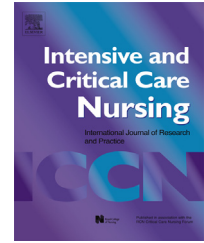




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# Monitoring and optimising outcomes of survivors of critical illness



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## KEYWORDS

Intensive care;  
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**Summary** Recovery after critical illness can be protracted and challenging. Compromise of physical, psychological, cognitive and social function is experienced by some patients and may persist for a number of years. Measurement of recovery outcomes at regular time points throughout the critical illness and recovery pathway is necessary to identify problems and guide selection of interventions to prevent, minimise or overcome that compromise. Optimisation of factors that enhance recovery, such as sleep, nutrition and memories of intensive care, will also assist with promotion of recovery.

Effective assessment of recovery requires integration of assessment of outcomes into routine clinical practice by all members of the interdisciplinary team. There must be agreement of appropriate measures and measurement timeframes alongside relevant education and training to ensure optimal assessment and use of the information gained. Assessment outcomes need to be communicated to interdisciplinary team members across the critical illness and recovery trajectory. Adequate resourcing for both the assessment activities and subsequent care is essential to improve patient outcomes after critical illness.

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### Implications for Clinical Practice

- Measurement of all aspects of recovery at multiple time points after critical illness will enable individualised support programmes to be delivered.
- Education and training of relevant health care personnel is necessary to ensure optimal assessment and use of information.
- Routine practice should incorporate optimisation of factors that enhance recovery, for example sleep, nutrition and psychological status.

## Introduction

There is widespread evidence that survivors of critical illness experience multi-dimensional compromise during their recovery (Needham et al., 2012). This recovery extends for weeks to years, with the recovery trajectory being different for each patient. Pre-existing health problems, psychological status and social circumstances all influence the recovery trajectory and are somewhat unique for each patient. The uniqueness of each patient's situation and the challenges they face means that different interventions may be required to meet individual goals.

Determining goals for each patient requires comprehensive assessment that incorporates the wishes of the patient and their family. Knowing the patient's pre-illness function and status will also inform realistic goals and interventions during recovery. Because critical illness is unexpected, accurately measuring baseline function and status is not possible and needs to be estimated from information provided by the family during the critical illness or the patient during recovery. A comprehensive, systematic approach incorporating all aspects of physical, psychological and social function should be used to elicit information to estimate baseline function. Inclusion of measures that incorporate pre-illness status, for example the Charlson Comorbidity Index (Charlson et al., 1987) and a measure of frailty, should be considered. Although both comorbidities and frailty overlap with function, additional understanding and detail is contributed by considering each of the concepts independently (Fried et al., 2001). No measure of frailty has been validated for use in the critical care population, although a trauma specific index has been developed (Joseph et al., 2014).

In recent years there has been considerable work undertaken to develop and refine interventions to promote recovery from critical illness. Evaluating the effectiveness of these interventions is dependent on measurement of relevant components of recovery and selecting the most appropriate times to undertake assessment. Measurement of functional outcomes during critical illness, for which there are several review papers available (Hough, 2013), often takes priority but measurement of recovery should not be limited to physical or functional aspects of health. The focus of this paper is examination and optimisation of all aspects of recovery following critical illness.

Integral to patient recovery is the health and well-being of family members. Although many of the physical, functional and cognitive issues do not affect family members, there is growing evidence of the psychological and social issues experienced by both patients and their

families (Lemiale et al., 2010, Buckley et al., 2012). The impact on family members has not been incorporated into this paper although this is an important aspect of recovery from critical illness for which many of the same outcome measures can be used. It is also important to explore how family involvement can be incorporated into effective strategies for improving the outcomes of patients following critical illness. Early reports of successful strategies involving family members to deliver or contribute to patient recovery focused interventions include both mobilisation (Rukstele and Gagnon, 2013) and nutrition (personal communication – Prof Daren K Heyland, Queen's University, Kingston, Ontario, Canada).

## What outcomes should we monitor in survivors of critical illness?

In its simplest form, measurement of outcome has involved monitoring mortality in survivors of critical illness, as well as other uni-dimensional characteristics such as organ failure and readmission to hospital. Expansion of the concept of outcome to include patient centred outcomes such as physical function and quality of life was seen in the 1990s, and more recently has been extended to include psychological, cognitive and social function. Use of strategies to measure and improve these aspects of recovery in survivors of critical illness is now considered an essential component of critical care practice.

Few instruments to measure patient outcomes have been developed or validated specifically for use in the critical care population. Instead we have adopted instruments developed for general use or for use in other patient populations (Table 1). A detailed review of instruments to measure physical function and quality of life is also available (Elliott et al., 2011a).

The benefits of adoption of generic instruments to measure patient outcome are two-fold. First, the use of generic instruments can reduce the time and cost incurred in developing an instrument. Using a generic instrument that has been used to report data for the non-critically ill patient populations also allows us to compare outcomes across groups of acute and critically ill patients. However, the use of generic instruments is not without disadvantages. For example, a certain level of cognitive function may be required to understand the questions posed and formulate a response, a process that may be challenging for some patients with impaired cognitive function. Determining cognitive function is essential before using any instrument as cognitive impairment can persist for many months

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