

## **The Development and Rollout of Medical Grab Bags for Resuscitating Critically Unwell Patients with Suspected COVID-19**

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### **Abstract**

#### ***Aim***

To optimise preparation for and reduce the stress of managing critically ill patients with suspected COVID-19 in the Emergency Department at Cork University Hospital using locally designed medical grab bags.

#### ***Methods***

Grab bags were designed by Emergency Department staff to contain equipment necessary for resuscitation of unstable patients requiring isolation. Content was iteratively refined to reflect current clinical guidance. 12 months post rollout, staff were surveyed on their experience of the bags using a 5-point Likert-type scale. Agreement was defined as at least 70% of respondents rating an indicator as "agree" or "strongly agree". Data were analysed using SPSS.

#### ***Results***

Eighty-five grab bags were produced with seventy-four used in twelve months. Twenty-six staff members replied to the survey. Sixteen (61.53%) used the bags more than five times, while one respondent (3.84%) had never used the bags. Agreement was reached that grab bags helped staff members feel prepared to, reduced the stress of, and minimised delays in treating unstable patients with suspected COVID-19. Staff agreed that grab bags contained sufficient equipment, however ten members (38.5%) felt that the bags contained excess equipment.

#### ***Conclusion***

The introduction of Primary Assessor Grab Bags at CUH ED was observed to optimise staff preparedness for and reduce the stress of treating critically unwell patients in isolation.

## Introduction

The COVID-19 pandemic was declared by the World Health Organisation (WHO) in March 2020<sup>1</sup> and has posed unprecedented challenges for healthcare workers<sup>2</sup>. Early reports on the virus described notoriously non-specific symptoms, with clinical presentations ranging from asymptomatic, to pneumonia, to death<sup>3</sup>. A letter submitted to the European Society of Intensive Care Medicine in March documenting the impact of the virus in Italy served as a call to arms to Irish healthcare workers to prepare for a sudden influx of severely hypoxaemic patients that could potentially overwhelm the state's Emergency and Intensive Care Unit (ICU) capacity<sup>4</sup>.

Data from epidemiology and virology studies determined that COVID-19 is transmitted through respiratory droplets, by direct contact with infected persons, or by contact with contaminated surfaces<sup>5</sup>. To mitigate the risk of intra-hospital virus transmission, the Health Protection Surveillance Centre (HPSC) issued guidelines describing the Personal Protective Equipment (PPE) to be worn by healthcare workers when treating suspected COVID-19 patients<sup>6</sup>. To prevent clinical equipment contamination and waste, it also mandated the removal of all non-essential items from designated COVID-19 treatment areas.

These necessary guidelines created the potential for delays in treating critically unwell patients with suspected COVID-19, which was of particular concern to Emergency Department (ED) staff. With high acuity patient cases often received by the ED with little warning, it was feared that time spent donning PPE and gathering clinical equipment in advance of treating patients requiring isolation could delay resuscitation and adversely impact patient outcomes. Furthermore, the unfamiliar era of fragile supply chains and novel infection control standards demanded a solution which minimised both equipment waste and staff movement in and out of isolation areas seeking consumables.

Cork University Hospital (CUH) acts as a regional centre for a catchment population of 550,000, and as a supra-regional centre for a total population of 1.1 million, with approximately 65,000 ED attendances per annum<sup>7</sup>. Responding to the challenge of the COVID-19 pandemic, CUH ED staff rapidly developed several, new, robust assessment and treatment strategies to manage the anticipated surge in patients requiring both isolation and critical care. One such strategy was to develop a supply of pre-packaged grab bags containing equipment necessary for the primary assessment and initial resuscitation of the unstable patient requiring isolation.

Delivering high quality care and maintaining patient safety is dependent on effectively and efficiently managing cognitive, physical, spatial, and temporal resources in the ED environment<sup>8</sup>. Caring for critically unwell patients with suspected COVID-19 within our ED required careful consideration of the process of equipment provision and use, in addition to the human factor challenges of working in a high-risk isolation environment<sup>9</sup>. To this end, a new model of care was introduced for unstable patients requiring isolation at CUH ED. This model involved an initial assessment and stabilisation phase via the "Primary Assessor Team" (comprised of an Emergency Medicine doctor and nurse), allowing the "Intubation Team" (comprised of two airway competent doctors and a nurse) time to prepare for intubation outside the isolation room when required.

The introduction of “Primary Assessor Grab Bags” complemented the “Primary Assessor” phase of this new model of care and aimed to reduce the risk of error and delays in patient treatment while improving staff experiences of managing isolated patients.

This article describes both the process of developing these “Primary Assessor Grab Bags” and the staff experiences of this bespoke addition to a novel primary assessment strategy of critically unwell patients at CUH ED. It is our hope that other healthcare facilities may find the concept beneficial in their own practice, or that it may be applicable to scenarios and environments beyond the COVID-19 pandemic.

## **Methods**

Emergency Department Clinical Operations and Governance (ED COG) structures at CUH approved the development of medical grab bags. Grab bags were designed by ED staff using equipment which was readily available and familiar to users. We adopted the “ABC” principle of patient management in our design, dividing bags into sections for managing anticipated airway, breathing and circulation areas, and for commencing initial resuscitative treatments.

Prototypes were trialled in multidisciplinary COVID-19 simulations attended by ED and Intensive Care medical and nursing staff. Realtime feedback from simulation debriefs and early experiences managing isolated patients helped modify grab bag content. Contents were iteratively updated to reflect ever evolving clinical guidance.

Volunteer medical students assembled to produce a consistent supply of grab bags once content was agreed. Quality assurance required the completion of an accompanying contents checklist prior to sealing each bag. Sealed bags were repackaged in a sterile environment by the Central Sterile Services Department (CSSD). Unnecessary packaging was removed at this stage, resulting in a leaner product which maximised storage space and reduced time spent opening equipment in resuscitation scenarios.

Bags were stored in an equipment hub within the “COVID Red Zone” – an area designated for the management of the most critically unwell isolation patients in the ED. Future stock orders were matched with the contents checklist, ensuring a secure supply. Daily checks were carried out to ensure a minimum number of bags was available to staff at all times. Crossover in stock supply to other areas was prevented by designating a room to house stock solely intended for grab bag production.

Staff were educated about the intended use of the grab bags at daily handovers, during multidisciplinary simulations and via a closed group on an instant messenger platform. Twelve months post grab bag introduction, a staff experience survey utilising a 5-point Likert-type scale was issued via Google Forms. Agreement that grab bags positively impacted staff experiences of managing unstable patients in isolation was defined as at least 70% of respondents rating an indicator as “agree” or “strongly agree”. Data were analysed using SPSS.

## Results

A total of eighty-five grab bags were produced. Seventy-four bags were used over a twelve-month period. A finalised grab bag with one iteration of the contents list is shown in Figure 1. The contents of each grab bag section is shown in Figure 2. Twenty-six staff members replied to the staff experience survey, the breakdown of which can be seen in Table 1. Sixteen (61.53%) respondents used the bags more than five times, while one respondent (3.84%) had never used the bags. Fifteen (57.67%) had received teaching (either formal or informal) on the intended use of the grab bags, while nineteen (73.07%) respondents had been involved in patient simulations using the grab bags. Agreement was reached amongst survey respondents that the grab bags helped them feel prepared to, reduced the stress of, and minimised delays in treating critically unwell patients with suspected COVID-19 (Figure 3). Twenty-three respondents (88.5%) agreed that the bags helped them feel prepared to treat patients requiring isolation. Twenty-one (80.8%) agreed that the bags reduced the stress of treating patients requiring isolation. Twenty-three (88.5%) agreed that the bags minimised delays in treating patients requiring isolation. Twenty-two (84.6%) agreed that the bags contained sufficient equipment while ten (38.5%) felt the bags contained excess equipment.



**Figure 1.** Finalised grab bag with checklist.

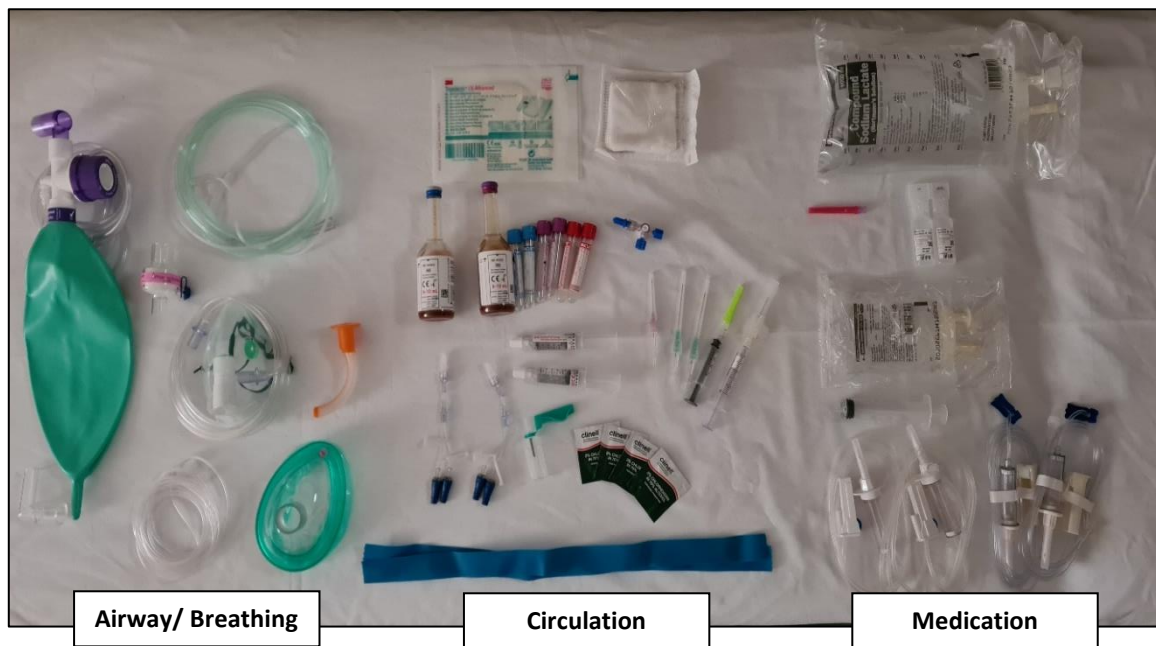


Figure 2. Grab bag sections.

Staff	Nurse	Consultant	Registrar	SHO
	12	2	10	2
Number of uses	Never	Once	2-5 times	>5 times
	1	4	5	16
Attended teaching	Yes		No	
	15		11	
Attended simulation	Yes		No	
	19		7	

Table 1. Survey demographics.

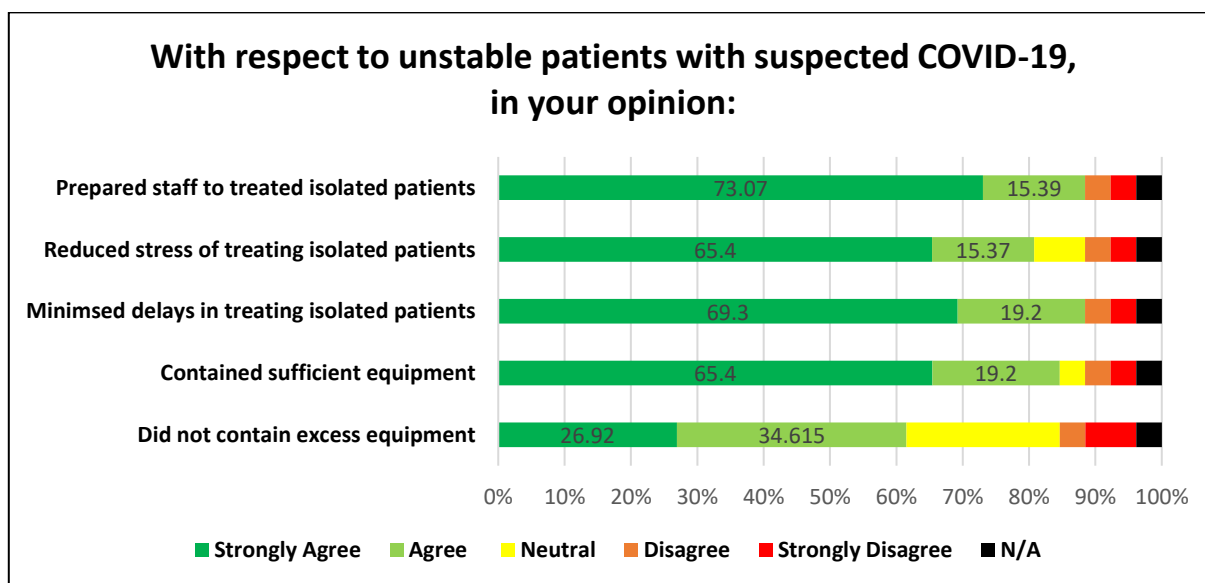


Figure 3. Results of Likert-type questionnaire.

## Discussion

In response to the myriad challenges presented by COVID-19, the introduction of Primary Assessor Grab Bags at CUH ED eased the cognitive burden and stress of managing critically ill patients in isolation areas and allowed staff to deliver high quality care in a safe and efficient manner, while maintaining compliance with infection control standards. However, developing a simple and useful clinical tool under the time constraints precipitated by the anticipated patient surge was not without its challenges.

Early stages of development focussed on reaching consensus on bag content. Content was largely informed by the “ABC” approach to patient resuscitation. Decisions regarding the choice of antibiotics and the inclusion of High-Efficiency Particulate Absorbing (HEPA) filters were steered by the CUH Drugs and Therapeutics Committee and American Heart Association guidance<sup>10</sup>, respectively. We were mindful to avoid both understocking and overstocking the bags, as both scenarios generated unwelcome sequelae. If understocked, precious time could be lost to awaiting delivery of requested equipment to isolation rooms. This also increased the potential for traffic back and forth from isolation rooms, thereby increasing the risk of virus exposure to staff and patients. If overstocked, unnecessary waste of equipment not required in initial resuscitation could occur. The solution was achieved via regular simulations of COVID-19 cases in ED isolation rooms, which were attended by both ED and ICU staff.

Multidisciplinary COVID-19 simulations were integral to both the initial design of and the subsequent demonstration of the grab bags. Feedback from simulation debrief sessions represented an invaluable resource for generating pragmatic alterations to the bags. To reflect clinical conditions, simulation teams had to wait in real time for the delivery of any additional requested equipment to their isolation room. These wait times cemented the potential implications of understocking bags. Conversely, when an item was routinely wasted in simulations, we sought feedback and agreement on whether it could be safely omitted. Unable to anticipate the exact equipment requirements for each case, we established an equipment hub in close proximity to the department’s major isolation rooms, allowing quick delivery of supplies to isolation rooms when required. With simulations themselves a potential source of equipment waste, we set aside a “simulation kit” which was complete with instructions for reassembly after use and was stored in the ED Registrar office.

We revised contents until no further recommendations were made at daily simulations or department handovers. The first prototype was ready just days after the pandemic was declared, however the bags were and continue to be subject to ongoing alterations as clinical guidance perpetually evolves. Early in the course of the pandemic, clinical guidelines were liable to change swiftly and significantly. Any proposed changes to the grab bags were communicated to the ED COG and multidisciplinary team, while recommendations for empirical antibiotic cover were monitored closely in conjunction with the ED Pharmacist. Given the supply issues facing all hospitals at that time, any necessary alterations were reflected in our stock orders to ease the process of stock acquisition.

It was our intention that grab bags were only employed in specific circumstances – that is, for the initial stabilisation of critically unwell patients requiring isolation where time was not available to gather equipment required for resuscitation. To avoid unnecessary use and waste of bags this policy had to be clearly communicated to ED staff – a process which was complicated by the increased staff turnover due to the pandemic. COVID-19 resulted in staff absences due to illness or mandatory self-isolation, a sudden influx of staff from other clinical areas in an attempt to ease the burden at the hospital frontline, and an era of working alongside members of the “Intubation Team” if not native to the ED. Thus, it was required that communication regarding the grab bags and other novel ED policies was an ongoing process during this turbulent time. This was facilitated in three ways. Firstly, via the introduction of twice daily handover meetings attended by all ED staff which addressed fresh issues and provided updates on new policies and procedures. Secondly, via routine COVID-19 simulations as discussed above. And lastly, via a secure instant messenger group which was established to ensure uniform and reliable dissemination of information pertaining to COVID-19 service provision, and which included ED staff from all disciplines and grades. At the time of writing, this group is still used to deliver department-wide clinical updates.

It should be noted here that the overall positive impact of this intervention may have been due to the grab bags in combination with the ongoing teaching sessions and simulations, and not necessarily due to the introduction of the grab bags alone.

By enabling staff to deliver high quality care in a time effective manner, while maintaining compliance with infection control standards, the introduction of Primary Assessor Grab Bags at CUH ED was observed to optimise staff preparedness for and reduce the stress of treating critically unwell patients in isolation. Capturing and actioning the human factor challenges posed by the COVID-19 pandemic became an essential task in the overall process of ensuring the safe, efficient, and effective implementation of this practice change.

#### **Declaration of Conflicts of Interest:**

The authors have no conflicts of interest to declare.

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