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Dr Rory Dwyer provides an update on the timely introduction of the ICU Bed Information System during COVID-19

by Rory Dwyer

As the health system reorganised itself to cope with the coming tsunami, NOCA put other projects on hold, to fast-track the development of ICU-BIS. We recognised this could play a central role in monitoring and responding to COVID pressures on ICU capacity. The team worked late at night and at weekends to design the configuration of the system, working with our IT partners in DMF Systems to implement and test the software design, communicate with the hospitals, the HSE and the Department of Health and to train staff in the hospitals to use the system. On March 26th the system went live just as ICU bed occupancy with COVID patients was starting to increase exponentially.

ICU BIS provides a real-time overview of ICU bed occupancy and bed availability nationally. This allows monitoring of trends and of spare capacity in ICU. It also provides data on individual hospital ICU bed occupancy and bed availability. This provides visibility of hospitals who are approaching the limits of their capacity, to trigger transfers of patients to other hospitals with spare capacity.

National ICU Bed Information System
National Status (All critical care units & off-unit occupancy figures)

Operational Beds	Occupied Beds	Presumably ventilated (v)	Closed For Discharge	Reserved Assigned Beds	Available	Closed Beds	Last Updated
409	283	115	27	35	167	74	21/05/2020 13:30:51

ICU-BIS allows identification of hospitals with spare capacity also.

Hospital	ICU	ICU Occupied	ICU Presumably ventilated	ICU Closed For Discharge	ICU Reserved Assigned Beds	ICU Available	ICU Closed Beds	Last Updated
Beaumont	12	10	5	5	-	-	5	21/05/2020 06:25:04
HDU	8	8	6	1	3	-	2	21/05/2020 06:25:32

On March 30th, Connolly Hospital experienced a surge of critically ill patients with COVID arriving to the Emergency Department, similar to those described by clinicians in Italy and London. Using ICU-BIS they identified neighbouring hospitals with spare capacity and after contacting ICU Consultants in these hospitals arranged the transfer of 4 patients to these hospitals. Two of these transfers were undertaken by the Critical Care Retrieval Service MICAS service who also use ICU BIS to identify need and plan their service.

ICU-BIS also provides a real-time display of COVID-19 occupancy and activity in ICU. This is the most up-to-date and accurate measure of the number of critically ill patients with COVID. This data is used by the Dept of Health to monitor trends in COVID numbers in ICU and ICU bed availability and provides the data quoted in the media for ICU beds.

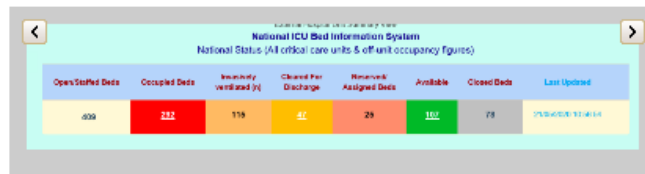
National ICU Bed Information System
National Current COVID Status

Admissions of COVID-confirmed patients in last 24 hrs (Non-Nure)	Confirmed-COVID cases under care of ICU team, in-Unit or off-Unit (v)	Confirmed-COVID cases in-Unit or off-Unit (v)	Confirmed-COVID: deaths under care of ICU team in last 24 hrs (Non-Nure) (v)	COVID-confirmed patients discharged to ward in last 24 hrs (Non-Nure) (v)	Suspected-COVID cases under care of ICU team, in-Unit or off-Unit (v)	Suspected COVID cases in-Unit or off-Unit (v)	Last updated
2	52	36	0	2	21	7	21/05/2020 12:56:54

Government decisions about restrictions on activity are based on predictions from 'modelling' experts on likely patterns in COVID infection rates and the ability of the health system, especially ICU beds, to cope with patient numbers. NOCA data both from the ICU-BIS and ICU Audit data has been a central part of the data they are using to make these predictions. As part of the ICU-BIS project NOCA undertook a detailed census of ICU potential bed capacity at different levels of 'surge' in COVID patient numbers and this has been enthusiastically welcomed by planners in the HSE and Dept of Health also.

The HSE is currently planning an expansion in ICU bed capacity to cope with what is expected to be ongoing requirement for ICU beds by COVID patients. A return to normal hospital activity will mean a return to normal baseline requirement for ICU beds by non-COVID patients and this will require increased ICU capacity. NOCA data on COVID activity and on baseline non-COVID activity is central to planning this.

These developments have been achieved by a small team in NOCA who put their other lives on hold to complete the ICU-BIS project in time for the surge in COVID activity. Brid Moran is our IT expert; her other expertise is in patience in dealing with vague specifications from the clinical lead and regular changes in design requests. Fionnuala Treanor was the Audit Manager for ICU-BIS and she and Mary Baggot have been indefatigable in the design of the system and in liaising with the hospitals to set up and maintain daily data entry into the BIS. Fionnola Kelly has provided data analysis and Carlo Lodolo designed a dashboard for display of the data on the website. Collette Tully, our Executive Director immediately recognised the importance of the project and sanctioned the redirection of NOCA resources to ICU-BIS. Our partners in DMF Systems, especially software engineers Miguel Bueno and Giulio Iannella, with the boss, Declan Fitzgerald put other projects on hold and worked late and at weekends to implement all our requests – and changes of requests as we responded to requests from those using the data. HSE OCIO PM Hannah Stern deftly channelled all the varied requests through the HSE to enable us get the system live and while delivering in an ever changing fast-paced situation. We received full support from Ciaran Browne and Liam Woods in HSE Acute Operations and Philip Crowley in HSE Quality Improvement Division. I think these have all combined to make a significant contribution to the health service response to this national emergency.



Open/Staffed Beds	Occupied Beds	Immediately ventilated (%)	Closed For Discharge	Reserved Assigned Beds	Available	Closed Beds	Last Updated
406	222	119	11	29	161	79	27/04/2020 11:46:14

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