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EDITORIAL

Should ICU clinicians follow patients after ICU discharge? Yes

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Introduction

The trajectory of recovery from critical illness is often portrayed as a continuum. At one extremity lies an unstable patient dependent on life-sustaining treatments in the intensive care unit. At the other extremity stands an independent community-dwelling individual with restored personal, social and cultural wellbeing. A progressive transition from illness to recovery reflected by gradual de-intensification of healthcare occurs over many weeks to months.

This notion of a continuous arc of recovery is reflected poorly in the design of modern healthcare systems. Patients with similar care needs tend to be co-located for operational and economic reasons. This creates arbitrary institutional and professional boundaries that transect the care pathway. Transitions between intensive care, high dependency, ward and home are often fragmented, leading to loss of information, omissions in treatment and poor patient and family experience [1, 2].

The challenge of addressing fragmented care after the ICU is epitomised at the crucial point of discharge home from hospital. Hospital clinicians perceive the moment of discharge home as a long-anticipated goal marking near completion of clinical recovery. This fallacious mind set is perpetuated during the hospital stay, generating unrealistic expectations of patients and caregivers about life at home. Passive transfer of clinical responsibility occurs via a written discharge document. As the notional separation between ICU and present day widens, so providers' familiarity with ICU-related interventions (and their complications) diminishes [3]. This impacts on medication management, follow-up investigations, specialist review and prompt referral to rehabilitation services.

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For many ICU survivors release from hospital marks the start of an arduous struggle. Persistent physical, psychological and cognitive deficits arising from critical illness are highly prevalent [4]. Patients and families lack understanding and context of their critical illness, resources to assist with life at home and information about what recovery can be expected to involve [5]. Pre-existing conditions may have been undertreated before admission or may interact to compound the complexity of care and deepen unmet need.

Another reality is that many patients will not make a full recovery following their critical illness. However deficits that cannot be reversed ought still to be identified, explained and reconciled. Resources can then be directed to adjusting to and coping with diminished quality of life after critical illness. This requires a patient- and family-centred approach extending beyond ICU and into the adaptive phase of recovery, enabling individuals to accomplish what matters most to them on a personal, social and economic level.

What is the relevance of post-critical care follow-up services in this challenging landscape?

The last 20 years represent a dynamic period of multidisciplinary engagement with critical care survivors, moving beyond matters of life and death and discovering the extent of their previously overlooked morbidity. The most prevalent service model for delivering follow-up is the outpatient clinic. To our knowledge the only conventionally designed trial of the post-ICU "clinic" concept is the PRaCTICaL study. In this well-conducted study it was not possible to identify either a patient-centred or health economic benefit. However, only one—possibly limited—clinic model was tested; arguably, the quantitative outcome measures may have been insensitive to change.

Recently we have learned how challenging demonstrating change can be [6]. Of interest, the PIX study of a

targeted exercise programme failed to shift a physiological outcome measure, yet a parallel qualitative evaluation demonstrated clear value for those in the intervention arm; patients felt more motivated, engaged and supported [7]. This disparity between quantitative and qualitative findings is echoed in the RECOVER study that tested a greater level of rehabilitation support within hospital; the quantitative analysis failed to identify a measurable change, but the parallel qualitative analysis showed benefits [8].

Fundamental hurdles including heterogeneity of case mix, lack of blinding, difficulty measuring the dose or magic bullet of a complex intervention, and incomplete knowledge about the outcome measures of interest may hamper comparative effectiveness trials in this field. Yet it is widely accepted and intuitive that follow-up activity is an effective intervention. The majority, 88% of UK ICU clinicians surveyed on this topic, cited financial constraints as the main barrier to ICU follow-up whereas only 24% cited lack of current evidence for benefit and only 12% cited lack of clinical need [9]. This implies a determination by front-line critical care staff to deliver follow-up services despite the recognised barriers. The failure to demonstrate change in predominantly single intervention studies emphasises the need to develop and evaluate future projects as *complex interventions*: the RECOVER investigators adopted such an approach, although they were ultimately unable to show a benefit on their primary outcome measure [10].

Post-ICU follow-up services and associated programmes to enhance post-ICU health are increasingly prevalent in the UK and globally. As of September 2017 the UK's National Institute for Health and Care Excellence (NICE) recommends healthcare commissioners ensure services they fund, assess and provide a rehabilitation plan for survivors of critical illness [11]:

> **"Commissioners** *(clinical commissioning groups) ensure that they commission services that follow up adults who were in critical care for more than 4 days and at risk of morbidity with a review 2 to 3 months after discharge from critical care. They also ensure that services accept and reassess all adults who have had a critical care stay if they self-refer at any time after discharge".*

Emerging concepts in recovery and rehabilitation are casting doubt on the relevance of a one-size-fits-all approach to follow-up [12]. Recent observational data highlight the interaction between pre-existing conditions and post-critical illness health trajectories [13]. Tailored interventions may be needed for distinct post-critical illness subtypes [14]. Mind and body 'cross-training' could provide a mechanism for the observation that cognitive rehabilitation can positively impact physical outcomes, and vice versa. It is postulated that post-traumatic growth may have a protective role in long-term outcomes after life-changing illness to be harnessed in the post-critical care setting [15]. Personal characteristics such as resilience, coping and acceptance are relevant to health-related quality of life and may be modifiable through post-ICU interventions [16].

The US Society of Critical Care Medicine Thrive Post ICU Collaborative was convened in 2017 to foster an international network of hospitals focussed on exploring diverse models of follow-up. One such model is the innovative In:SPIRE (Intensive Care Recovery: Supporting and Promoting Independence and Return to Employment) project evaluating a 5-week post-ICU rehabilitation intervention in several centres in Scotland [17]. Candidate follow-up models tend to be intensive care practitioner-delivered and patient co-designed clinics straddling traditional healthcare boundaries. Arguably these will be the attributes necessary to achieve patient-centred, cost-effective and integrated ICU follow-up care that improves long-term outcomes and successfully mirrors the continuum of recovery from critical illness.

Follow-up after ICU discharge has benefits for…						
The patient	**The family**	**The ICU staff**	**The organisation/ provider**	**Primary care physician**	**The economy/public health**	**Research**
Safety netting and coordination of ongoing care…address omissions in care/FU (follow-up)/meds	Provide understanding and information	Realignment of purpose	Achieve NICE 83 and quality standard and GPICS	Improve ability to provide post-ICU care through info/support	Reduced reattendance/readmission to hospital and use of emergency services	Provides an environment in which to study survivorship/ outcomes and recruit to studies
Provide information/ knowledge	Signpost to resources and support	Contextualisation of daily efforts	(Guidelines for the provision of intensive care services) recommendations		More return to independence	
Contextualisation of life event	Expression of gratitude and emotional link to the unit	Reduce burnout/disillusionment	Improve pt and family experience		More return to work/ gainful employment	
Improve HRQOL (Health-Related Quality of Life)		Learn, improve, humanise care	Quality agenda		Reduce carer burden	
Signpost to social and welfare benefits			Patient- and family-centred care			

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EDITORIAL

Should ICU clinicians follow patients after ICU discharge? No

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Introduction

Post-intensive care syndrome (PICS) describes new or worsening impairments of physical, cognitive or mental health resulting from an episode of critical illness and its treatment and lasting after discharge from the intensive care unit (ICU) [1]. The incidence of PICS varies based on the domain impacted, ranging from up to 25% for physical and cognitive and up to 60% for psychiatric disturbances [2, 3]. Even as we continue to make significant impact on mortality, short- and long-term consequences of survivorship are emerging as the new frontier.

Why we should not follow up critically ill patients after ICU discharge

As the definition of PICS suggests, the extent of impairment spans several domains. Although critical illness seems to be the common pathway leading to these disturbances, treatment of ICU survivors with these impairments needs expertise from a wide array of clinical teams. These may include physiotherapists and occupational therapists, psychiatrists, geriatricians, neurologists and rehabilitation experts. The intensive care physician's knowledge and skills, albeit broad, do not reliably extend to any of these domains even though our advocacy certainly extends there. The advent of specialized medicine stems from the recognition that medicine is too expansive for any one group to claim expertise over all domains. PICS should be no different, in that it needs to be treated by dedicated practitioners with expertise in these specific domains.

Second, we also believe that any time spent practicing outside of the ICU takes us away from our core area of practice. In the current model, many intensive care physicians already practice in their base specialty; the addition of ICU follow-up could have important implications in terms of knowledge and skill attrition as well as opportunity costs on our time.

Finally, it is also clear from the high-quality randomized controlled trials (see below) that well-intentioned, existing interventions, designed and delivered by ICU teams after ICU discharge, have not yielded the desired results. So maybe it's time to let more expert clinicians take over the helm!

The evidence

A number of ICU and post-ICU interventions have been evaluated with disappointing results to date. Cuthbertson and colleagues conducted a randomized evaluation [4] of a nurse-led intervention on improving post-ICU quality of life on 286 patients after ICU admission. The intervention involved a nurse-led complex intervention including a manual-based, self-directed, physical rehabilitation program developed by physiotherapists and directed by a study nurse with medical oversight. Patients monitored their own progress and were reviewed by nurses at 3 and 9 months after discharge. The primary outcome of the health-related quality of life (HRQoL) score at 12 months showed no difference between the groups. There was no improvement in any of the secondary outcomes either.

Walsh and colleagues [5] studied the effect of a strategy of hospital-based physical rehabilitation and information provision after ICU discharge in a randomized clinical trial on 240 critically ill patients. The

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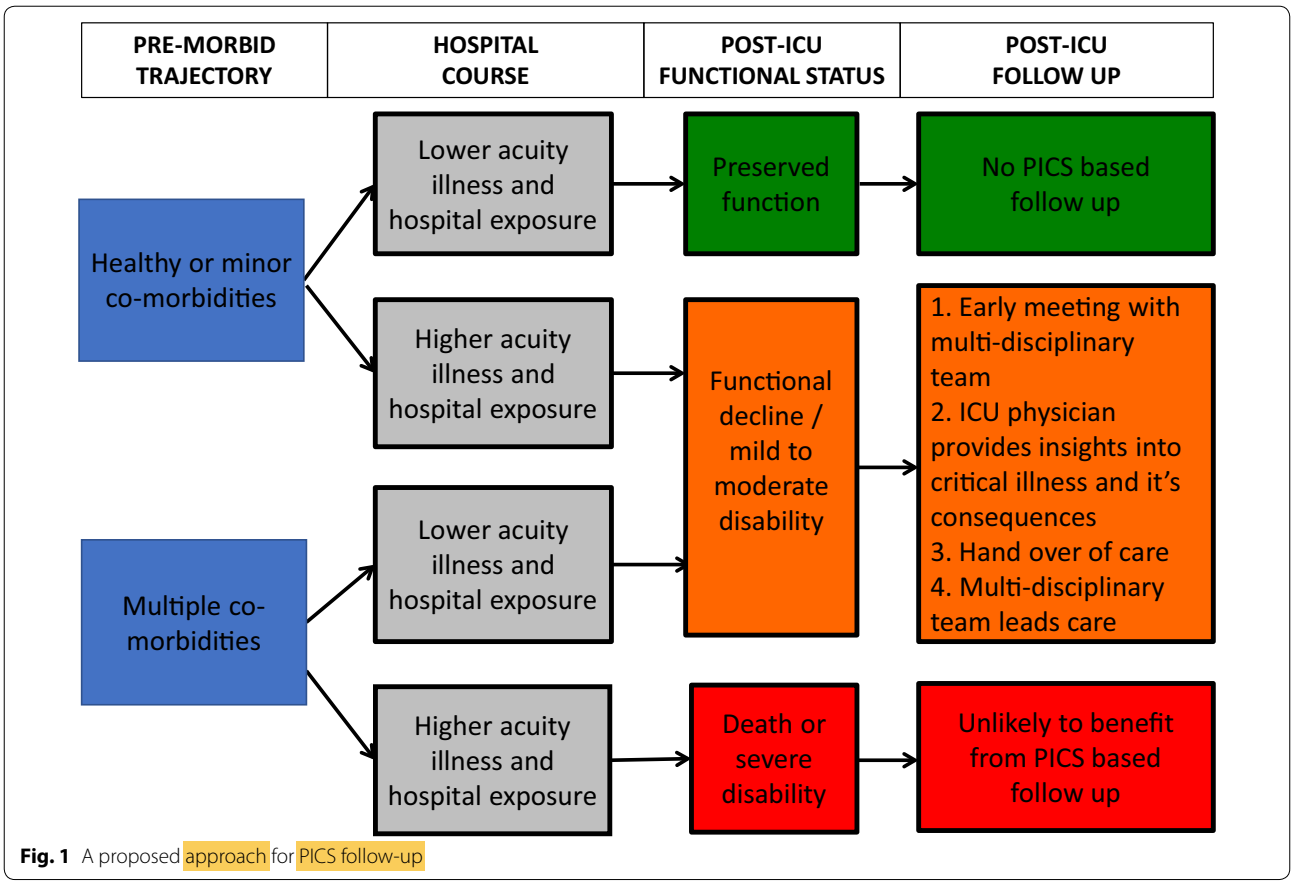

Fig. 1 A proposed approach for PICS follow-up

intervention involved rehabilitation that increased the frequency of mobility and exercise therapies, increased dietetic assessment and treatment, used individualized goal setting and provided greater illness specific information. In this study, the primary outcome measure was similar between the groups. The study also found no difference in the HRQoL, anxiety and depressive symptoms, post-traumatic symptoms or any of the physical symptom scores between groups at 3, 6 or 12 months.

Similarly, other RCTs of post-ICU interventions [6–9] have failed to show improvement in functional outcomes. There are several reasons why these interventions may have been ineffective including the complexity of the pathophysiology, a focus on physical rehabilitation alone, inability to identify and target high-risk groups, inability to individualize therapy, a focus on the wrong outcome measures and a lack of input from other expert providers such as therapists, neurologists, psychiatrists, geriatricians and rehabilitation physicians. These challenges seem to speak to why follow-up interventions led by intensive care teams are unlikely to be effective in the future.

Where can we help then?

We identify two specific areas where intensive care physicians can make a meaningful impact on outcomes after ICU discharge:

1. Identify high-risk groups for the development of PICS (e.g., high severity of illness, frailty, prior cognitive impairment, pre-existing disability, etc.) and focus on mitigating these stressors with interventions delivered within the ICU (prevention/treatment of delirium, early mobilization, use of the ABCDE bundle [10], ICU diaries [11]).
2. Facilitate post-ICU care—we propose triaging ICU survivors into three broad groups (green, orange and red categories) (Fig. 1) depending on their comorbidity and acute severity of illness. We suggest scheduling a review for all "orange" patients after their ICU/hospital discharge with the previously identified care providers for a needs assessment where this multidisciplinary team can develop an individualized follow-up plan. The intensive care physician at this meeting can provide important perspectives to the patient and other team members regarding the critical illness

events and their potential longer-term consequences. They would then handover their patient to this team's care. Note that we do not propose such follow up for "red" or "green" patients as we believe that neither of these groups will sufficiently benefit from this model of care. We accept that current methods to identify "orange" patients are inadequate (see below).

Future research

Given the lack of benefit for these post-ICU strategies, we may need to rethink our approach to improving PICS-related outcomes. Future trials should evaluate the role of multidisciplinary and interprofessional team-based programs with ICU physicians playing the role of facilitators. Precisely identifying the "orange" patients who can benefit will be an important part of this agenda. Research must also continue to focus on biologic mechanisms that contribute to PICS, which in turn can guide further interventional research.

In conclusion, while we recognize the desire of the intensive care physician to contribute to helping patients after critical illness, intensivist-led follow-up programs do not seem to be effective, and therefore we should limit ourselves to supplying information to our patients and to multiprofessional teams that are better equipped to help them with their ongoing challenges.

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