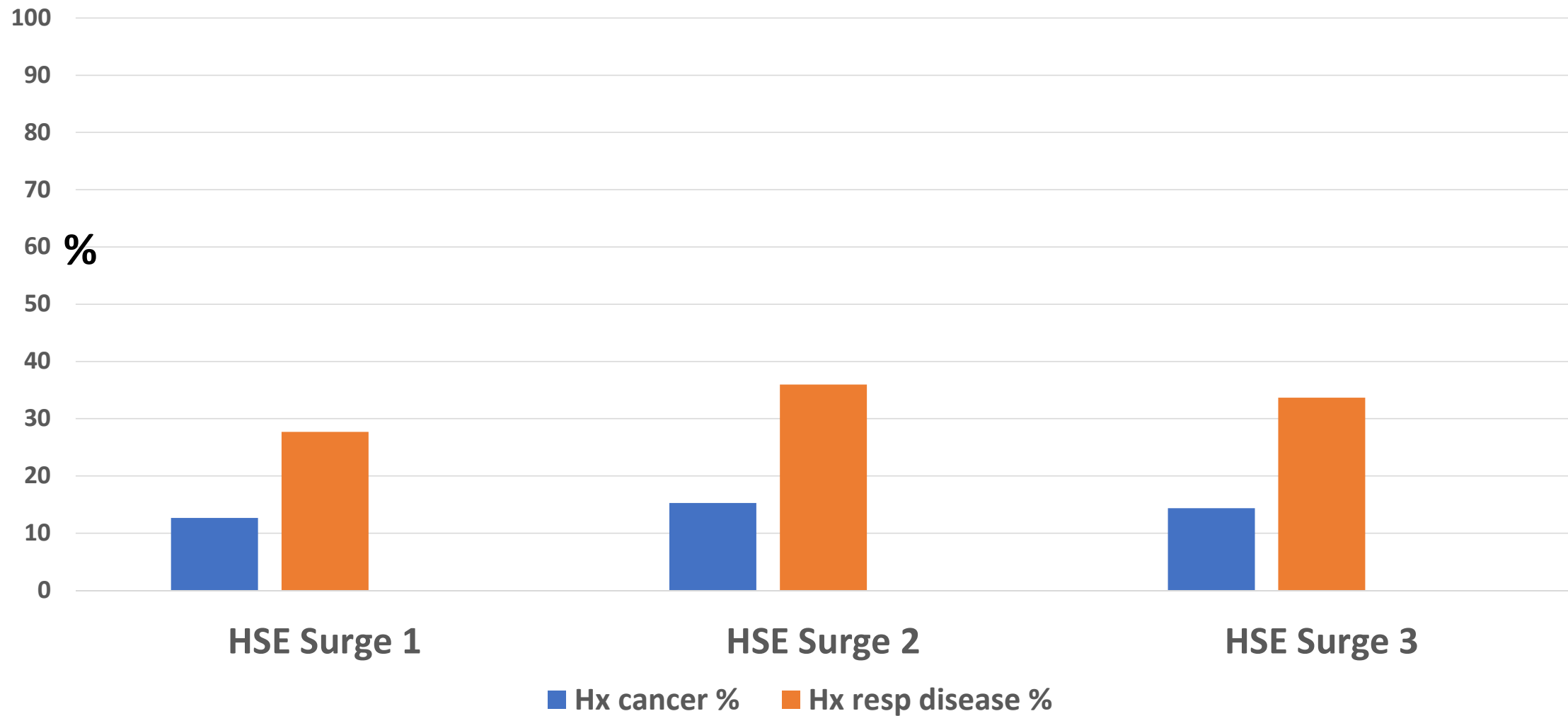
COVID admissions to ICU; age (median)



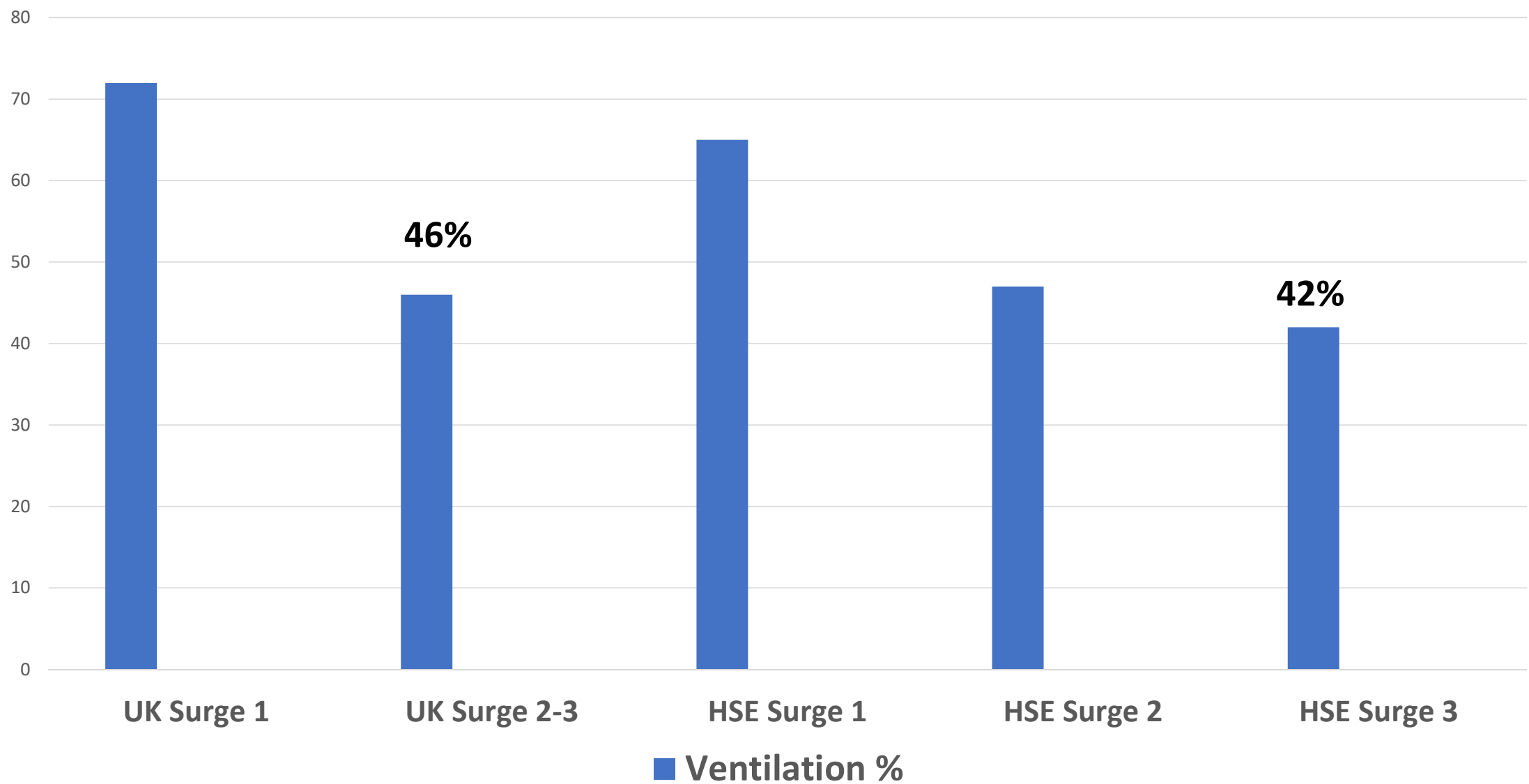
COVID patients in ICU; weight



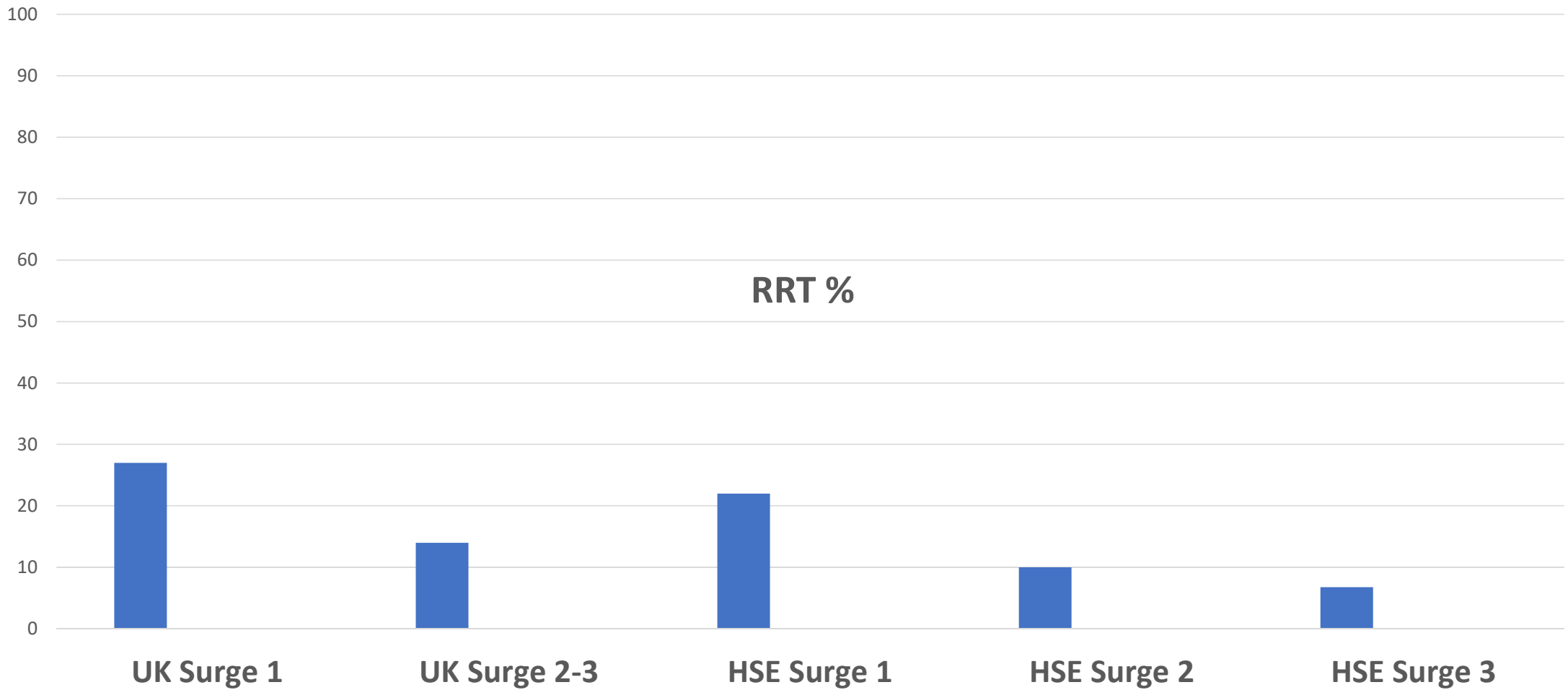
COVID patients in ICU; pre-existing conditions (i) Cancer (ii) Chronic respiratory disease



COVID patients in ICU; % ventilated

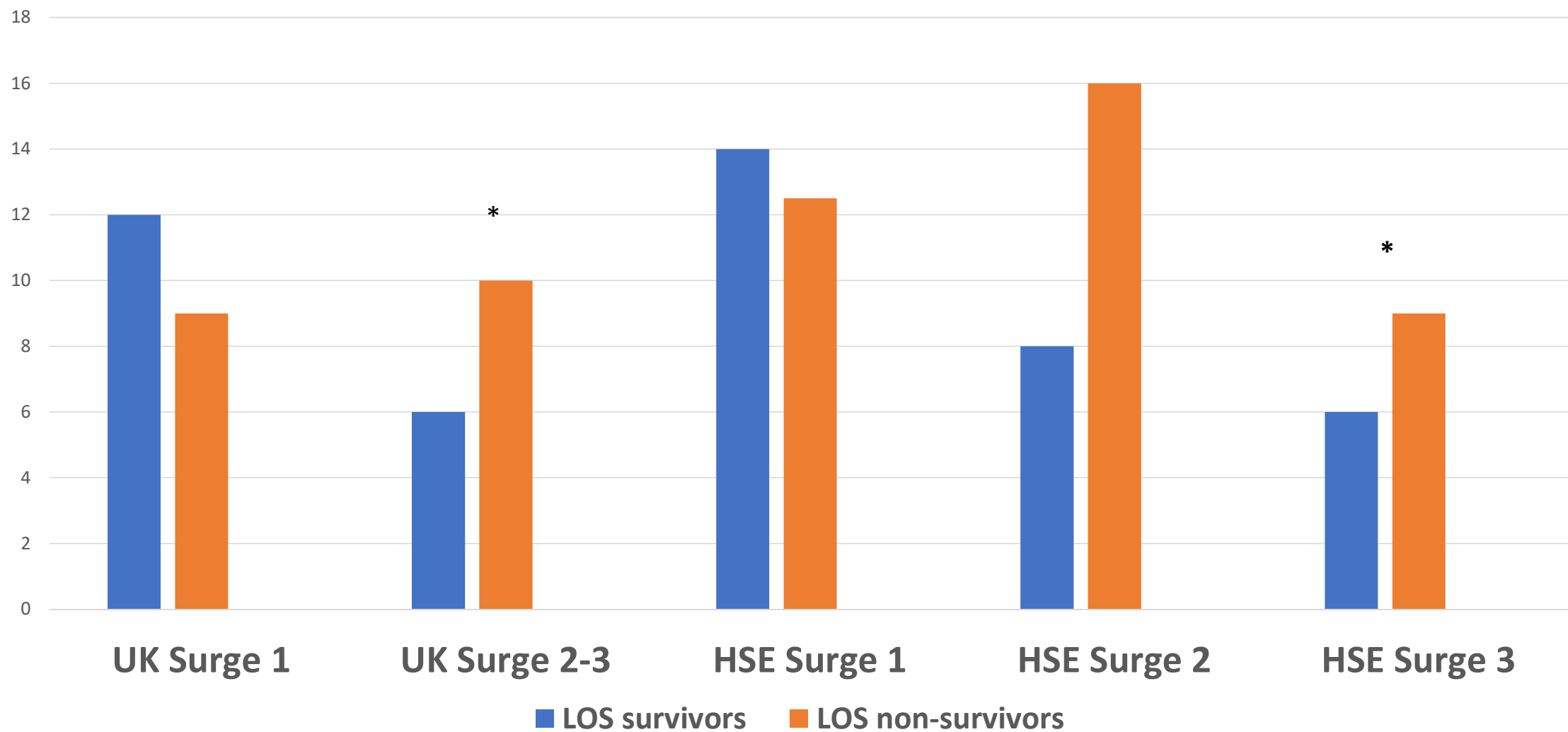


COVID patients in ICU; % requiring RRT



ICU Length of stay (median, days)

** Bias towards shorter stays as many patients are still in ICU*

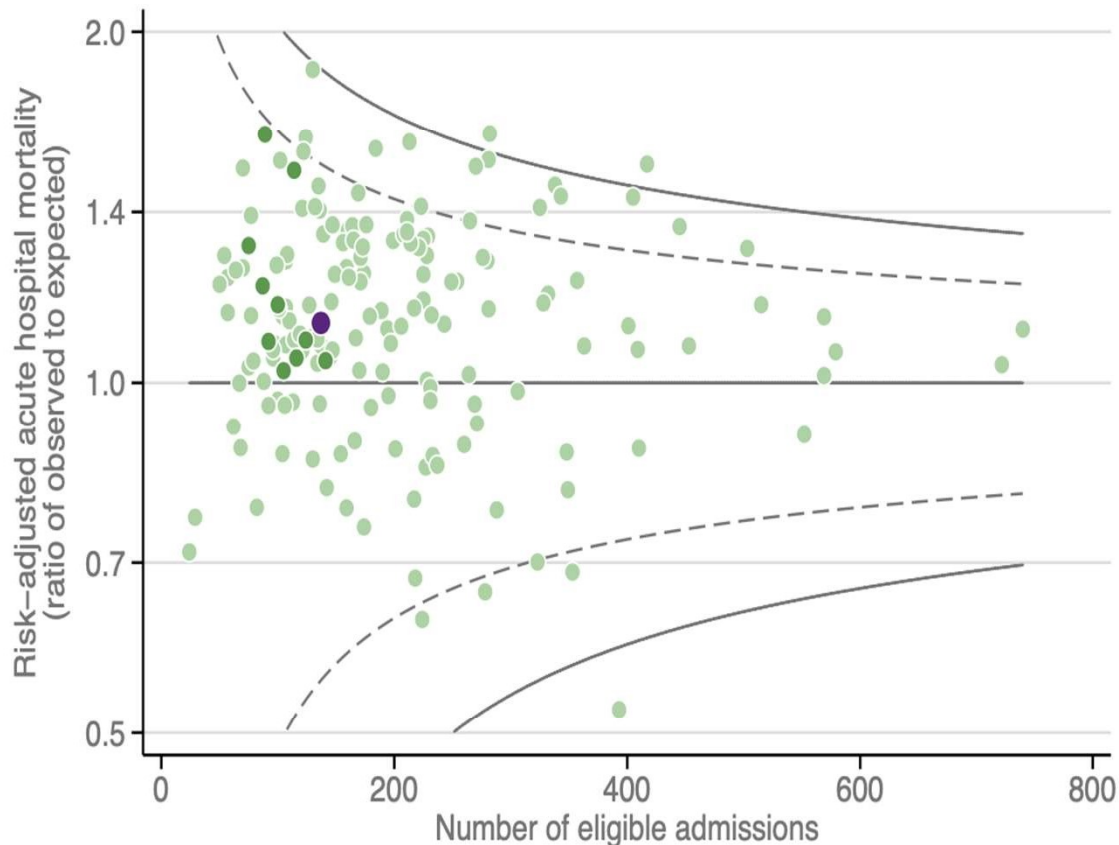


Conclusions

- Data for Surge 3 are *preliminary* because 50% of admissions are still in ICU
- Mortality is higher in Surge 2 and 3 than Surge 1
- Possible factors to explain this include;
 - older age,
 - lower BMI,
 - pre-existing conditions,
 - outbreaks of COVID in patients already in hospital,
 - patients with ceilings of care admitted to ICU
 - ?
- Further data are required

Connolly Hospital, Dublin – Quarter 2, 2020

Risk-adjusted acute hospital mortality

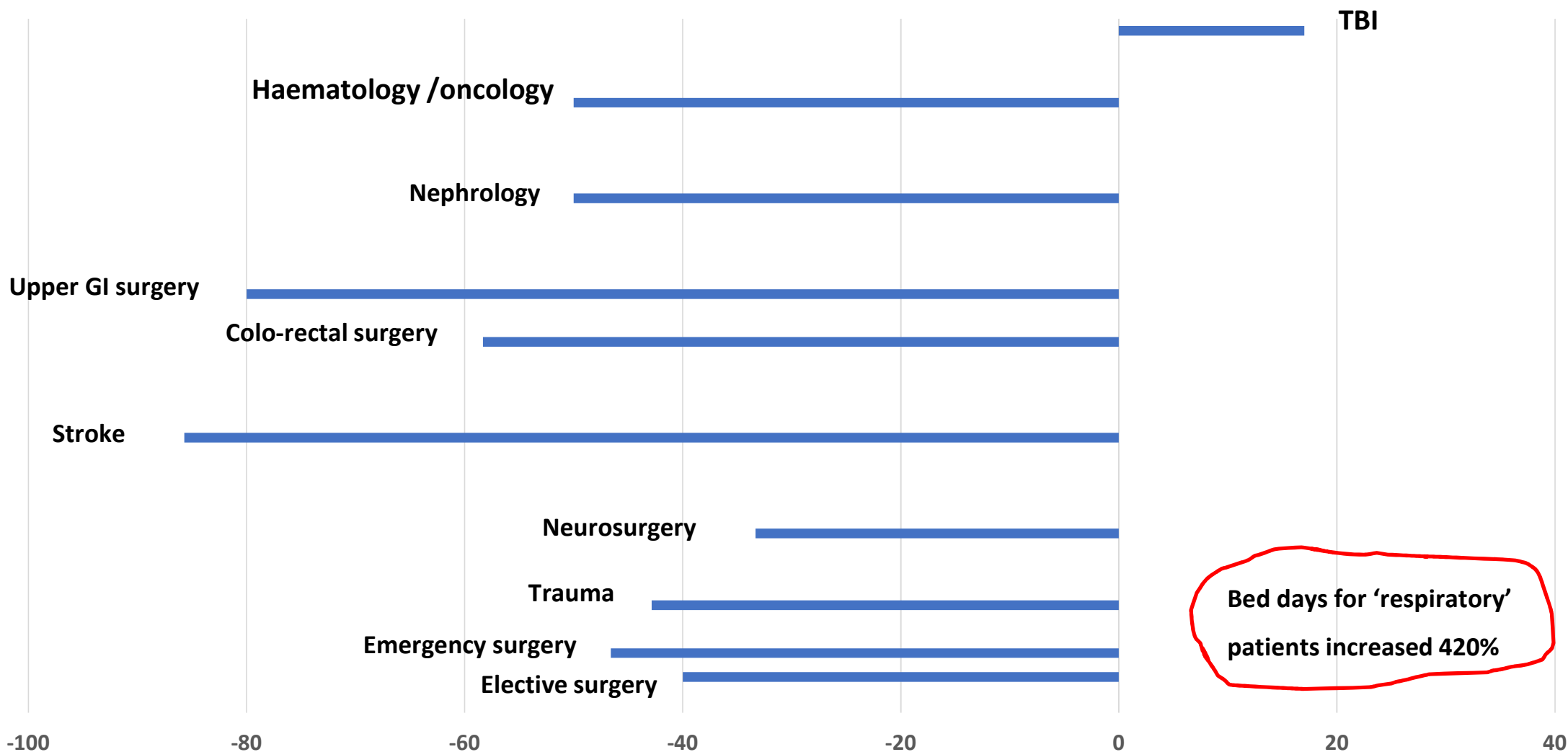


● Your unit (1.13) ● Similar units ● All units

	Eligible	Numerator	Denominator	Result	
Quarter 1 [N=78]	71	20	16.2	1.24	■
Quarter 2 [N=79]	66	14	14.0	1.00	■
Quarter 3					
Quarter 4					
Year to date [N=157]	137	34	30.2	1.13 (0.83, 1.48)	■

% change in patient numbers, Quarter 2, Beaumont Hospital ICU

(ICNARC data)



Lessons learned

- ICU nursing is the key determinant of ICU capacity in the Irish system
- Collect essential activity data and disseminate it widely
- Set up central coordination of activity
- More data needed to explain apparent increase in mortality in Surge 2 and 3

“Never waste a good crisis”; ‘benefits’ arising from pandemic

- Recognition of the centrality of Intensive Care to modern acute medicine
- Allocation of new resources from government for a major expansion in ICU capacity
- Development of systems to provide real-time information on activity and resources
- Provision of resources for upskilling of staff
- Development of a HSE structure for crisis management by coordination of resources
- Devolvment of responsibility and authority to front-line clinicians (medical and nursing)

Acknowledgements

- Brid Moran, Fionnuala Treanor, Paul Dempsey, Fionnola Kelly, Mary Baggot from NOCA who collect and analyse the data
- Anna Marie Murphy for MICAS Retrieval Service data
- Joanne Mulvihill, Magda Pecak for Beaumont data
- Dr Joan O Donnell and staff for HPSC data