

**ADAPTING GUIDELINES TO SUPPORT INTENSIVE CARE UNIT (ICU)
SURVIVORSHIP: A PILOT STUDY**

by

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Abstract

Background: As ICU mortality decreases, it has been reported that over half of ICU survivors inadvertently experience post-intensive care syndrome (PICS). Comprehensive and consistent strategies to prevent, recognize and treat the physical, cognitive and psychological symptoms of PICS are in development in a large number of clinical settings nationally and internationally. There exists little research focusing on the implementation of PICS care pathways at the individual institutional level.

Purpose: This was a pilot study and the first step in a quality improvement initiative. The purpose of this study was to examine whether the United Kingdom, National Institute for health and Clinical Excellence (NICE) 2009 guideline on rehabilitation after critical illness could be helpful to audit clinical practice in a Canadian hospital.

Method: This was a pilot study that incorporated a retrospective chart audit. Data was collected from patient charts utilizing the NICE 2009 rehabilitation after critical illness audit support tool.

Results: Not all of the proposed recommendations in the NICE 2009 guideline were applicable to the Canadian context. While the selected Canadian clinical setting in the study does not have an implemented PICS pathway, nine out of fifteen proposed audited recommendations were a part of usual care or based on health care professional expertise in the Canadian hospital.

Conclusion: Collecting data on post-ICU recovery in the Canadian clinical setting utilizing the NICE 2009 rehabilitation after critical illness audit support tool is feasible. Clarification of the roles of multidisciplinary team members in the rehabilitation pathway and the auditing strategies to prevent, manage, and treat PICS throughout the ICU trajectory could potentially improve the usability and relevance of the NICE chart abstraction tool to the Canadian context.

Implications: A PICS care pathway has the potential to optimize health outcomes of ICU survivors. To be effective, a multidisciplinary team approach is recommended in caring for the critically ill patient throughout the ICU trajectory. Nurse leaders, in collaboration with the multidisciplinary team, should review each proposed recommendation on rehabilitation after critical illness published by NICE to determine the applicability to local clinical settings in efforts to optimize ICU survivorship.

Lay Summary

Post-intensive care syndrome (PICS) is a term to represent the unintentional physical, cognitive and psychological impairments commonly present after critical illness. With more people surviving critical illness, PICS has emerged as a growing concern. Experts in critical care medicine have suggested the development of a PICS care pathway to help optimize the health outcomes of critical care survivors. Currently, the United Kingdom, National Institute for health and Clinical Excellence (NICE) is the only organization to have developed a guideline on rehabilitation after critical illness to help care providers direct care. This study utilized the NICE audit tool on rehabilitation after critical illness to determine the applicability of the guideline to a Canadian tertiary care hospital. This study will contribute to the review of PICS rehabilitation in the selected Canadian setting and the potential to engage multidisciplinary team members in developing a PICS pathway applicable to the context.

Preface

This dissertation is original and independent work by the author, Jagdeep Chahal. This pilot study consisted of a retrospective chart audit to gather quantitative data. Jagdeep Chahal collected and analyzed the research data and wrote the entire dissertation with the guidance from the supervisory and committee members: Dr. Jennifer Kryworuchko (supervisor, Professor, UBC School of Nursing), Dr. Fuchsia Howard (committee member, Professor, UBC School of Nursing), and Dr. Greg Haljan (committee member, Doctor of Medicine, Surrey Memorial Hospital). Ethics approval was received from the University of British Columbia Research Ethics Board (ethics approval number H17-01198).

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List of Abbreviations

ABCDE bundle = Awakening and Breathing Coordination, Delirium Monitoring and Management, and Early Mobility

ADLs = Activities of Daily Living

ICU = Intensive Care Unit

ICU-AW = Intensive Care Unit – Acquired Weakness

NICE = National Institute for health and Clinical Excellence

PAD bundle = Pain, Agitation and Delirium

PICS = Post-Intensive Care Syndrome

PTSD = Post Traumatic Stress Disorder

RNs = Registered Nurses

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Dedication

I dedicate this work to my parents. Mom and dad, you have taught me how to be strong and independent and the importance of upholding principles. Thank you for everything.

Chapter 1: Introduction

There has been a reported 12% increase of admissions to adult Intensive Care Units (ICU) in Canada (excluding Quebec) since 2008 (Canadian Institute for Health Information [CIHI], 2016). The Canadian Institute for Health Information (2016) indicates the rates of ICU admission will continue to rise in the coming years due to Canada's aging population and the increase in the severity of illnesses. However, advances in medical practice over the past 20 years have shown a steady decrease in the rate of ICU mortality (Connolly, 2015; Gruther et al., 2017; Hopkins & Girard, 2012; Iwashyna, Mikkelsen, & Netzer, 2018; Jutte, Erb, & Jackson, 2015). As ICU mortality decreases, post-ICU morbidity has been reported in more than half of ICU survivors (Connolly et al., 2015; Iwashyna et al., 2018; Jutte et al., 2015; Mehlhorn et al., 2014).

The hallmark features of post-ICU morbidity, or serious problems after critical illness, are new or worsened impairments to patient cognition (i.e.: executive functioning, attention/concentration, memory, mental processing speed), psychological (i.e., anxiety, depression, posttraumatic stress disorder) or physical domains (i.e., poor mobility, weakness, fatigue, pain, shortness of breath) (Iwashyna et al., 2018; Jutte et al., 2015). The incidence of each symptom varies, ranging from 1–78% (Iwashyna et al., 2018; Jutte et al., 2015; Mikkelsen et al., 2016). Post-Intensive Care Syndrome (PICS) became an established term, coined in 2010 by the Society of Critical Care Medicine, to grasp all symptoms of post-ICU morbidity (Elliot et al., 2014). Post-intensive care syndrome is an evolving term and evidence of the many impairments to the cognitive, psychological and physical domains continue to emerge (Connolly et al., 2015). The term post-intensive care syndrome is inclusive of all adult patients except for diagnoses of traumatic brain injury and stroke (Iwashyna et al., 2018). Post-intensive care

syndrome is typically identified immediately following critical illness, however there is not a definitive point after critical illness where inadvertent physical, psychological or cognitive impairments may or may not occur (Iwashyna et al., 2018).

Post-intensive care syndrome persists in over half of the patients who are discharged from an ICU. An extensive study by Pandharipande et al. (2013) reported that at three months after discharge, 40% of ICU survivors had cognitive deficits similar to patients with moderate traumatic brain injury. Jutte et al. (2015) stated that 50% of ICU survivors had clinical symptoms of anxiety one year after discharge and estimated 28% of ICU survivors experienced depressive symptoms. Diagnoses of posttraumatic stress disorder (PTSD) have been reported in 20%-44% of ICU survivors at the time of hospital discharge (Davydow, Desai, Needham, & Bienvenu, 2008). Research varies on the prevalence of physical disability (25–75%), as it is mostly dependent on the extent of critical illness (Iwashyna et al., 2018; Jutte et al., 2015). Long-term follow-up studies of ICU survivors beyond five years are not abundantly published (Iwashyna et al., 2018). However, current literature suggests that the symptoms of post-intensive care syndrome may persist for up to eight years in some ICU survivors, while some may not return to baseline (Connolly et al., 2015; Herridge et al., 2011; Jutte et al., 2015).

There are five key terms in post-intensive care research demonstrating the salience of the unintended impairments occurring after critical illness. Post-intensive care syndrome and post-ICU morbidity are interchangeable terms reflecting the physical, cognitive, and psychological symptoms inadvertently present after critical illness. The physical symptoms include poor mobility, weakness, fatigue, pain, and shortness of breath (Iwashyna et al., 2018; Jutte et al., 2015). Impairments to executive functioning, memory/attention, mental processing speed comprise the cognitive symptoms (Iwashyna et al., 2018; Jutte et al., 2015). Anxiety, depression,

and PTSD encompass the non-physical symptoms (Iwashyna et al., 2018; Jutte et al., 2015). ICU survivor(s) is a phrase to represent patients who have survived their critical illness. With the high incidence of post-intensive care syndrome (Stelfox et al., 2015), the term ICU survivorship is integral to the literature. ICU survivorship reflects the optimization of health outcomes and enabling patients who have survived the ICU to reclaim their lives after critical illness (Iwashyna, 2010). ICU survivorship extends beyond the critical care period (Iwashyna, 2010). A supported method of optimizing ICU survivorship is using care pathways (Mehlhorn et al., 2014). Care pathways are comprehensive and evidence-based practices that are integrated into clinical routines to enhance patient health outcomes and improve the quality of care (Bao et al., 2016).

Uncoordinated care after ICU discharge remains an important problem (Mehlhorn et al., 2014; McFetridge, 2011; Salisbury, Merriweather, & Walsh, 2010; Stelfox et al., 2015). The post-ICU trajectory is unclear (Mikkelsen et al., 2016) with poor understanding of individual rehabilitation needs (Deacon, 2012; Olsen, Nester, & Hansen, 2017). Half of ICU patients return to the emergency department after discharge from hospital (Hill et al., 2016), begging the question whether practice can be improved to optimize ICU survivorship. There is limited evidence on the rehabilitative regimes that are most effective for ICU survivors, which has inhibited the development of standardized practice guidelines (Connolly et al., 2015; Iwashyna et al., 2018; Mikkelsen et al., 2016; Turnbull et al., 2016). However, preliminary research and expert consensus on post-intensive care syndrome prevention, recognition/assessment, and treatment have been published to support care providers in delivering consistent and competent care (Connolly et al., 2015; Jutte et al., 2015).

Supporting ICU survivorship should begin in the ICU and then should continue throughout the post-ICU journey (Iwashyna et al., 2018; National Institute for Health and Clinical Excellence [NICE], 2009). General adult ICUs are for patients who require close observation and life-supporting therapies for medical reasons (i.e., sepsis, pneumonia, cardiac arrest) (CIHI, 2016). The Canadian Association of Critical Care Nurses (2017) define ICU nurses as advanced-problem solving individuals with a specialized body of knowledge on critical illness and technology in nursing the critically ill. The British Columbia Nurses Union (BCNU, 2015) mandates that one critical care nurse is responsible for the care of one mechanically ventilated patient and that one critical care nurse may be assigned to two non-ventilated patients. Once the ICU patient is medically stable and does not require continuous monitoring, the patient is discharged to a general ward or general unit. General ward nurses have special knowledge of the complex medical or surgical patient and may care for up to four patients at the same time (BCNU, 2015). Much of the care on the general wards is still treatment, with attention and resources towards rehabilitating patients for hospital discharge (Connolly et al., 2015).

As frontline providers of direct patient care, any proposed recommendation on supporting ICU survivorship will have a direct influence on nursing practice (Balas et al., 2012; Balas et al., 2013; Elliot et al., 2014). The framework for the practice of Registered Nurses in Canada outlines the importance and mandatory competency of implementing practice change in response to advances in nursing knowledge (Canadian Nurses Association [CNA], 2015). Specific to critical care nursing practice standards in Canada, standard 4.4 outlines using "quality improvement findings, research, and knowledge translation to promote positive change for nursing practice and health care delivery" (Canadian Association of Critical Care Nurses [CACCN], 2017, p. 6). As the patient is stabilized and transferred to a general ward, ICU

survivorship care should not stop (Iwashyna et al., 2018). Registered Nurses are autonomous health care professionals who work to enable individuals to be as healthy as possible given any health challenges they face (CNA, 2015). It is a nurse's ethical responsibility to promote health and well-being through collaboration with multiple disciplines of expertise to maximize the health benefits and health care needs of patients (Canadian Nurses Association [CNA], 2017).

ICU survivorship care is the shared responsibility of various health care professionals involved in the rehabilitation pathway (NICE, 2009). A broad team approach in caring for ICU survivors forms the foundation of the National Institute for Health and Clinical Excellence (NICE) guidelines on rehabilitation after critical illness. Communication is fundamental to nursing practice (CNA, 2017). Direct care nurses have a critical role in leading the multidisciplinary team to establish necessary patient care and are active participants in the rehabilitation pathway (CNA, 2015; Iwashyna et al., 2018). Within a multidisciplinary team approach, the standards of practice situate nurses at the forefront of enhancing ICU survivorship.

1.1 Problem Statement

Despite the recognized debilitating effects of post-intensive care syndrome, a consistent and comprehensive strategy for mitigating these effects is not always implemented in clinical practice (Iwashyna et al., 2018; McFetridge, 2011; Salisbury et al., 2010). As a result, ICU patients may receive inconsistent care along their hospital journey (Salisbury et al., 2010). Multidisciplinary team members are often unaware of their need to assist in post-intensive care syndrome recognition and rehabilitation (McFetridge, 2011). A care pathway could guide health care professionals to make consistent and informed decisions regarding an ICU survivor's care plan. Salisbury et al. (2010) reported that general adult ICU patients are at a disadvantage compared to those where a clear rehabilitation pathway exists. A care pathway could be helpful

in outlining the post-intensive care syndrome recognition and rehabilitation regimes and interventions that ICU patients require during the post-acute phase of illness up to the point of hospital discharge.

NICE is an England based non-departmental public body sponsored by the United Kingdom (UK) Department of Health tasked with providing guidance on best practice to improve health outcomes (National Institute for Health and Clinical Excellence [NICE], 2016). They are a well-respected organization that summarizes structured reviews of literature and recommendations of committees of experts (NICE, 2016). The NICE 2009 guideline on rehabilitation after critical illness are published to provide optimal practice strategies to enhance ICU survivorship (NICE, 2016). Currently, the guideline stands as the only summarized practice guideline offering recommendations on a rehabilitation pathway after critical illness for the general adult ICU population. The tertiary care teaching hospital in British Columbia, Canada selected for the study has not explicitly implemented the NICE 2009 guidelines on rehabilitation after critical illness

Considering the guidelines were developed for the UK healthcare system, the strategies on rehabilitating patients after critical illness may not be transferable to the Canadian context. Organizational care in British Columbia may not be similar to the UK, which will reduce the feasibility in reviewing post-ICU recovery by using the guidelines in the local context. Reviewing local policies, resources, scopes of practice and existing models of care in the Canadian context will be essential in determining the usability of the guideline (Harrison, Légaré, Graham, & Fervers, 2010). By adapting an existing guideline, it reduces the duplication of effort, enhances the applicability for local use, and optimizes use of resources (Harrison et al., 2010). Assessing the feasibility and usability of an existing guideline to the local context

encourages a quality improvement initiative review of institutional practice and the ability to optimize patient health outcomes (NICE, 2016). I am joining the critical care research conversation of ICU survivorship based on the available evidence reflected in NICE guidelines.

Much of the post-intensive care syndrome literature reports on the inadvertent physical, psychological and cognitive effects ICU survivors may face. There is continuing research on rehabilitative regimes to best optimize health outcomes of ICU survivors. In the meantime, experts in the critical care community have proposed recommendations to support the care planning for ICU survivors. Nurses, within a multidisciplinary team approach, have a professional role of engaging in the current conversation of ICU survivorship literature.

1.2 Purpose of the Study

This pilot study was the first step in a quality improvement initiative. The purpose of this study is to examine whether the NICE 2009 guidelines on rehabilitation after critical illness could be helpful to audit clinical practice in a Canadian hospital. The two research questions were:

- 1) What is the feasibility of reviewing care provided regarding post-ICU recovery in a tertiary care teaching hospital using the NICE 2009 guidelines on rehabilitation after critical illness?
- 2) What adaptations would improve the usability and relevance of the NICE 2009 guidelines on rehabilitation after critical illness in the context of a tertiary care hospital in British Columbia?

1.3 Outline

This dissertation proceeds with a literature review (Chapter 2) focusing on evidence for post-intensive care syndrome. First, the quantitative evidence for rehabilitative strategies and

therapies to assess and treat post-ICU morbidity will be reported. Proposed post-intensive care syndrome prevention and rehabilitation therapies published by expert practitioners will be included to fill the research gap. Chapter 3 outlines the study design and methods. Chapter 4 presents the descriptive and contextual findings with respect to each research question. In Chapter 5, the study results are interpreted and analyzed in reference to available published literature on the post-intensive care syndrome rehabilitation care pathway; implications for clinical practice and future research are also discussed.

Chapter 2: Literature Review

To understand the sequelae of post-intensive care syndrome, a body of literature on implemented and proposed clinical practice regimes in response to post-ICU morbidity research is presented. This body of knowledge will be linked to the role of the multidisciplinary team along the ICU continuum. Based on the findings from the literature, the concept of a care pathway as a hospital ICU survivorship quality improvement initiative is presented.

2.1 Post Intensive Care Syndrome

Iwashyna et al. (2018) consider post-intensive care syndrome to be a medical emergency. As any medical diagnosis, individual risk factors predispose the patient to developing complications. In post-intensive care syndrome, the patient's baseline functional status and ICU treatment and care factors are referenced as determinants of post-ICU morbidity (Jutte et al., 2015; Sakusic et al., 2018). Physical symptoms of post-intensive care syndrome are poor mobility, weakness, fatigue, pain, and shortness of breath (Iwashyna et al., 2018; Jutte et al., 2015). The common cognitive and psychological symptoms that may be present after critical illness include impairments to executive functioning, memory/attention, mental processing speed, anxiety, depression, and PTSD (Iwashyna et al., 2018; Jutte et al., 2015). The available evidence on prevention and rehabilitative interventions to mitigate the symptoms of physical, cognitive and psychological impairments after critical illness will be discussed in further detail.

2.1.1 Physical Symptoms of Post-Intensive Care Syndrome

Peripheral skeletal muscle wasting, critical illness polyneuropathy and critical illness myopathy manifest as ICU acquired weakness (ICU-AW) (Connolly et al., 2015; Kress, & Hall, 2014). ICU-AW is an important component of post-intensive care syndrome. The term ICU-AW may be applied in clinical cases in which a patient is noted to have clinically detected weakness

with no plausible cause other than critical illness (Kress & Hall, 2014). Kress and Hall (2014) report the incidence of ICU-AW occurs in 25% or more of ICU survivors. Puthuchear (2017) reported critically ill patients on average lose 2% - 3% of muscle mass a day and patients with multi-organ failure or among the sicker population can lose up to 20% of muscle mass per day. A 2013 observational study of peripheral skeletal muscle wasting in critically ill patients reported a 20% loss in the quadriceps rectus femoris muscle within 10 days of ICU admission. Critical illness polyneuropathy and myopathy have an incidence of 25% - 45%, with a higher incidence correlating to the duration and severity of illness (Zhou et al., 2014). Critical illness polyneuropathy is thought to be caused by axonal degeneration, and the loss of myosin is the reported cause of critical illness myopathy (Zhou et al., 2014). The axonal degeneration and loss of myosin in critically ill patients is not well understood, however is thought to be due to microvascular, metabolic, and electrical alterations and bioenergetic failure during acute illness (Zhou et al., 2014). Although critical illness polyneuropathy and myopathy are reported to have a different pathophysiological mechanism, both conditions present with same the clinical manifestation of symmetric limb paralysis, retained sensory function and respiratory muscle weakness (Zhou et al., 2014).

Prolonged mechanical ventilation, bedrest/immobility, administration of sedating agents and hyperglycemia are strongly associated to the development of ICU-AW (Iwashyna et al., 2018; Kress & Hall, 2014). The administration of paralytic agents and corticosteroids are thought to lead to ICU-AW, however literature is inconsistent on confirming a strong association to ICU-AW (Iwashyna et al., 2018; Kress & Hall, 2014). The clinical diagnoses of sepsis, acute respiratory distress syndrome, and multi-system organ failure are linked to cause ICU-AW (Iwashyna et al., 2018). The physical symptoms of post-intensive care syndrome (i.e.: poor

mobility, weakness, failure/prolonged wean off the ventilator, fatigue, pain, reduced exercise capacity, and shortness of breath) are the clinical presentations of ICU-AW (Herridge et al., 2011; Iwashyna et al., 2018; Kress, & Hall, 2014). Zhou et al. (2014) reported most ICU survivors will continue to have reduced physical capacity after their critical care stay as a result of ICU-AW, which correlates to reduced independence and a poorer quality of life.

Early physical rehabilitation initiated within 72 hours of ICU admission has been shown to reduce the severity of ICU-AW (Connolly et al., 2015; Connolly et al., 2016; Doherty & Steen, 2010; Fraser, Spiva, Forman, & Hallen, 2015; Wright et al., 2018). Patient passive and active assisted exercises, sitting at the edge of the bed or transferring her or him to a bedside chair, standing, marching on the spot and eventually mobilizing consist of early physical rehabilitation in the ICU (Connolly et al., 2015; McFetridge, 2011). A systematic review of 14 randomized controlled trials examined the effectiveness of physical therapy and parenteral nutrition to improve physical function in ICU survivors (Calvo-Ayala, Khan, Farber, Ely, & Boustani, 2013). Early physical rehabilitation initiated in the ICU and continued on the general wards was the only intervention associated with improved physical function (Calvo-Ayala et al., 2013). A meta-analysis of four trials reported a shorter duration of mechanical ventilation by a mean of 2.7 days, and a higher incidence of ambulation at discharge (64% vs. 41%) with early mobilization in the ICU compared to usual care (Girard et al., 2017). The Extra Physiotherapy in Critical Care (EPICC) trial was unable to demonstrate any benefit to early intensive patient mobilization compared to standard physiotherapy. EPICC measured physical, psychological, and functional well-being of ICU survivors on critical care discharge, and at three and six months after randomization (Wright et al., 2018). Study limitations may have influenced these findings - authors reported inconsistent delivery of physiotherapy in both intervention and control groups,

participants and health care professionals were not blind to allocation, and 25% of the participants were lost to follow-up (Wright et al., 2018). Likewise, other trials examining intensive physical rehabilitation compared to early initiation did not report any differences (Morris et al., 2016; Moss et al., 2016; Walsh et al., 2015; Wright et al., 2018). Regardless of the intensity of physical rehabilitation, the findings of these studies show that early physiotherapy in the ICU is effective in mitigating the physical symptoms of post-intensive care syndrome.

Consensus on the need for physical rehabilitation after critical care discharge is widely published (e.g., mobilization) Connolly et al., 2015; Iwashyna et al., 2018; Jutte et al., 2015; McFetridge, 2011; Mehlhorn et al., 2014). Regular physical therapy continued on the general ward further reduces the clinical manifestations of ICU-AW (Connolly et al., 2015; Jutte et al., 2015; Mehlhorn et al., 2014). In a feasibility trial, Salisbury et al. (2010) found no difference in physical strength and functioning between ICU survivors who received enhanced rehabilitation on the general ward (additional passive and strength exercises, mobility, and balance practice) combined with a dietetic rehabilitation package (mealtime assistance, monitoring consumption, and ensuring adequate oral intake through reviewing food charts) at a three-month follow-up compared to standard ward-based physiotherapy and nutritional service. In 2015, the RECOVER trial did not find any improvements in physical recovery, mobility, exercise, or nutrition with increased mobility, exercise, and dietetic therapy on the general ward at a 12-month follow-up compared to standard ward-based physiotherapy, and dietetic services; although there was improved patient satisfaction with the coordinated care (Walsh et al., 2015). A 2017 trial found a significant reduction in hospital length of stay for post-ICU survivors receiving early rehabilitation (breathing techniques, mobilization, exercise therapy, and neuromuscular electrical stimulation) on the general wards compared to the standard physiotherapy as ordered by the

medical team (Gruther et al., 2017). However, there was no difference in patient physical functioning between the intervention and control group at the time of hospital discharge (Gruther et al., 2017). Common published limitations in studies evaluating post-intensive care syndrome treatment include small sample sizes (Gruther et al., 2017; Salisbury et al., 2010) and inability to blind participants and health care providers (Gruther et al., 2017; Walsh et al., 2015). The available research on the type, frequency, and intensity of physical rehabilitation provided on the general ward to optimize the health outcome of ICU survivors has yet to be determined.

Overall, the literature recognizes that direct nursing staff in collaboration with health care professionals with expertise in physiotherapy, occupational therapy, nutrition, respiratory therapy, and pharmacology are essential to help shape a rehabilitation program specific to the needs of the ICU survivor (Iwashyna et al., 2018; NICE, 2009). It is unclear what form of rehabilitative therapy is most effective to improve the inadvertent physical symptoms of post-intensive care syndrome. With the current evidence on post-intensive care syndrome rehabilitation, it is apparent that some form of early physical rehabilitative therapy initiated in the ICU and continued on the general ward plays an important role in improving physical health outcomes after critical illness.

2.1.2 Cognitive Symptoms of Post-Intensive Care Syndrome

Cognitive impairment in post-intensive care syndrome is characterized by the exacerbation of a pre-existing mild deficit or a new deficit in global cognition or executive functioning (Pandharipande et al., 2013). Impairments to patient executive functioning, attention/concentration, memory, and mental processing speed are important post-ICU morbidity components in the cognitive dimension (Iwashyna et al., 2018; Jutte et al., 2015). The reported incidence of cognitive impairment after critical illness averages from 25% - 78% (Iwashyna et

al., 2018). The BRAIN-ICU study evaluated global cognition (i.e.: immediate and delayed memory, attention, visuospatial construction, and language), and executive function (i.e.: cognitive flexibility and set shifting) at 3 and 12 months after discharge from a general medical, surgical adult ICU (Pandharipande et al., 2013). Pandharipande et al. (2013) reported 40% of the participants had cognitive impairment reflective of patients with moderate traumatic brain injury and 26% had global cognition scores similar to patients with mild Alzheimer's disease at the 3-month follow-up. At the 12-month follow-up, 34% reflected patients with traumatic brain injury and 24% reflected those with mild Alzheimer's disease (Pandharipande et al., 2013). The cognitive impairments in post-intensive care syndrome are thought to contribute to functional and social difficulties, thus reducing independence and health related quality of life (Clancy, Edginton, Casarin, & Vizcaychipi, 2015; Iwashyna, Ely, Smith, & Langa, 2010; Jutte et al., 2015). Jutte et al. (2015) suggested that approximately half of ICU survivors are not able to return to work within a year of ICU discharge due to impaired cognitive functioning. Cognitive impairments after critical illness are strongly associated to delirium, and thought to be caused by hypoxia, glucose and metabolic dysregulation, hypotension, inflammation, and neurotoxic effects of medications (i.e., sedatives, narcotics) during critical illness (Clancy et al., 2015; Iwashyna et al., 2018; Jutte et al., 2015; Sakusic et al., 2018).

Delirium is considered a strong independent risk factor of long-term cognitive impairment and is thought to be associated with brain atrophy (Clancy et al., 2015; Pandharipande et al., 2013). Delirium is characterized “by the acute onset of cerebral dysfunction with fluctuating mental status, inattention, and either an altered level of consciousness or disorganized thinking” (Blair, Mehmood, Rudnick, Kushner, & Barr, 2018, pg. 1). The BRAIN-ICU study reported a longer duration of delirium was associated to poor

cognitive scores and worse executive functioning at the 3 and 12-month follow-up in ICU survivors (Pandharipande et al., 2013).

Interventions to reduce delirium may mitigate the cognitive impairments after critical illness (Clancy et al., 2015; Pandharipande et al., 2013). A majority of the recommended prevention and management of delirium are to optimize pain management, implement early and continued physical rehabilitation, normalize a sleep-wake cycle, provide reorientation to patients, and remove invasive devices as soon as possible (i.e.: central line, urinary catheter, endotracheal tube) (Blair et al., 2018; Clancy et al., 2015). The American College of Critical Care Medicine and the Society of Critical Care Medicine developed an evidence-based guideline to support direct care providers in the assessment and management of Pain, Agitation and Delirium (PAD guidelines) in the ICU (Clancy et al., 2015). The guidelines advocate for adequate pain management and recommend performing pain assessments every two hours (Blair et al., 2018; Clancy et al., 2015). A 2016 prospective cohort quality improvement initiative evaluating the PAD guideline compliance reported full implementation of the guideline in the selected sites and the guidelines was independently associated to fewer days of delirium and induced coma (Blair et al., 2018).

Evidence for specific recommendations on pharmaceutical options in delirium prevention and management is not consistently supported by evidence (Clancy et al., 2015). The haloperidol on the duration of delirium and coma in critically ill patients (HOPE-ICU) trial was a randomized, double-blind, placebo-controlled trial of intravenous haloperidol in a general mixed medical and surgical adult ICU (Page et al., 2015). Page et al., (2015) reported no difference on the prevalence or duration of delirium or coma free days between the haloperidol and the placebo; inadvertently the researchers reported higher levels of over sedation with the

administration of haloperidol. A 2017 retrospective cohort comparison of antipsychotic use and non-antipsychotic use in the ICU reported the use of antipsychotics (i.e.: haloperidol, quetiapine, olanzapine, risperidone) were not associated with a shorter duration of delirium (Weaver, Kane-Gill, Gunn, Kirisci, & Smithburger, 2017).

The BRAIN-ICU study did not find a persistent association with the use of sedative or analgesic to long-term cognitive impairment (Pandharipande et al., 2013); there is not consensual literature on the association of sedation or analgesia to cognitive impairment after critical illness (Iwashyna et al., 2018). However, early ambulation in the ICU has shown to improve cognition; a randomized study found a reduced number of delirium days (two vs. four days) in patients with early ambulation compared to usual care (Schweickert et al., 2009). When feasible, experts recommend light sedation practice in the critical care setting and ICU physicians should provide care to avoid hypoxia, and glucose and other metabolic dysregulation (Iwashyna et al., 2018). Prevention is a strategy in potentially reducing the effects of cognitive impairment after critical illness (Iwashyna et al., 2018; Mehlhorn et al., 2014).

The Activity and Cognitive Therapy in the ICU (ACT-ICU) trial is currently the only available published research on cognitive therapy in the ICU. The ACT-ICU was a small randomized trial evaluating the feasibility of cognitive therapy through the administration of orientation, memory, attention, and problem-solving exercises (Brummel et al., 2014). While the study was not adequately powered to detect meaningful changes, it determined that cognitive therapy was feasible in the ICU (Brummel et al., 2014). Future studies will need a larger sample size to determine the effects of cognitive therapy in the ICU on patient executive functioning, attention/concentration, memory, and mental processing speed. The RETURN trial was a similar feasibility pilot trial hypothesizing improved cognitive and functional performance with

cognitive, physical and functional rehabilitation after ICU discharge (Jackson et al., 2012). The RETURN trial implemented goal-management training to improve cognitive processing, exercise interventions tailored to the ICU survivors needs and contact with an occupational therapist for home environment support (Jackson et al., 2012). The trial determined cognitive, physical and functional rehabilitation provided after ICU discharge is feasible and results indicated improved cognitive executive functioning in the group receiving the three forms of rehabilitation (Jackson et al., 2012). However, a larger sample size is required to confirm the reported difference and to determine whether all three rehabilitation therapies contributed to improved cognitive functioning. The Improving Recovery and Outcomes Every day after the ICU (IMPROVE) study is a large randomized controlled trial currently underway evaluating the efficacy of a combined physical exercise and cognitive training program on the cognitive function of ICU survivors who experienced delirium during the ICU stay (Wang et al., 2018). The IMPROVE study is expected to be completed in 2023 (Wang et al., 2018). For now, delirium prevention and management combined with early and continued physical rehabilitation are considered important strategies to reduce the effects of cognitive impairment after critical illness.

2.1.3 Psychological Symptoms of Post-Intensive Care Syndrome

Anxiety, depression, and posttraumatic stress disorder are important post-intensive care syndrome components in the psychological domain (Iwashyna et al., 2018; Jutte et al., 2015). The incidence of symptoms of anxiety are reported in 50% of ICU survivors at the time of ICU discharge (Jutte et al., 2015). While anxiety may be considered a normal response to critical illness, untreated distress from anxiety may have negative impacts on patient health outcomes (Jutte et al., 2015). Symptoms of depression are reported in up to 33% of ICU survivors and PTSD symptoms are reported as high as 44% (Clancy et al., 2015; Kapfhammer, Rothenhäusler,

Krauseneck, Stoll, & Schelling, 2004). A prospective longitudinal cohort study in acute respiratory distress syndrome survivors found the prevalence of anxiety, depression and posttraumatic stress disorder symptoms persisted at a 12-month follow-up (Huang et al., 2016). Survivors of acute respiratory distress syndrome are reported to have higher incidences of psychological symptoms, with Kapfhammer et al., (2004) indicating the possibility of PTSD persisting for up to 8 years. The psychological impairments in post-intensive care syndrome are thought to precipitate social isolation and reduced quality of life (Clancy et al., 2015; Iwashyna et al., 2018; Jutte et al., 2015). Psychological impairments after critical illness are associated with patient traumatic/delusional memories of ICU, sepsis, acute respiratory distress syndrome, delirium, use of sedation, duration of mechanical ventilation, and degree of impairment in physical functioning after acute illness (Clancy et al., 2015; Iwashyna et al., 2018; Jutte et al., 2015; Sakusic et al., 2018).

There is limited literature on the best practices of treating the psychological symptoms of post-intensive care syndrome (Clancy et al., 2015). Similar to treating the cognitive dimension in post-intensive care syndrome, prevention in the ICU is considered an effective strategy to reduce psychological impairments (Hopkins, & Girard, 2012; Iwashyna et al., 2018; Jutte et al., 2015; Mehlhorn et al., 2014). Much of the non-pharmacological methods of preventing and treating the cognitive dimension are the same for the psychological dimension. Experts recommend delirium prevention and management through the PAD guidelines, adequate pain management, early and continued physical rehabilitation, promote normalize sleep-wake cycle, provide reorientation to patients, and remove invasive devices as soon as possible (i.e.: central line, urinary catheter, endotracheal tube) (Blair et al., 2018; Clancy et al., 2015). Nursing care through facilitating communication is thought to promote a positive effect on psychological well-being (Clancy et

al., 2015). Explaining care prior to initiating, rationalizing interventions, reorientation to the environment, and providing reassurance to the patient have been reported in the literature to optimize psychological health outcomes (Clancy et al., 2015). A 2003 randomized controlled trial reported a lower rate of depression in participants who received a 6-week self-help rehabilitation manual after ICU discharge in addition to the standard care of nurse-led ward visits, three telephone calls at home and clinic appointments at 8 weeks and 6 months (Jones et al., 2003). Experts recommend the practice of light sedation when feasible in attempts to reduce the duration of mechanical ventilation and promote patient participation in physical rehabilitation, which is believed to reduce the incidence of depression (Iwashyna et al., 2018; Mehlhorn et al., 2014). The use of ICU diaries maintained by the patient's family and/or health care providers during the critical care stay can help ICU survivors piece together memories that were lost during their ICU stay (Jutte et al., 2014; NICE, 2009). A systematic review of five randomized trials evaluating the effect of ICU diaries revealed that four studies found positive effects of such diaries, especially in reducing the prevalence of PTSD at a three month follow up (5% vs. 13%) (Mehlhorn et al., 2014).

There is relatively little literature published on pharmacotherapy management for anxiety, depression, and PTSD (Clancy et al., 2015). Pharmacotherapy to treat psychological impairment after critical illness are typically administered based on physician preference (Jutte et al., 2015). Jutte et al. (2015). Mehlhorn et al. (2014) recommend that ICU physicians would benefit from consulting with psychiatrists to assist in developing a pharmacotherapy regime for ICU survivors and in identifying patients who would benefit from counselling.

2.2 Clinical Practice in the ICU

The Awakening and Breathing coordination of daily sedation and ventilator weaning trials, Choice of sedative and analgesic exposure, Delirium monitoring and management and Early mobility and Exercise' (ABCDE) bundle is an evidence-based approach recommended for ICU units (Balas et al., 2012). A majority of the evidence presented on the strategies to prevent or mitigate the effects of post-intensive care syndrome focuses on early physical rehabilitation and minimizing delirium in the ICU (Clancy et al., 2015; Iwashyna et al., 2018; Jutte et al., 2015; Pandharipande et al., 2013). The ABCDE bundle approach aims to standardize ICU processes, increase multidisciplinary collaboration, and reduce the over-sedation and prolonged mechanical ventilation sequence ultimately leading to patient delirium and ICU-AW (Balas et al., 2012; Morandi, Brummel, & Ely, 2011; Salgado et al., 2011). Experts have abundantly published the ABCDE bundle approach in an effort to mitigate the inadvertent physical, cognitive and psychological effects after critical illness (Connolly et al., 2015; Iwashyna et al., 2018; Jutte et al., 2015). Implementation of the ABCDE bundle in critical care settings has shown to reduce the prevalence of delirium, reduce the number of mechanical ventilation days, and reduced severity of ICU-AW (Balas et al., 2012). Kram, DiBartolo, Hinderer, and Jones, (2015) reported the implementation of the ABCDE bundle reduced the length of mechanical ventilation days by an average of one day. Bounds et al. (2016) reported the implementation of the ABCDE bundle reduced the prevalence of delirium from 38% to 23%. Balas, Buckingham, Braley, Saldi, and Vasilevskis, (2013) reported patients who received ventilator weaning trials and early mobilization were more likely to experience ventilator free days, shorter duration of delirium (two vs. four days) and improved functional status at hospital discharge. The ABCDE bundle has shifted the ICU culture and is considered a forefront to early mobility and is promising in

reducing the severity of post-intensive care syndrome (Balas et al., 2012; Morandi et al., 2011; Salgado et al., 2011).

2.3 Follow-up Programs

Nurse-led follow-up is a published strategy to support the transition of ICU patients to the general wards (Cuthbertson et al., 2009; Egerod et al., 2013; Endacott & Chaboyer, 2006). There is variation in the type of models of nurse-led follow-up (Egerod et al., 2013). The standard terms of ICU liaison nurse and ICU outreach are commonly used in the current literature (Endacott & Chaboyer, 2006). In Australia, the role of an ICU liaison nurse is to provide staff education and support (formal in-services), ward liaison (prepare ward staff and ICU patients for transfer), patient care and support (case management), and family education and support (Endacott & Chaboyer, 2006). In the UK, ICU outreach is intended to support the ward in managing recently discharged ICU patients, but also has a role in identifying patients who are deteriorating (Endacott & Chaboyer, 2006). Nurse-led follow-up programs in Denmark, Norway and Sweden are commonly practiced with a focus on the patient past and present (Egerod et al., 2013). The use of ICU diaries in Denmark, Norway, and Sweden are commonly practiced to help ICU survivors revisit their stay in critical care to patch together the events that occurred in an effort to optimize psychological recovery (Egerod et al., 2013). A patient assessment utilizing the common tools (i.e.: ICU-Memory tool, Hospital Anxiety Depression Scale (HADS), Posttraumatic Stress Syndrome 14-question inventory (PTSS-14), and Health Questionnaire Short Form (SF-36) are performed in the follow-up visit by the nurse after critical care discharge as a strategy to focus on present patient needs (Egerod et al., 2013). Published quantitative data could not be found to support the effects of nurse-led follow-up on the short and long-term outcomes of post-intensive care syndrome. Egerod et al. (2013) recommends further research on

the appropriate timing for nurse-led follow-up after the ICU patient is discharged to the general ward, as well as the health benefits of such follow-up programs. Nonetheless, in a qualitative analysis, Prinjha, Field, and Rowan, (2009) reported ICU survivors valued some form of ICU follow-up and the receiving of information and reassurance on the physical, emotional and psychological recovery after ICU. ICU survivors without access to follow-up services reported feeling abandoned, and unsure of their recovery process (Prinjha et al., 2009).

Post-ICU clinics have been practised in parts of Europe and the UK and newly introduced to the United States as a strategy for continued post-intensive care syndrome rehabilitation after hospital discharge (Iwashyna et al., 2018). Post-ICU clinics are not part of standardized care, therefore there is variability in the literature on the structure of follow-up practice (Egerod et al., 2013). In the UK and Europe, most of the post-ICU clinics are nurse-led in an outpatient clinic and operate either as part of an organizational structure or as a referral service to different members of the multidisciplinary team (Clancy et al., 2015). Most of the ICU follow-up clinics in the United States are clinic-visits with a multidisciplinary team approach on physical and cognitive rehabilitation and act as a referral center for further community follow-up (Lasiter, Oles, Mundell, London, & Khan, 2016). The impact of post-ICU clinics has varied in literature due to the heterogeneity of outcome measures, tools used to measure outcomes, differences in staffing and the types of interventions/therapies provided in the clinic (Korzickn & Layon, 2017). Further studies are recommended in evaluating the effectiveness of post-ICU clinics on the physical, cognitive, and psychological impairments after critical illness (Iwashyna et al., 2018).

2.4 Care Pathway

A care pathway is a strategy to integrate available evidence on post-intensive care syndrome into clinical practice. Common established care pathways involve the diagnoses of stroke, heart failure, pneumonia, cancer, and a variety of surgical procedures (Bao et al., 2016; Evans-Lacko, Jarrett, McCrone, & Thornicroft, 2010; Müller et al., 2009). Two consistent components of a care pathway are 1) types of services/interventions administered and 2) the timeline for administration of identified services/interventions (Evans-Lacko et al., 2010).

In post-intensive care syndrome, prevention strategies such as reducing delirium, and initiating early physical rehabilitation are key in reducing the severity of physical, psychological and cognitive impairments after critical illness (Iwashyna et al., 2018; Jutte et al., 2015). On the general ward, continued rehabilitation and assessment of the inadvertent physical, psychological and cognitive symptoms after critical illness are essential in reducing the severity of post-intensive care syndrome (Iwashyna et al., 2018; Jutte et al., 2015; NICE 2009). While the ABCDE bundle is intended for the ICU and has shown to reduce the unintentional physical, psychological and cognitive symptoms of post-intensive care syndrome, a clinical “bundle” or “pathway” approach to guide care of the post-ICU patient on the general ward is currently not available. A care pathway could benefit health care providers by providing a comprehensive, consistent method of managing and improving the health outcomes of ICU survivors along the hospital continuum.

2.5 Guidelines on Rehabilitation after Critical Illness

In 2009, the National Institute for Health and Clinical Excellence (NICE) developed a clinical practice guideline to guide the care of ICU survivors. The NICE guidelines do not explicitly utilize the term ‘post-intensive care syndrome’, however the inadvertent physical,

psychological and cognitive impairments after critical illness published in the guidelines are representative of post-intensive care syndrome. The NICE guidelines proposed a set of 25 recommendations to support the integration of available evidence for ICU survivors into clinical care. The proposed recommendations are categorized into the five stages of an ICU care pathway; during the critical care stay, before discharge from critical care, during ward-based care, before discharge to home or community care, and at two to three months after critical care discharge (NICE, 2009).

The key components of the guideline corresponding to post-intensive care syndrome prevention, identification, and treatment are to assess for the physical, cognitive and psychological impairments after critical illness, initiate early rehabilitation, and reevaluate individualized rehabilitative care along the post-ICU continuum. The guideline does not specify the form of rehabilitative therapy, rather, it recommends consultation with experts from different medical services to develop a rehabilitation care pathway along the post-ICU journey. In the absence of research-based evidence to inform recommendations on rehabilitation after critical illness, expert consensus was the basis for most of the recommendations (NICE 2009). The recommendations informed by evidence are:

- “1.1.7: Give patients the following information during their critical care stay. Also give the information to their family and/or carer, unless the patient disagrees. Deliver the information more than once during the patient’s critical care stay.
 - Information about the patient’s critical illness, interventions and treatments.
 - Information about the equipment used during the patient’s critical care stay.

- If applicable, information about any possible short or long term physical and non-physical problems that may require rehabilitation” (NICE, 2009, p. 11).
- “1.1.13: Give patients the following information before, or as soon as possible after, their discharge from critical care. Also give the information to their family and/or carer, unless the patient disagrees.
 - Information about the rehabilitation care pathway.
 - Information about the differences between critical care and ward-based care. This should include information about the differences in the environment and staffing and monitoring levels.
 - Information about the transfer of clinical responsibility to a different medical team (this includes information about the formal structured handover of care recommended in ‘Acutely ill patients in hospital’ NICE clinical guideline 50).
 - If applicable, emphasize the information about possible short or long term physical and non-physical problems that may require rehabilitation.
 - If applicable, information about sleeping problems, nightmares, and hallucinations and the readjustment to ward-based care” (NICE, 2009, p. 12 – 13).
- “1.1.22: Give the patient the following information before their discharge to home or community care. Also give the information to their family and/or carer, if the patient agrees.

- Information about their physical recovery, based on the goals set during ward-based care if applicable.
- If applicable, information about diet and any other continuing treatments.
- Information about how to manage activities of daily living including self-care and reengaging with everyday life.
- If applicable, information about driving, returning to work, housing and benefits.
- Information about local statutory and non-statutory support services, such as support groups.
- General guidance, especially for the family and/or carer, on what to expect and how to support the patient at home. This should take into account both the patient's needs and the family's /carer's needs" (NICE, 2009, p. 15).

NICE (2009) proposed regular patient risk assessment of developing physical and non-physical symptoms of post-intensive care syndrome during the critical care stay, before discharge from critical care and during ward-based care. The physical symptoms after critical illness in the guidelines include: unable to get out of bed independently, anticipated long duration of critical care stay, obvious significant physical or neurological injury, lack of cognitive functioning to continue exercise independently, unable to self-ventilate on 35% of oxygen or less, presence of premorbid respiratory or mobility problems, and unable to mobilize independently over short distances (NICE, 2009). Recurrent nightmares, intrusive memories of traumatic events that occurred prior to admission or during critical care stay, new and recurrent anxiety or panic attacks, and expressing a wish not to talk about the illness or changing the

subject quickly are the non-physical symptoms of post-intensive care syndrome in the NICE guidelines (NICE, 2009). The listed physical and non-physical symptoms are not exhaustive and health care professionals are encouraged to use their expertise in identifying patients at risk of developing post-ICU morbidity (NICE, 2009).

The guideline highlighted the need for providing essential information for the patient or her or his family along the hospital journey. Qualitative research on patient and family experiences in the ICU and post-ICU periods informed the types of information patients or families need during the five stages of the ICU care pathway (Database of Individual Patient Experiences [DIPEX], n.d; McKinney, & Deeny, 2002; Paul, Hendry, & Cabrelli, 2004; Strahan, & Brown, 2005). Most of the requested information by patients and families pertained to critical illness and recovery, common post-ICU morbidity symptoms, and rehabilitation and available supports for successful integration to home or community care (DIPEX, n.d; McKinney, & Deeny, 2002; Paul, Hendry, & Cabrelli, 2004; Strahan, & Brown, 2005).

A comprehensive review of guideline compliance across the UK was published in 2014, however only focused on the post-hospital period (Connolly et al., 2014). The review identified that fewer than one-third of the 182 surveyed institutions had implemented any form of follow-up clinical services (i.e., ICU clinic) or rehabilitation programs (i.e., cardiovascular exercise, muscles strength, balance, and functional activities) for ICU survivors (Connolly et al., 2014). The lack of funding, lack of managerial support, and inadequate clinical infrastructure were leading barriers to follow-up services (Connolly et al., 2014). A published comprehensive review on the implementation of the NICE guidelines throughout the patient hospital stay could not be found.

A 2013 survey of 59 ICUs in England discovered a variable range of compliance with the NICE guidelines on rehabilitation after critical illness (Berry, Cutler & Himsworth, 2013). Berry et al. (2013) reported a 52% guideline compliance in the ICUs, but compliance reduced to 27% on the general ward. Barriers to guideline implementation were not discussed by Berry et al. (2013), but, Appleton, MacKinnon, Booth, Wells, and Quasim, (2011) reported insufficient funding, equipment, and staff as obstacles. Other expert practitioners have reported the lack of evidence-informed recommendations in the NICE guidelines on rehabilitation after critical illness as a primary limitation (McFetridge, 2011; Mehlhorn et al., 2014). However, NICE has captured the available evidence on post-intensive care syndrome and proposed a set of recommendations for care in clinical practice to better support the health outcomes of ICU survivors.

2.6 Summary

This literature review provided an overview of studies into post-intensive care syndrome and the current methods of preventing and treating the unintentional physical, cognitive and psychological impairments occurring post critical illness. The implementation of a care pathway was presented as a method of integrating available evidence in post-intensive care syndrome care. To optimize ICU survivorship, the NICE guidelines provided a set of recommendations for care, beginning in the ICU and carrying on after hospital discharge. The NICE guidelines were not only intended to support ICU survivors and families but to guide health care professionals in providing coordinated and comprehensive care throughout the post-ICU continuum. The next chapter will discuss the methods undertaken in this study to answer the research questions.

Chapter 3: Methods

The primary purpose of this pilot study was to examine the applicability of the NICE 2009 guidelines to clinical practice in a Canadian hospital. Ultimately, it is important to understand whether a UK based guideline on rehabilitation after critical illness could be helpful to audit and guide care in a Canadian clinical setting. In this section, I discuss the study methods. This chapter begins with a general description of the study design, followed by details of the sample, method of data collection, and data analysis techniques. Last, ethical considerations will be discussed.

3.1 Research Questions

Two research questions examined in this pilot study were:

- 1) What is the feasibility of reviewing care provided regarding post-ICU recovery in a tertiary care teaching hospital using the NICE 2009 guidelines on rehabilitation after critical illness?
- 2) What adaptations are needed to improve the usability and relevance of the NICE 2009 guidelines chart abstraction tool on rehabilitation after critical illness in the context of a tertiary care hospital in British Columbia?

3.2 Hypothesis

The hypothesis in this study was:

- 1) The NICE 2009 guidelines can be used to audit post-ICU recovery care (RQ#1), although adaptations will be needed to the audit tool since the guidelines on rehabilitation after critical illness will be relevant to some, but not all aspects of rehabilitation in a Canadian tertiary care teaching hospital (RQ#2).

3.3 Research Design

This research was a pilot study that incorporated a retrospective chart audit. The study was a small-scale pilot study because of the uncertainty of how applicable a UK based guideline on rehabilitation after critical illness would be to a Canadian context. The retrospective chart audit involved general adult ICU patients who were discharged to the ward.

3.3.1 Framework

An audit support tool had been developed by NICE for institutions to measure current practice of post-ICU rehabilitation against the 2009 guidelines on rehabilitation after critical illness (NICE, 2009) (Appendix A). The NICE audit tool extracted patient ethnicity, however since data on patient ethnicity was not related to the study purpose, ethnicity was not collected. In order to compare the sample in the study to other ICU cohorts, the APACHE (Acute Physiology and Chronic Health Evaluation) II score was collected to describe the ICU population in the Canadian setting.

The audit support tool was categorized into the five stages of a critical care rehabilitation pathway beginning with: during the critical care stay, before discharge from critical care, during ward-based care, before discharge to home or community care, and 2-3 months after discharge from critical care (NICE, 2009). There were 16 criteria in the audit tool that identified the specific data to extract and with the proposed NICE recommendation referenced in the last column. Of the proposed 25 recommendations, nine recommendations were not acknowledged in the audit support tool with no documentation as to why they were missing. The nine missing recommendations were not extracted as part of data collection. The audit tool has one proposed recommendation in the category 2–3 months after discharge from critical care. Most of the patients were presumed to be discharged from the hospital 2-3 months after ICU discharge, thus

out of scope of the research question. Therefore, the one proposed recommendation in the category 2-3 months after discharge from critical care was also omitted from the audit tool used in this study. A total of 15 proposed recommendations were included as the basis for data extraction for this study (Appendix B).

3.4 Sample

The setting for the study was a general adult ICU in a tertiary care teaching hospital (not a trauma center) in British Columbia (BC). The sample included charts of patients who were: admitted to the tertiary care hospital under study from January 2015 – December 2015, admitted to the adult general ICU for greater than or equal to 48 hours, mechanically ventilated for greater than or equal to 48 hours during ICU stay and discharged to a ward for a minimum 24 hours. Charts of patients who passed away during the ICU stay, who were re-admitted to the ICU within 24 hours of transfer from ICU, those discharged to the ward for end of life care and patients with a specific care plan pathway where ICU admission was a precaution and planned (i.e., STEMI, CABG, trauma) were excluded from the study since they would not be considered an “ICU survivor” at risk for post-intensive care syndrome. Because the primary goals were to evaluate feasibility and applicability, the study was not powered to detect statistically significant differences in audited data. To ensure that it was possible to collect data based on the NICE 2009 audit tool; this pilot study examined a sample of 50 charts.

3.4.1 Recruitment method

The hospital analytics department identified 73 potentially eligible patient charts from January 2015 – December 2015 for the audit. The first 50 charts that met the inclusion criteria were selected for the study.

3.5 Procedures

The hospital analytics department identified 73 potentially eligible charts and provided access to these charts in the health records department. I reviewed the full charts to identify the first 50 charts that met inclusion criteria. I collected data for the study from all charts on the data extraction forms, i.e., demographics, patient health services use, and the rehabilitation pathway (Appendix C). The demographic and patient health services use data abstraction tool was attached in paper format in front of the audit tool. The NICE 2009 audit support tool was utilized to collect rehabilitation pathway data. All the data was extracted in a paper copy format.

3.6 Data Collection

Data collected for this study included the patient demographics, health services use, and the proposed rehabilitation pathway.

3.6.1 Patient Demographics and Health Services Use

Patient demographics were collected to describe the sample. The patient health services use data provided a small-scale synopsis of the ICU trajectory in the selected Canadian hospital (Appendix D). Patient demographics and health services use data involved: the patient age, APACHE II score, number of ICU days during initial hospital admission, the number of hospital days during initial hospital admission, and sample mortality. Readmission data was also collected, including: whether the patient was readmitted to ICU during initial hospital stay, the number of readmitted days to ICU during initial hospital stay, and readmission diagnosis to ICU during initial hospital stay. Readmission data one year after hospital discharge was collected, including readmission to the hospital one year within hospital discharge, length of readmitted hospital days within one year of hospital discharge, readmission diagnosis to hospital within one year of hospital discharge, readmission to ICU within one year of hospital discharge, number of

readmitted ICU days within one year of hospital discharge, and readmission diagnosis to ICU within one year of hospital discharge.

3.6.2 Rehabilitation Pathway Data

The audit support tool developed by NICE was utilized to extract data on the proposed rehabilitation pathway guideline. The rehabilitation pathway data determined the feasibility of reviewing post-ICU recovery care in a Canadian context and the relevance of the NICE 2009 guidelines on rehabilitation after critical illness to the Canadian tertiary care hospital in the study. I utilized a researcher journal to write the location of the documents corresponding to the audit tool questions and the discipline responsible for the document. The researcher journal relied on my ability to interpret the chart data as someone who documents in patient charts and is familiar with the health authority documentation. Through my personal experience of documenting in patient charts, the primary documents that corresponded to the chart abstraction were the physiotherapy, occupational therapy, dietary, speech language pathology and social work assessments, dictated physician consult and discharge summary, the *'pre-admission screening questionnaire'*, *'ICU quality care and interdisciplinary rounds summary'*, *'Interprofessional care and discharge plan: critical care and transfer summary'*, *'24 hour nursing flowsheets'*, and the *'patient discharge instructions.'*

The audit tool directs most questions to be answered in a yes/no/not applicable (N/A) format. For ease of data collection and data analysis, I coded all data extracted as 'yes' to a 1, 'no' as 2 and 'N/A' as 3. Some of the audit tool questions require the answers from a pre-determined list. Coding through the use of letters from the alphabet were used for each pre-determined answer (Appendix E). Letters were designated to pre-determined answers in the audit tool beginning with letter 'A' and corresponding letters for the options within the specific audit

question. For example, a short clinical assessment of the patient was recommended in the NICE 2009 guidelines during the critical care stay (data item no. 2.2/2.3, recommendation 1.1.2), before critical care discharge (data item no. 6.2/6.3, recommendation 1.1.8) and during ward-based care (data item no. 10.2/10.3, recommendation 1.1.14) (NICE, 2009). NICE recommendations 1.1.2, 1.1.8 and 1.1.14 required the identification of pre-determined physical and non-physical morbidity risk(s). I collected the pre-determined physical and non-physical morbidity risk(s) by coding each risk with the alphabet. The first pre-determined risk published in the audit tool was coded as letter 'A', and the following risks corresponded with the order of the alphabet. The audit tool provided an 'others' section under each physical and non-physical morbidity assessment where I manually recorded documented risk(s) from the patient charts. Since it was known that routine assessment of delirium was documented in the patient charts, delirium was placed in the 'other' category. Any other identified morbidity risk(s) documented by members of the interdisciplinary team was also included as part of the data collection under the 'others' category. I was unsure of how many 'other' identified morbidity risk(s) would be documented in the patient charts, therefore all data extracted in the 'other' section was coded with one letter from the alphabet. In order to calculate the prevalence of the documented 'other' identified risk(s), I manually documented each of the 'other' risk(s) in the chart abstraction form.

3.7 Data Analysis

Microsoft Excel was utilized to organize the data on a password-protected computer. No personal identifiers were included in the database. Using the statistics functions in Excel, the mean, median, range, and 95% confidence intervals for patient demographic and health services use data were calculated. Microsoft Excel was utilized to input the rehabilitation pathway data for analysis. The columns of the excel spreadsheet were titled with each data item number from

the NICE audit tool and the rows presented the coded individual patient data specific to each column. After inputting all the data to Excel, I manually calculated the ratios of each audit question. The ‘other’ morbidity risk factors were placed onto one Excel document, where I manually tallied the prevalence of each risk from the chart abstraction form. The data from the researcher journal added to the context of the chart abstraction in helping to determine the feasibility of the chart review in a Canadian setting.

Research question one pertained to the feasibility of performing a chart audit based on UK recommendations on rehabilitation after critical illness and research question two pertained to the adaptation(s) required to improve the usability and relevance of the NICE 2009 chart abstraction tool to a Canadian context. With my familiarity of the documentation in the patient charts, the proportion of yes/no/not applicable and letter coded responses were extracted, data was calculated manually, and raw data was presented for each audit question (research hypothesis).

3.8 Ethical Considerations

Prior to initiating this study, ethics approval was obtained from the University of British Columbia (UBC) and the FH Research Ethics Board (REB). The organizational approvals included the Data Access Agreement, a signed Letter of Authorization from the Department of Evaluation and Research services and an approval email from the FH Information and Privacy Office.

There was not any direct contact with participants; the study required de-identified data for quality improvement purposes, not to inform individual patient care. A password protected designated computer was used for all data collection. J.C completed all data collection on paper-based audit forms and had sole access to the patient charts at the hospital site for the audit.

Patient names and identifying numbers were not collected to protect patient anonymity. All paper-based audit forms were stored securely in a locked office at UBC.

Chapter 4: Results

In this chapter, study results are organized into five key sections. In the first section, the sample is described, including demographic data and patient health services use. The subsequent four sections are categorized into the stages of a rehabilitation care pathway where excerpts of raw data and the researcher journal are reported with respect to the proposed NICE recommendations. The four sections begin with during the critical care stay, followed by before discharge from critical care, during ward-based care, and before discharge to home or community care. The narratives from the researcher journal are summarized and examined to inform each research question and study hypothesis.

4.1 Demographics

The descriptive statistics on age, APACHE II scores, lengths of ICU, and hospital stay during initial hospital admission are presented in Table 1. Patients were adults from 28 – 86 years (Mean = 62.9, *Mdn* = 65.5, 95% CI = 58.9 – 67.0). Since the sample included only ICU survivors, the sample included patients with a range of health concerns and comorbid conditions; APACHE scores ranged from a low score of 5, which indicated an 8% chance of mortality to 38 which is an 85% mortality risk (Medical Criteria, 2007). APACHE II Mean = 20.2, *Mdn* = 19, *Range* = 5 – 38, 95% CI = 18.3 – 22.2. The APACHE II mean 20.2 reflects a population with a 40% chance of mortality (Medical Criteria, 2007). The mean length of an ICU stay was 9.2 days during an initial admission (*Mdn* = 7.5, *Range* = 3 – 30, 95% CI = 7.7 – 10.6) with the mean of the total length of a hospital stay being 47.7 days (*Mdn* = 27, *Range* = 8 – 281, 95% CI = 31.1 – 64.4). The primary reason for admission is displayed in Figure 1. Patients admitted to the ICU from the operating room, cardiac, surgical, neurology, and medical wards constituted the

unplanned local medical/surgical admissions (14/50) (Figure 2). The remaining 36/50 patients were admitted to ICU as an unplanned transfer from the emergency, high acuity ward, and different hospitals.

Table 1 **Patient demographics**

	Mean, <i>Median</i> Range , (95% CI)
Gender	17 female : 33 male
Age (years)	62.9, 65.5, 28 – 86 , (58.9 – 67.0)
APACHE II score	20.2, 19, 5 – 38 , (18.3 – 22.2)
Total length (days) of ICU stay during initial hospital admission	9.2, 7.5, 4 – 30 , (7.7 – 10.6)
Total length (days) of hospital stay during initial admission	47.7, 27, 8 – 281 , (31.1 – 64.4)

Notes. n = 50. CI, confidence interval; ICU, intensive care unit

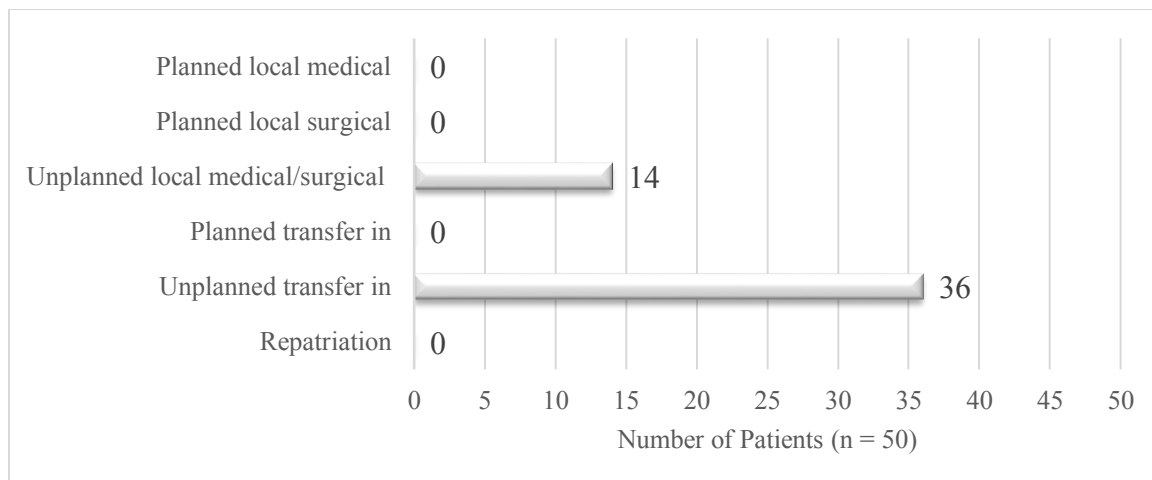


Figure 1 Reason for ICU admission

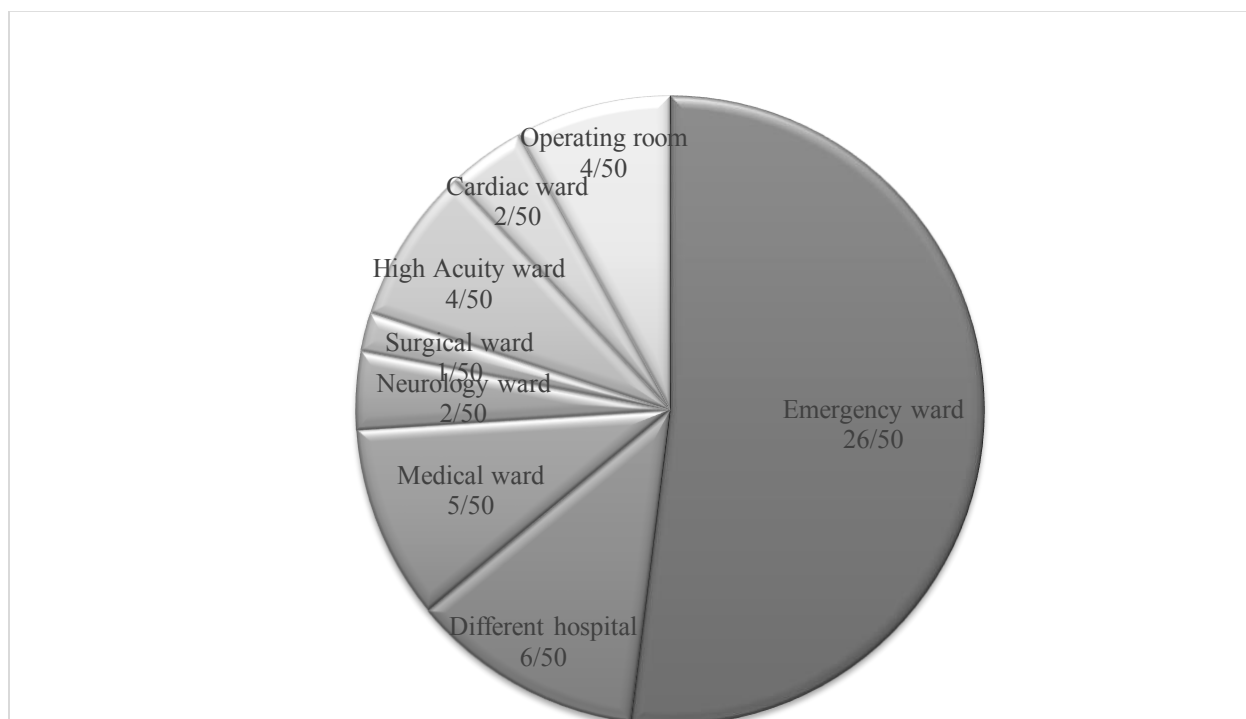


Figure 2: Location prior to ICU admission

4.1.1 Patient Health Services Use

As per inclusion criteria, all 50 ICU patients were discharged to ward-based care. Figure 3 displays the health services use of the sample during the initial hospital admission. Of the sample, 1/50 patients died on the ward after ICU discharge. Eight patients (8/49) were readmitted to the ICU with an average stay of 11.3 days ($Mdn = 9.5$, $Range = 3 - 34$ days, $95\% CI = 9.7 - 12.9$). Respiratory distress (3/8) and pneumonia (3/8) were the leading causes of ICU readmission followed by decreased level of consciousness/generalized weakness (1/8) and urosepsis (1/8). Only one readmitted patient died, and almost all (48/50) patients were eventually discharged from the hospital. A majority of the sample was discharged to home (34/48), 9/48 were discharged to a rehabilitation facility, 4/48 to assisted living, and one patient to a shelter.

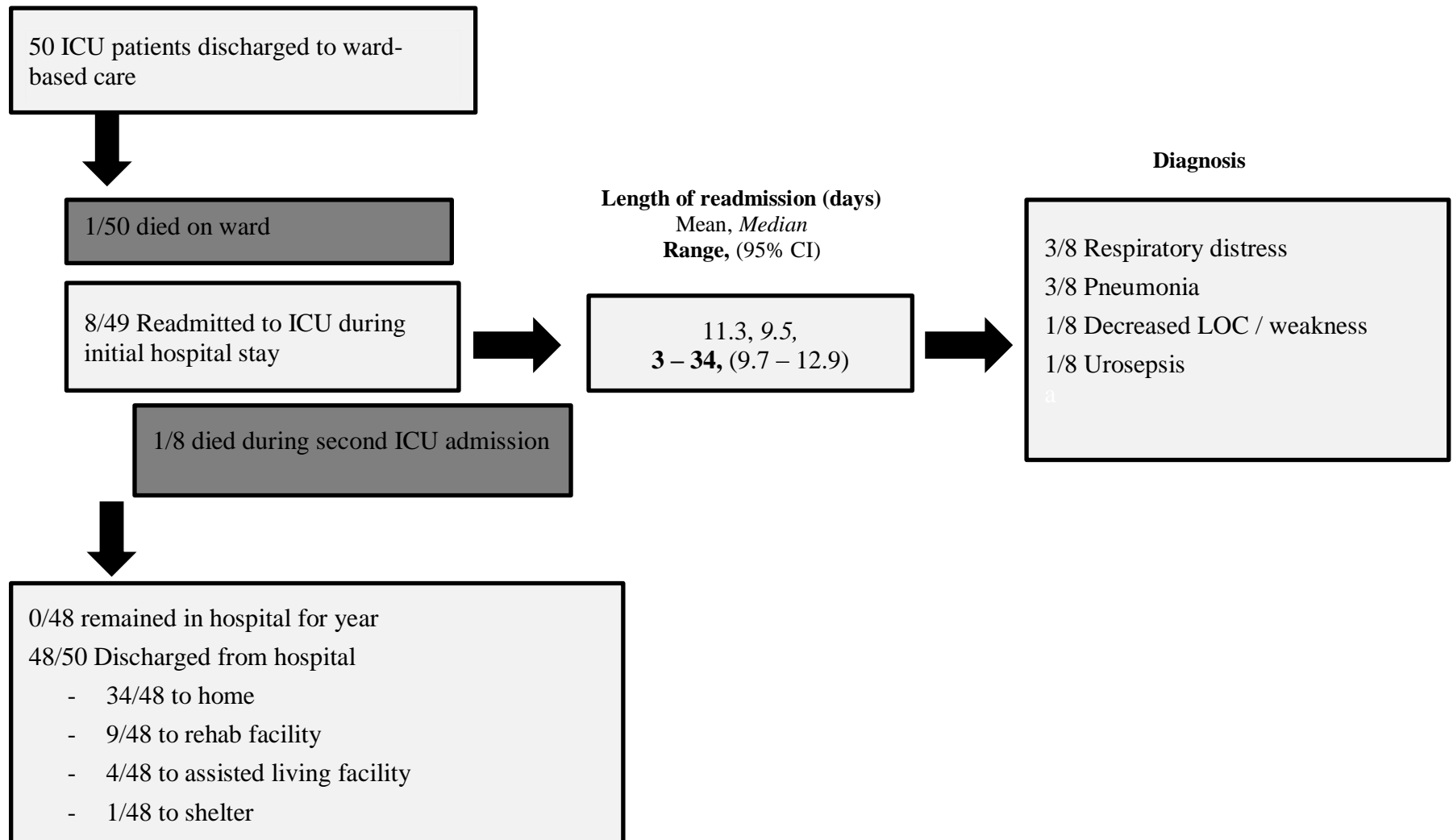


Figure 3: Patient health services use during initial admission

Within one year of hospital discharge, half (26/48) of discharged ICU patients were readmitted to the hospital (Figure 4). The average stay for that second admission was 24.5 days ($Mdn = 15$, $Range = 1 - 143$, $95\% CI = 12.3 - 36.7$). Multiple diagnoses were responsible for hospital readmission. Chest pain was the primary cause of readmission (4/26), 3/26 patients with sepsis, 2/26 patients each for delirium/bizarre behavior and chronic obstructive pulmonary disease exacerbation (COPDE), and 15/26 patients were readmitted with individual diagnoses. Of the 26 patients, six were readmitted to the ICU within one year of their hospital discharge; 4/6 patients were readmitted to the ICU multiple times within a year of their hospital discharge. The readmitted ICU stay averaged 35.8 days ($Mdn = 28$, $Range = 5 - 92$, $95\% CI = 9.6 - 62.0$). With respect to diagnoses, 2/6 patients had a diagnosis of sepsis, and one of these patients was admitted to ICU twice for this diagnosis. 1/6 patient was readmitted with respiratory failure, the same patient was admitted to ICU twice for this diagnosis, and two other patients were admitted once each to ICU with respiratory failure. Congestive Heart Failure (CHF) led to 1/6 readmissions, and the same patient was admitted again to ICU for this diagnosis. One of the six patients had a readmitting diagnosis of COPDE and was admitted twice to ICU for this diagnosis. PEA caused 1 ICU readmission. Among the readmitted patients, one patient died of PEA in the ICU and 1/26 died on a second ICU readmission due to sepsis. The remaining 24/26 were discharged from hospital (Table 2).

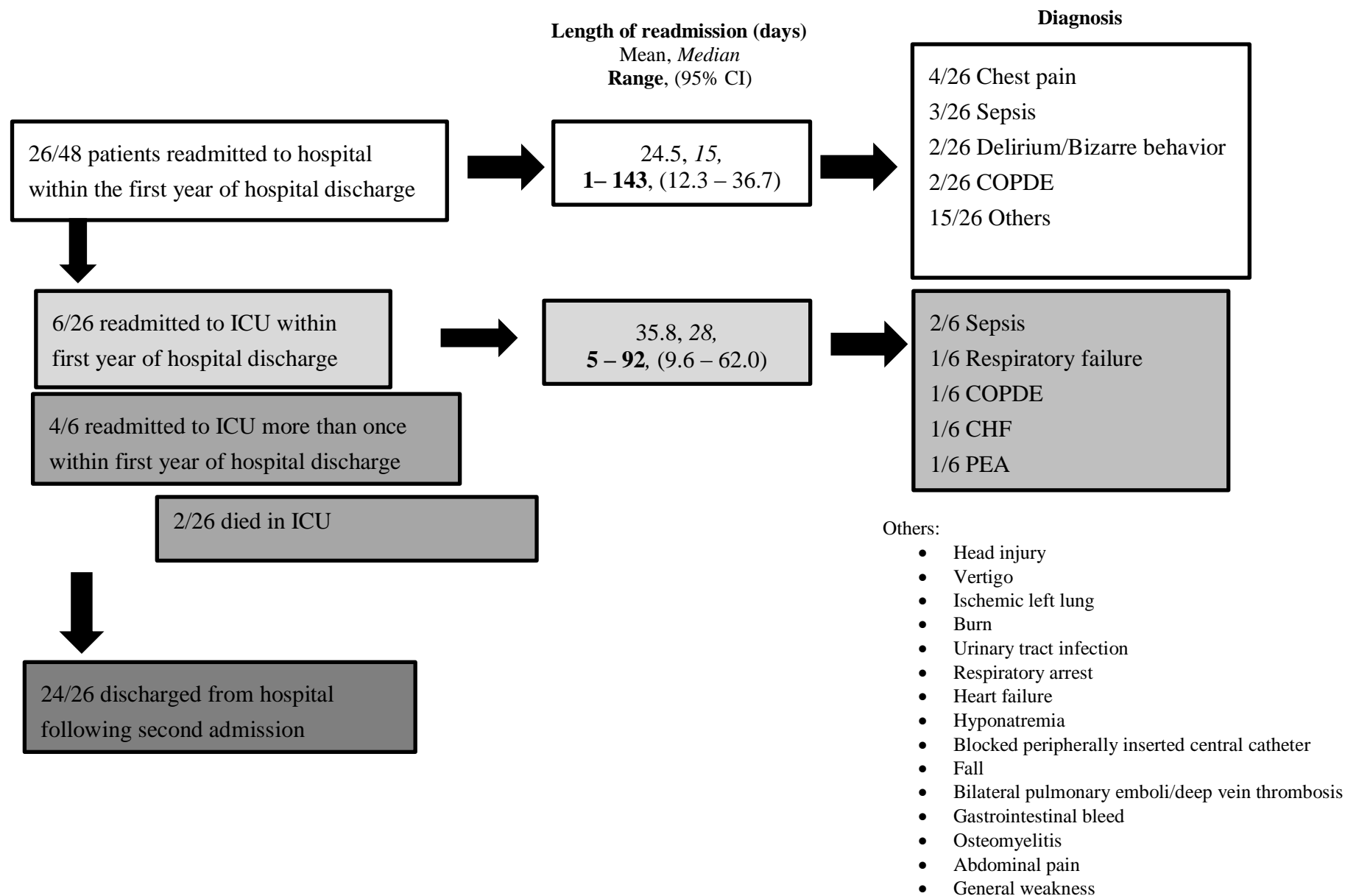


Figure 4: Patient readmission

Table 2: Patient health service use

Disposition/Timing	Number of patients
Readmitted to ICU during initial hospital stay	8/50
Readmitted to hospital within the first year of hospital discharge	26/48
Readmitted to ICU first within the first year of hospital discharge.	6/26
Readmitted to ICU more than once within the first year of hospital discharge	4/6
Died (mortality rate) during hospital stay	4/50

4.2 During the Critical Care Stay

The ICU attending physician was the rehabilitation coordinator for all patients (50/50) (NICE recommendation 1.1.1) (Figure 5). In the ICU context, pre-printed orders were completed for all patients by the ICU attending physician. The pre-printed orders were used to establish care provided by physicians and nurses, and had automatic interdisciplinary referrals to the dietician, pharmacist, physiotherapist, respiratory therapist, and social worker. Therefore, the ICU pre-printed orders served to identify a rehabilitation coordinator (NICE recommendation 1.1.1). However, NICE did not clarify if a rehabilitation coordinator needed to be the same individual(s) for the duration of the patient's hospital stay. The model of ICU physician services practiced in this setting consisted of the ICU attending physician responsible for the care of the patient while admitted in the ICU; but not when discharged to ward-based care. Multiple members of the

medical services team (i.e., physicians, nurses, pharmacy, physiotherapy, dietary, speech language pathology) continued care for the patient until ready for discharge from the hospital.

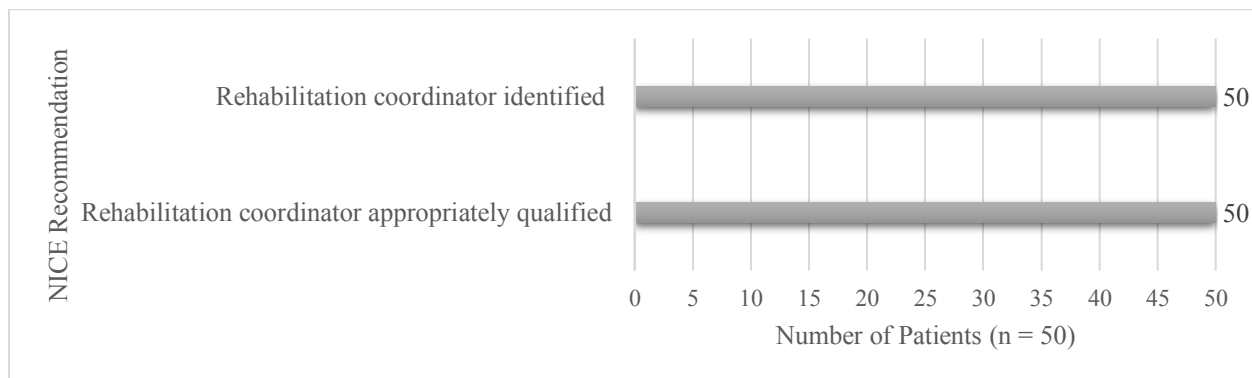


Figure 5: Rehabilitation pathway coordinator

4.2.1 Short Clinical Assessment

Less than half the sample (20/50) had documented physical and non-physical morbidity risk assessments (NICE recommendation 1.1.2) (Figure 6). While all ICU patients had a non-physical morbidity assessment of delirium, only 20 patients had documented physical risks. Delirium was identified as a prevalent risk in 32/50 patients in the ICU (Figure 7), followed by cardiorespiratory compromise (20/50), musculoskeletal deterioration (19/50), and fewer than 5/50 patients for decreased mobility, withdrawal from polysubstance overdose, and new and recurrent anxiety or panic attacks. Only 1/50 patients had a documented risk of items on the pre-established list in the chart audit (new and recurrent anxiety or panic attacks). The 20 patients who had a physical morbidity risk assessment documented, had such risks documented within 1–4 days of ICU admission. Delirium was assessed for all patients by the primary RN, and ICU physiotherapists had documented the physical morbidity risk(s) on 20/50 patients.

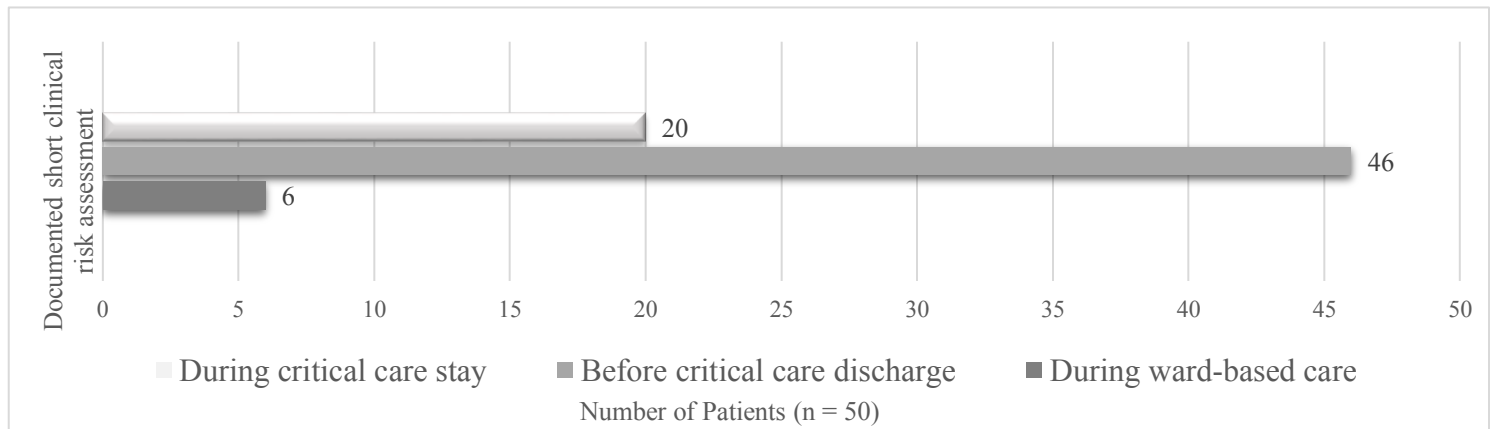


Figure 6: Proportion of documented physical and non-physical morbidity short clinical risk assessments

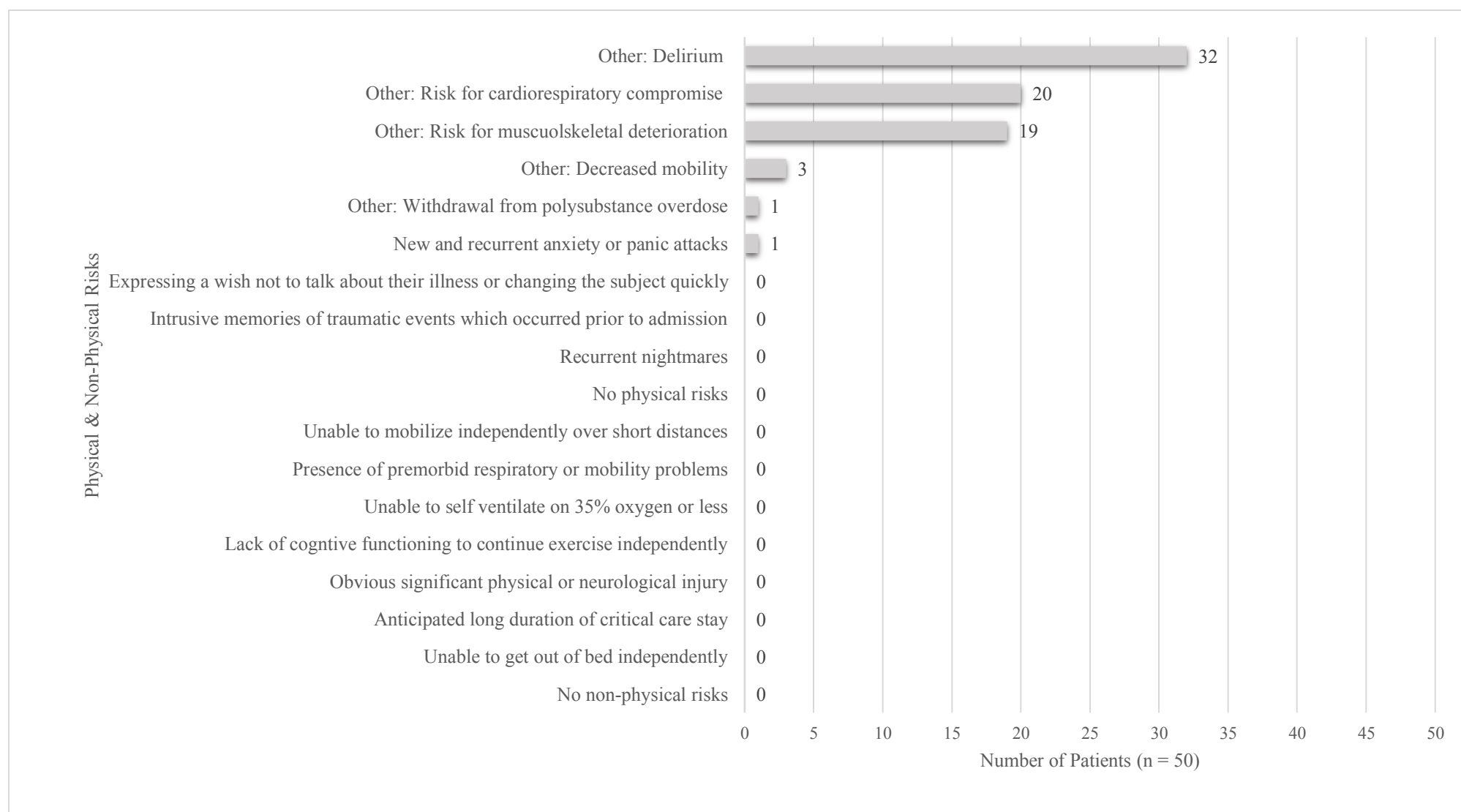


Figure 7: Documented physical & non-physical morbidity risks: during critical care

The hospital had implemented a 48/6 care model, which is an initiative to help provide consistent and timely care to patients in the six key areas of nutrition and hydration, cognitive function, medication management, pain, mobility, and bowel/bladder function (Fraser Health [FH], 2018). The ‘*pre-admission screening questionnaire*’ was one of the 48/6 standardized tools used in the hospital that also corresponded to NICE recommendation 1.1.2. The one-page, double-sided ‘*pre-admission screening questionnaire*’ was a legal document completed by the patient or family member within 48 hours of hospital admission. The purpose of the questionnaire was to identify patient baseline concern(s) to the interdisciplinary team to inform rehabilitation care planning (FH, 2018).

4.2.2 Rehabilitation Planning

All patients had documented comprehensive clinical assessments (NICE recommendation 1.1.3) (Figure 8). Short-term goals were documented for almost all of the patients (48/50) (NICE recommendation 1.1.4). Medium-term goals aimed to achieve normal activities of daily living after the patient was discharged from hospital (NICE, 2009). No documentation on medium-term goals in the selected ICU setting could be found (NICE recommendation 1.1.4). NICE recommendation 1.1.6 proposed initiating rehabilitation as soon as clinically possible through an individualized and structured plan with frequent follow-up reviews (44/50).

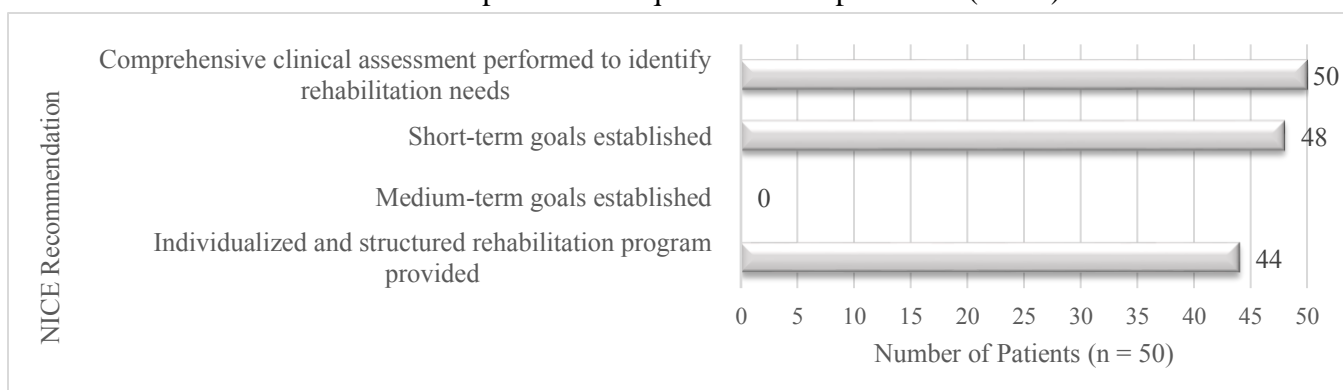


Figure 8: Rehabilitation planning: During the critical care stay

Multidisciplinary team referrals were completed automatically at the time of ICU admission for expert consultation on goal and rehabilitation planning (NICE recommendation 1.1.4 and 1.1.6). Daily documentation of short-term goals was supported by a checklist during interdisciplinary rounds titled '*ICU quality care and interdisciplinary rounds summary*' (NICE recommendation 1.1.4). The checklist consisted of: pain/agitation/delirium control, glycemic control, a ventilator management bundle, a central line maintenance bundle, review of invasive lines/restraints, medication review, nutrition, mobility, and family centered care. The checklist was found on all patient charts while in the critical care setting and almost all patients had the checklist completed for over half of their ICU stay (48/50). While the document was intended to be completed daily in interdisciplinary rounds, 39 patient charts had the '*ICU quality care and interdisciplinary rounds summary*' checklist completed daily.

4.2.3 Information Giving

Most patients and/or families (45/50) received information on the critical illness leading to an ICU admission (NICE recommendation 1.1.7) (Figure 9). Less than half of the patients and/or families received information on the ICU equipment used (24/50), and 5/50 patients and/or families were informed of potential morbidity risks after critical illness. The audit tool had a 'not applicable' section in the event the patient was not able to comprehend the information or the patient did not consent for family to receive information (NICE, 2009). In the ICU context, if there was not a legally documented temporary substitute decision maker, information was not provided to patient visitors. No information was provided to two patients since the one patient's medical condition included an anoxic brain injury, and in a second case the family was absent throughout the critical care stay.

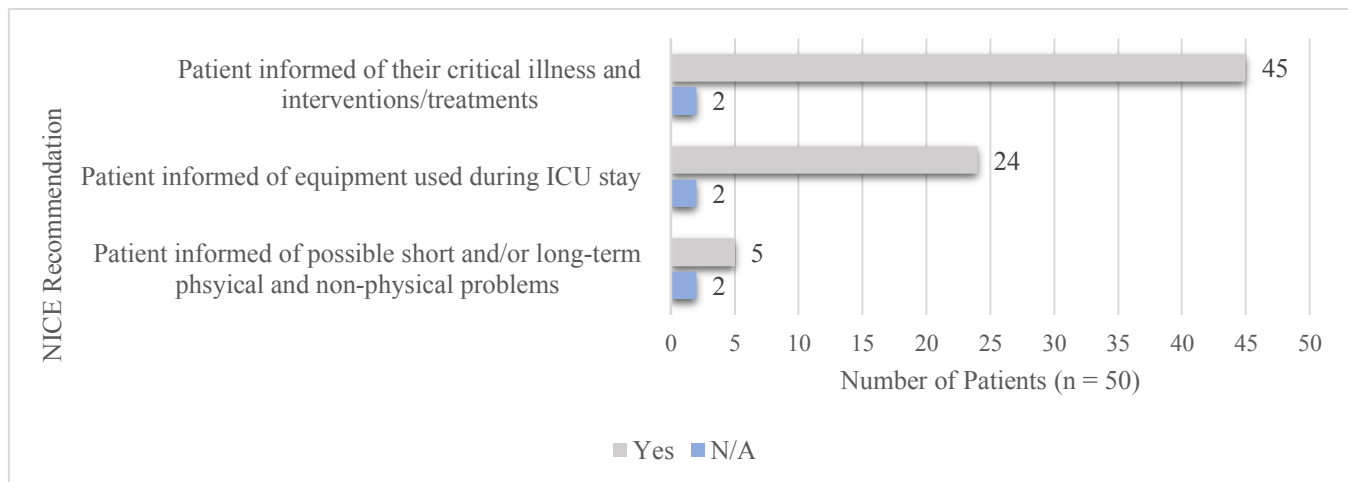


Figure 9: Information giving: During the critical care stay

Almost all patient families had a documented family meeting with the ICU attending physician and social worker (45/50) during the critical care stay. On average, the initial family meetings were completed at the time of patient admission to within three days of their admission to ICU. In the charts audited for the study, eight patient families received one family meeting, fifteen families received two family meetings, and over twenty families received three or more family meetings during the critical care stay. Documentation of the conversation in the family meetings reflected the reason for ICU admission and plan of care (45/50), the equipment used in the ICU (24/50) and potential morbidity risk(s) (5/50) (NICE recommendation 1.1.7).

4.3 Before Discharge from Critical Care

NICE recommended a short clinical assessment be repeated to determine patient risk of developing physical and non-physical morbidity prior to critical care discharge (NICE recommendation 1.1.8). Almost all patients had a repeat short clinical assessment before transferring out of the ICU (46/50) (Figure 6). A total of 39 physical and non-physical risk categories were documented (Figure 10). The three-primary documented physical risks were: unable to mobilize independently over short distances (36/50), aspiration risk (30/50), and unable

to get out of bed independently (22/50). The three-leading documented non-physical risks included: delirium (18/50), frequent pain (8/50), followed by new and recurrent anxiety or panic attacks (5/50). The short clinical assessments were documented either at the time of receiving an ICU discharge order or at the time of physical patient transfer out of the critical care unit. Multiple short clinical assessments were documented by members of the interdisciplinary team; therefore, a single date of a short clinical assessment could not be extracted.

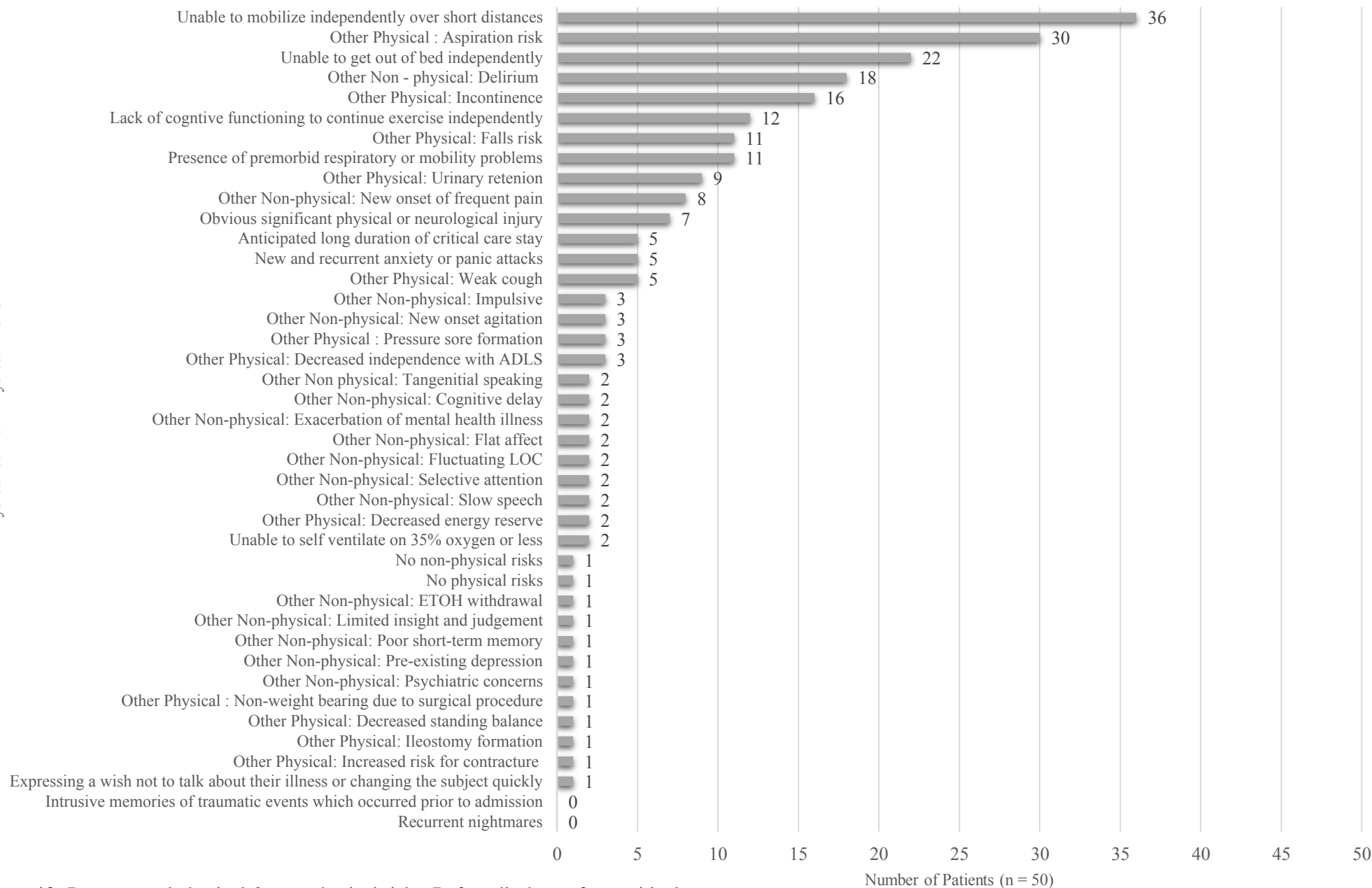


Figure 10: Documented physical & non-physical risks: Before discharge from critical care

At the time of patient discharge from the ICU, the '*interprofessional care and discharge plan: critical care and transfer summary*' legal document was completed by the primary RN. The document required the RN to acknowledge any problem/need associated to the key areas, goals/interventions and the profession responsible in achieving patient goals; which corresponded to NICE recommendation 1.1.8. In cases where the 'critical care summary' document was not completed; interdisciplinary documentation of patient needs and goals/interventions from the patient chart filled the gap.

4.3.1 Rehabilitation Pathway Continuation

Comprehensive reassessments to identify patient rehabilitation needs at the time of critical discharge were documented in 45/50 patients (NICE recommendation 1.1.9) (Figure 11). Based on the comprehensive assessment, 43/50 patients had documented revision of goals and updated plans of care (NICE recommendation 1.1.11). In terms of information being provided to patients and/or family (NICE recommendation 1.1.13), few patients received information about the rehabilitation care pathway (5/50). Half of the patients and/or family (25/50) were informed of the transfer of care to a different medical team and the change in clinical environment. For two patients, information sharing was 'not applicable' due to the medical conditions inhibiting their comprehension and the absence of family. Few patients (3/50) received the contact details of the rehabilitation coordinator (NICE recommendation 1.1.1).

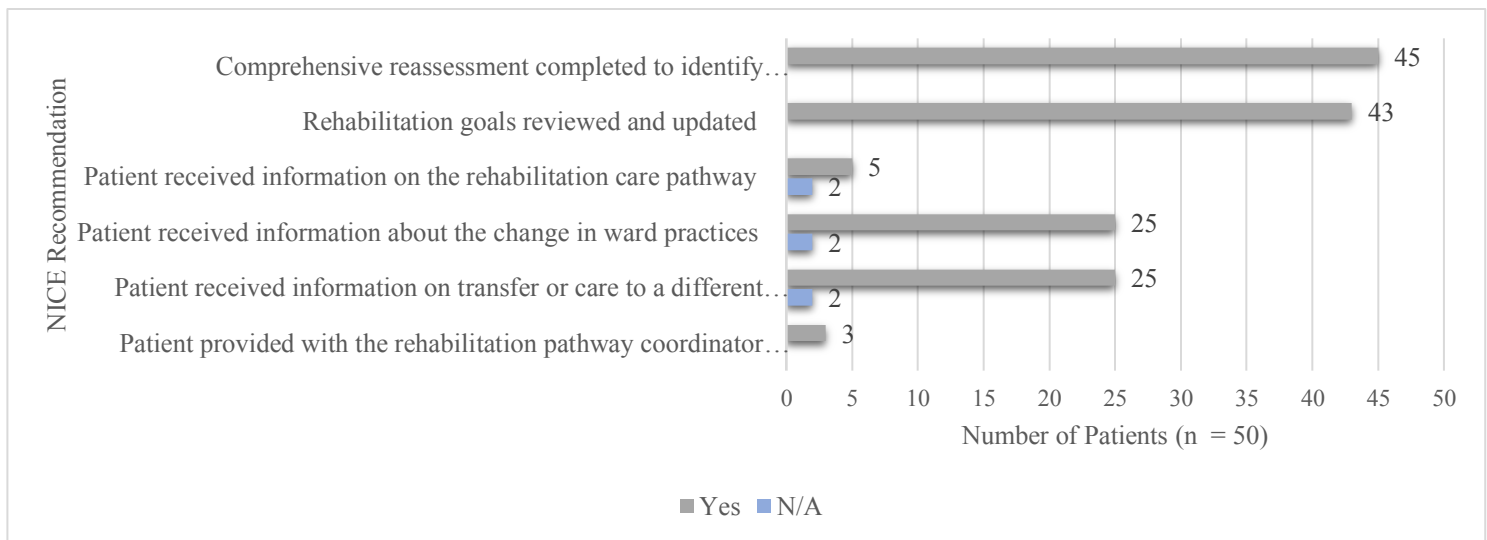


Figure 11: Rehabilitation pathway continuation: Before discharge from critical

As in the short clinical assessment, the ‘*interprofessional care and discharge plan: Critical care and transfer summary*’ document and interdisciplinary assessments on the patient chart were utilized to extract data for NICE recommendation 1.1.9 and 1.1.11. In the context of the ICU, a pamphlet titled ‘*Beyond the Intensive Care Unit: Patient and Family information--After ICU Care and Recovering from a Critical Illness*’ was provided to patient/family at the time of ICU discharge. The pamphlet identified the differences in a critical care ward to a general ward and also outlined eight common problems after critical illness (NICE recommendation 1.1.13). A hospital transfer checklist was completed at time of patient transfer from the ICU where the RN acknowledged that the pamphlet was provided. The pamphlet did not review the patient’s individualized rehabilitation plan; this data was collected from the ICU attending progress notes. Three patients were transferred to a neurology ward following a debilitating medical event. Physiotherapy documentation showed that contact information for the unit neurology physiotherapist was provided to patient and family.

4.4 During Ward-based Care

Few patients (6/50) had a documented reassessment of physical and non-physical morbidity risk(s) (NICE recommendation 1.1.14) (Figure 6). During ward-based care, delirium/confusion was the primary identified risk (4/50), followed by falls risk (2/50), the presence of premorbid respiratory or mobility problems (2/50), and eight separate risk categories were singly identified (Figure 12). Nurses were the only discipline to document patient risk(s) of developing physical and non-physical morbidity.

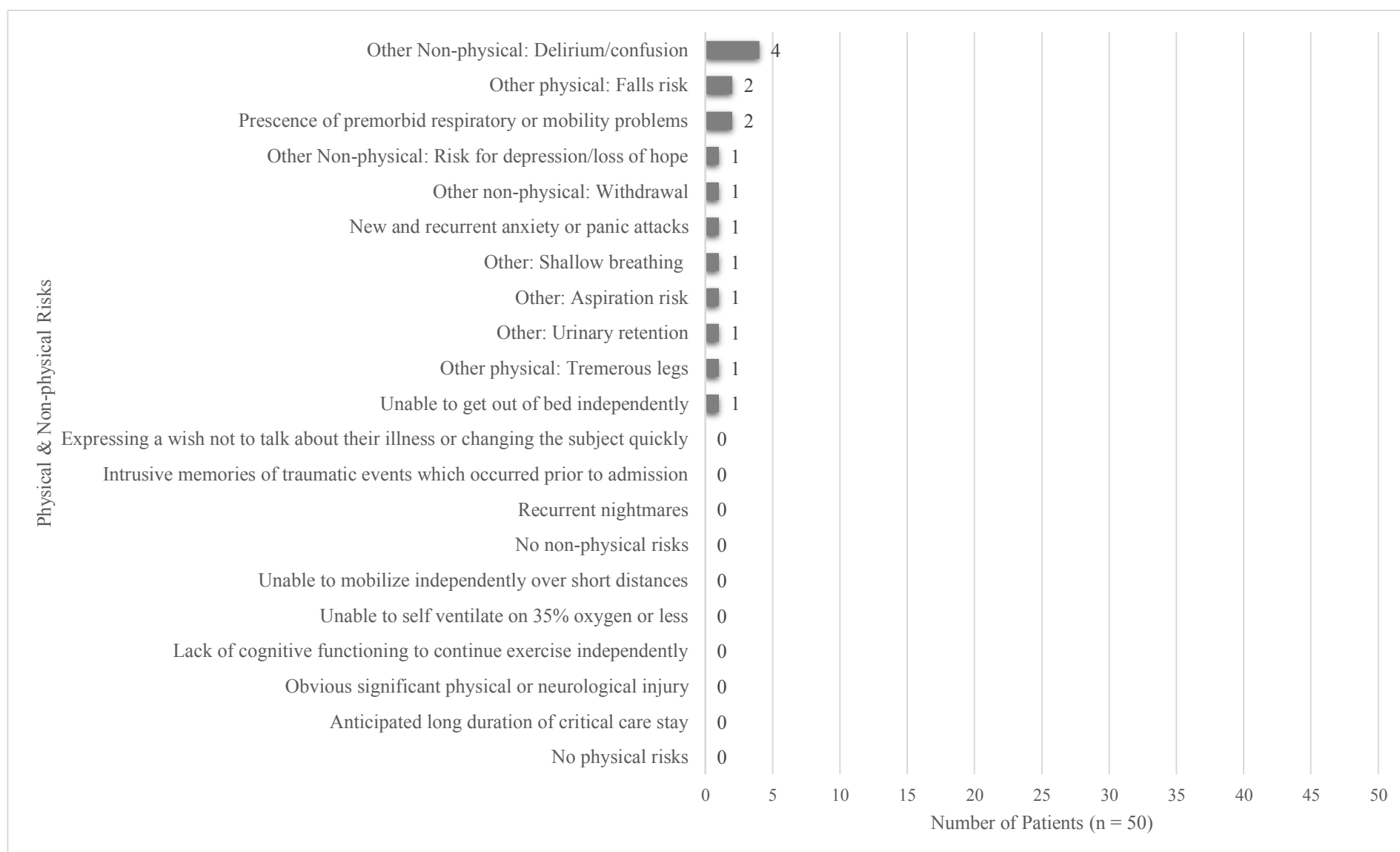


Figure 12: Documented physical & non-physical morbidity risks: During ward-based care

Of the 6/50 patients who received a short clinical assessment, one patient was on a psychiatric ward, one patient on a surgical ward, and four were on a general medical ward. The hospital did not use a legal document to indicate a patient's risk of developing physical and non-physical morbidity, thus data was collected from individual nursing flowsheets, in which nursing staff would document 'F/C' (focus charting) next to a specific body system. The integrated progress notes would reveal the reason behind the 'F/C' and in some cases identified patient risk(s) of developing physical and/or non-physical morbidity (NICE recommendation 1.1.14).

4.4.1 Individualized Rehabilitation Pathway Coordination

Nearly all patients (49/50) received a comprehensive reassessment (NICE recommendation 1.1.15), and 41/50 patients were also provided an individualized structured program (NICE recommendation 1.1.16) (Figure 13). A single date of the comprehensive reassessment could not be extracted as multiple members of the multidisciplinary team were involved in care planning, thus this activity occurred asynchronously, at various times during the hospital stay. Documentation revealed that assessments occurred at the time of patient admission to the general ward and up to 24 days of the patients stay.

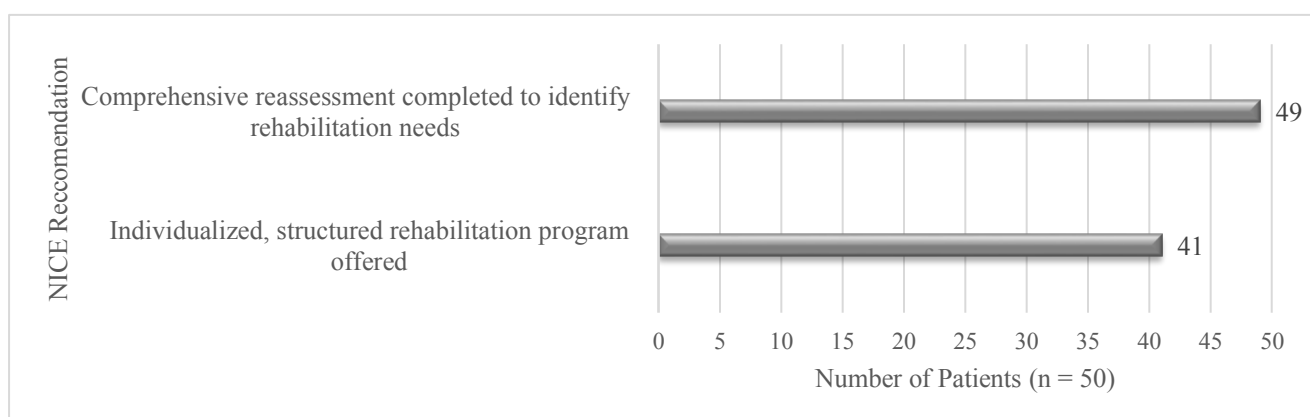


Figure 13: Individualized rehabilitation pathway coordination: During ward-based care

Only one patient did not receive a comprehensive reassessment; this was because the patient had an anoxic brain injury. Care of the patient was to resume from critical care and multidisciplinary team members were not involved in the rehabilitation care pathway. Interdisciplinary comprehensive assessments were gathered from the patient chart (NICE recommendation 1.1.15). For 9/50 patients, respective health care professionals documented 'continue to assess/monitor' and did not specify a rehabilitation care plan. Therefore, the co-investigator did not extract this data as corresponding an individualized structured rehabilitation program (NICE recommendation 1.1.16).

4.5 Before Discharge to Home or Community Care

More than half of patients (31/49) patients had a documented functional assessment on their medical chart (NICE recommendation 1.1.20). One patient died on the general ward (cardiac arrest) before a functional assessment could be completed. The consensus based physical and non-physical dimensions (Appendix F) recommended to be a part of the functional assessment are displayed in Figure 14. Physical problems (29/49) and equipment needs (28/49) were the two leading physical dimensions assessed as part of a functional assessment. The two main non-physical dimensions assessed in a functional assessment were behavioral and cognitive problems (24/49) and psychosocial problems (7/49). An assessment of post-traumatic stress-related symptoms was not documented in any patient charts as part of a functional assessment.

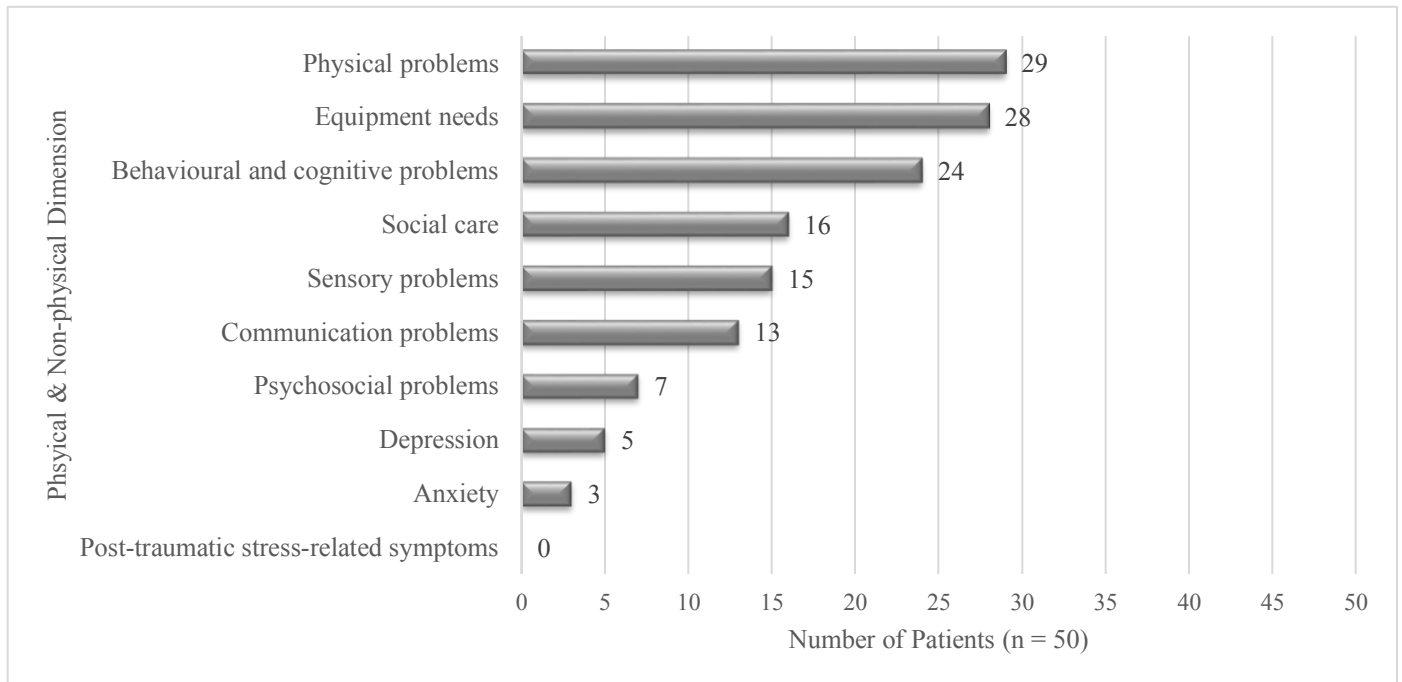


Figure 14: Physical & non-physical dimensions included in the functional assessment: Before discharge to home or community care

4.5.1 Rehabilitation Pathway Discharge Preparation

Only one patient received contact information of the health care professional coordinating their care pathway on discharge (NICE recommendation 1.1.1) (Figure 15). The patient who received contact information for the rehabilitation coordinator was discharged to an intensive rehabilitation facility. Before hospital discharge, the patient received physiotherapy visits from the rehabilitation facility to promote ease of transition, and it was during this interaction that contact information was provided (NICE recommendation 1.1.1). No documentation was found to confirm that patients were provided with a copy of the critical care discharge summary (NICE recommendation 1.1.22). However, information was provided about physical recovery (12/49), diet, and continuing treatments (37/49), managing everyday life (14/49) and general guidance (12/49) for the patient and family before hospital discharge (NICE recommendation 1.1.22).

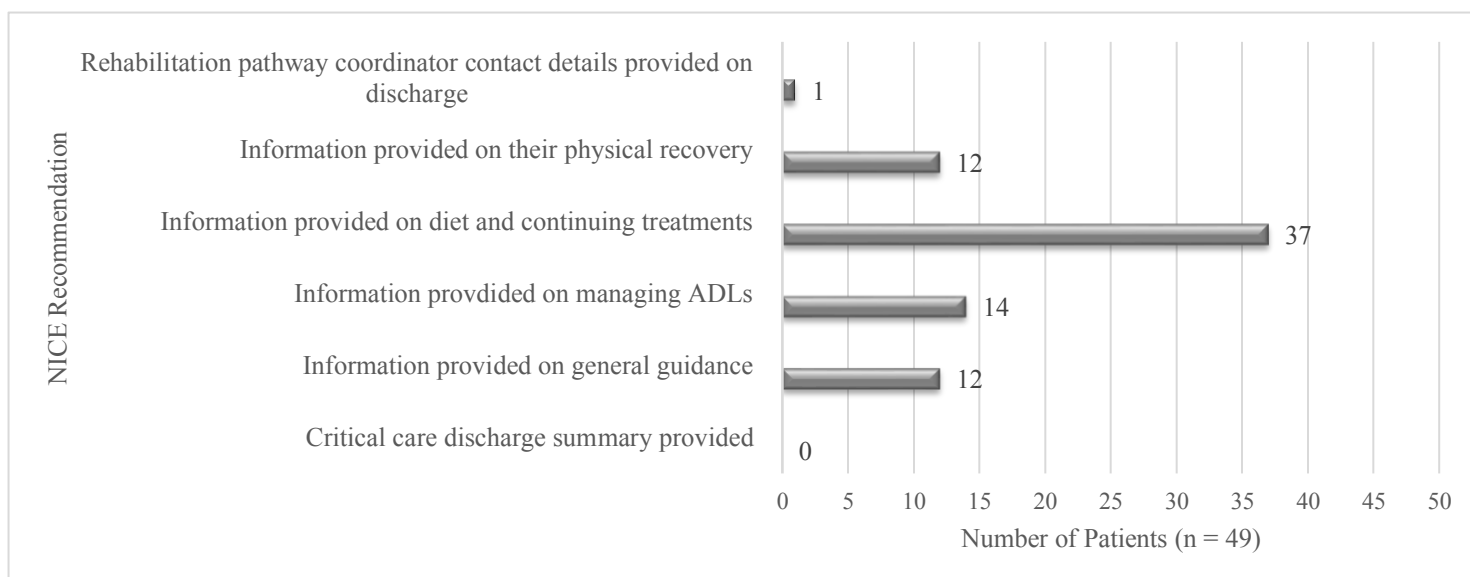


Figure 15: Rehabilitation pathway discharge preparation: Before discharge to home or community care

A generic '*patient discharge instructions*' document was provided to all patients at time of hospital discharge. Individualized patient teaching was documented by health care providers (NICE recommendation 1.1.22), under the location for the respective disciplines in the patient's chart. The generic '*patient discharge instructions*' document was reviewed; it did not provide data tailored to the post-ICU population (i.e., information on the trajectory projection of the recovery, basic information on exercise and drug treatment if applicable, information on available support services and rehabilitation and sources of further help). On 37/49 discharge summaries for ICU survivors, the primary documented instruction stated to 'follow-up with a general practitioner in one week.'

4.6 Results of the Research Questions

In this section, the findings of the study are summarized with respect to the study research questions and hypothesis.

- 1) What is the feasibility of reviewing post-ICU recovery in a tertiary care teaching hospital using the NICE 2009 guidelines on rehabilitation after critical illness?

Results: It is feasible to review post-ICU recovery in a tertiary care teaching hospital utilizing the NICE 2009 guidelines after critical illness. For ease of data extraction, it would be beneficial for users to be familiar with the patient charts, specifically, the location of documents corresponding to the proposed recommendations. With my familiarity and practice of documenting in the patient charts, it was feasible to review post-ICU recovery in the tertiary care teaching hospital utilizing the NICE 2009 guidelines. A few proposed recommendations were not applicable to the context. For example, NICE suggested classifying ICU patients as ‘low risk’ verses ‘risk’ for physical and non-physical morbidity during the critical care stay (NICE recommendation 1.1.2), before discharge from critical care (NICE recommendation 1.1.8), and during ward-based care (NICE recommendation 1.1.14). In the Canadian context in this study, patients were not documented into ‘low risk’ or ‘risk’ categories, and all ICU patients were generally considered to be at some form of risk of developing physical and non-physical morbidity after critical illness. Users would need to review the audit support tool to ensure the proposed recommendations are applicable to the selected context.

- 2) What adaptations are needed to improve the usability and relevance of the NICE 2009 guidelines chart abstraction tool on rehabilitation after critical illness in the context of a tertiary care hospital in British Columbia?

Results: This was a feasibility study therefore no changes were made to the chart abstraction tool itself before data collection. However, there are a few changes that could be made to the NICE audit support tool that would potentially improve the usability and relevance to the Canadian tertiary hospital setting. The language in chart abstraction tool categorizes ICU patients as ‘low risk’ or ‘risk’ of developing physical and non-physical morbidity throughout the five stages of the ICU care pathway. The guidelines only recommend a comprehensive patient

assessment and revisions of the rehabilitation regime if the patient was determined to be at ‘risk’ of developing physical and non-physical morbidity. Naturally, patients admitted to the ICU are at some degree of developing morbidity after critical illness (Connolly et al., 2015; Iwashyna et al., 2018; Jutte et al., 2015). In the charts audited for the study, the classification of ‘low risk’ or ‘risk’ was not practiced and all ICU patients were considered to have some degree of morbidity after critical illness. The chart abstraction tool should be modified to reflect literature supporting an ‘at risk’ ICU population. Therefore, an audit of comprehensive patient assessments for all ICU survivors in addition to assessments of the inadvertent physical, cognitive and psychological impairments after critical illness throughout the ICU care pathway would improve the relevance to the Canadian setting.

In order to improve the usability and relevance of the chart abstraction tool on rehabilitation after critical illness to the context of a Canadian hospital, there is a need for clarity pertaining to rehabilitation pathway coordination. During the critical care stay, the chart abstraction tool requires the identification of a rehabilitation coordinator. The NICE guidelines indicate a profession with rehabilitation expertise with access to multidisciplinary team referrals is sufficient as a rehabilitation pathway coordinator (NICE, 2009). In the audited charts, it revealed the ICU attending physician overlooked the care of the critically ill patient. In the ICU, referrals are automatically made to disciplines apart of the rehabilitation pathway as included in the critical care admission orders (i.e.: dietician, pharmacist, physiotherapy, respiratory therapy, social work), and from physician, nurse or physiotherapy clinical judgment (i.e.: nephrology, psychiatry, occupational therapy). From the charts audited in the study, the ICU attending physician relied on the multidisciplinary team members expertise to help develop and implement patient rehabilitation. Once the ICU survivor is transferred to a general unit, the ICU attending

physician is no longer the most responsible physician overseeing the care of the patient. The ward medical team continues the care for the ICU survivor, but the chart abstraction tool does not audit the identification of a rehabilitation coordinator during ward-based care. Similar to during the critical care stay, the most responsible physician on the general ward consults the multidisciplinary team members with experience in rehabilitation pathway coordination. Therefore, it is unclear if the chart abstraction tool indicates the need for one, or multiple rehabilitation coordinator(s). Furthermore, the NICE guidelines and experts in critical care medicine suggest the prevention and treatment of post-intensive care syndrome requires various members of the multidisciplinary team to coordinate a rehabilitation pathway (Iwashyna et al., 2018; NICE, 2009). To make the chart abstraction tool relevant to the Canadian setting, perhaps the audit question pertaining to the identification of a rehabilitation coordinator could be replaced with an audit of the multidisciplinary team members referred to and involved in the rehabilitation pathway. The chart abstraction tool could suggest the different members of the multidisciplinary team pertinent to rehabilitation coordination under each stage of the rehabilitation pathway (i.e.: during the critical care stay, before discharge from critical care, during ward-based care, and before discharge to home or community care) to grasp the hospitals current coordination of a rehabilitation pathway for ICU survivors and to evaluate the use of resources. By incorporating an audit of the multidisciplinary team members involved in care, it would add value and clarity in identifying where in the patient chart to extract data for a completed comprehensive clinical reassessment (NICE recommendation 1.1.3, 1.1.9, 1.1.15), short-term and medium-term rehabilitation goals (NICE recommendation 1.1.4, 1.1.11), and an individualized structured rehabilitation program (NICE recommendation 1.1.6, 1.1.16).

Beginning in the critical care stay, a short clinical assessment to determine the patient's risk of developing physical and non-physical morbidity (NICE recommendation 1.1.2) is not relevant to the Canadian setting. From the charts audited in the study, the Canadian tertiary care hospital already focuses on post-intensive care syndrome prevention. To improve the relevance of the chart abstraction tool to the setting, the short clinical assessment to determine a patient's risk of developing physical and non-physical morbidity during the critical care stay should be replaced with an audit of post-intensive care syndrome prevention and treatment in the ICU (i.e.: early physical rehabilitation, delirium management, ABCDE bundle, PAD bundle) or care factors influencing rehabilitation (i.e.: severity of illness, sedation, procedures) (Balas et al., 2013).

The relevance of the chart abstraction tool to the tertiary care hospital in British Columbia could be enhanced with the addition of auditing ICU follow-up strategies. Literature suggests the implementation of ICU follow-up strategies to help guide the transition of ICU survivors to the general ward and to provide support to general ward nurses in caring for the post-ICU patient (Egerod et al., 2012; Melhorn et al., 2014). During ward-based care, the chart abstraction tool focuses on the short clinical assessment to determine a patient's risk of developing physical and non-physical morbidity and the development and implementation of an individualized rehabilitation program. In the Canadian setting, auditing the documentation of comprehensive assessments and rehabilitation regimes are not of significance as it is part of usual care. To improve the relevance and to evaluate if post-intensive care syndrome rehabilitation strategies are being provided in the Canadian setting, the chart abstraction tool should audit the presence of ICU follow-up during ward-based care.

A few of the proposed NICE recommendations on rehabilitation after critical illness were implemented as either usual care or based on health care professional expertise in the Canadian hospital. During the critical care stay, the regularly completed NICE recommendations included the comprehensive clinical assessment to identify rehabilitation needs (NICE recommendation 1.1.3), identification of short-term goals (NICE recommendation 1.1.4), an individualized and structured rehabilitation program for ICU patients (NICE recommendation 1.1.6) and information provided to the patient and/or family on the critical illness, interventions and treatments (NICE recommendation 1.1.7). The commonly completed NICE recommendations before discharge from critical care included the completion of a short-clinical assessment (NICE recommendation 1.1.8), the comprehensive clinical assessment to identify rehabilitation needs (NICE recommendation 1.1.9) and the review and update of rehabilitation goals (NICE recommendation 1.1.11). During ward-based care, the routinely completed NICE recommendations were the comprehensive clinical assessment to identify rehabilitation needs (NICE recommendation 1.1.15) and the development of an individualized and structured rehabilitation program for ICU survivors (NICE recommendation 1.1.16).

- 3) The NICE 2009 guidelines can be used to audit post-ICU recovery care (RQ#1), although adaptations will be needed to the audit tool since the guidelines on rehabilitation after critical illness will be relevant to some, but not all aspects of rehabilitation in a Canadian tertiary care teaching hospital (RQ#2).

Results: In summary, for the most part, it is feasible to use the chart abstraction tool to audit post-ICU recovery. In some cases, data from the chart audit could not be extracted from the Canadian tertiary care teaching hospital. Data on classifying patients as ‘low risk’ or ‘risk’ did not apply to the Canadian context; all ICU patients were considered at some extent of risk for

developing physical and non-physical morbidity. The chart abstraction tool required the identification of a rehabilitation coordinator, and while the ICU attending physician was presumed to assume this role, it was unclear if this role was shared with other members of the multidisciplinary team. In the Canadian context, the model of care was a multidisciplinary team approach in developing and implementing a rehabilitation pathway for the ICU survivor throughout the post-ICU trajectory. In the short clinical assessment during the critical care stay (NICE recommendation 1.1.2), a few of the identified physical (i.e.: unable to get out of bed independently, anticipated long duration of critical care stay, obvious significant physical or neurological injury, lack of cognitive functioning to continue exercise independently, unable to self-ventilate on 35% oxygen or less, and unable to mobilize independently over short distances) and non-physical risks (i.e.: recurrent nightmares, intrusive memories of traumatic events that occurred prior to admission, and not wanting to talk about the illness or changing the subject quickly) by the chart abstraction tool were not applicable during the acute phase of critical illness in the Canadian ICU. Before discharge from critical care and before discharge to home or community care, the chart abstraction tool audits if the contact details of the rehabilitation coordinator was provided to the ICU survivor. However, the model of care in providing contact information of the healthcare professional is not practiced in the Canadian tertiary care hospital.

Chapter 5: Discussion

The purpose of this study was to examine if a UK based guideline on rehabilitation after critical illness could be helpful to audit and guide care in a Canadian clinical setting. In this chapter, the findings are explained and interpreted. This chapter is presented in four key sections. First, the strengths and limitations associated with the study will be addressed. The second section begins with the key findings. This is followed by a discussion on the relevance of the NICE guidelines on rehabilitation after critical illness to Canadian clinical practice with respect to the four key proposed recommendations of physical and non-physical short clinical assessments, rehabilitation planning, information giving, and functional assessment. Last, practice and research implications of the findings are discussed.

5.1 Strengths and Limitations

This study reviewed the documented record of care provided in support of post-ICU recovery in the selected Canadian hospital. A data abstraction tool was used to collect data from all charts, and the abstraction was completed by the same researcher for all charts. The published audit tool created from proposed recommendations by NICE on rehabilitation after critical illness allowed for structure and reliable data collection. The researcher's familiarity with the health authority documentation optimized the feasibility of extracting data for the chart audit.

There were three key limitations associated with the study. First, the retrospective cohort study design involving patient chart audits relied on documentation. Therefore, the findings need to be interpreted with caution as any form of rehabilitation pathway planning that may have occurred but was left undocumented would not be reflected in the data. Specifically, conversation on provision of information to patients and families throughout the stages of the rehabilitation pathway are often done but not consistently documented. The study was not

designed to infer causation or control exposure of rehabilitative measures to patient health outcomes (Polit & Beck, 2016).

Secondly, this study was conducted in a single Canadian tertiary care teaching hospital (not a trauma centre) with 50 patient charts. Access to patient charts for one year after ICU discharge did not encompass the trajectory of ICU survivorship, which can take up to eight years (Herridge et al., 2011). However, since this was a feasibility pilot study, the small sample size and single location for data collection were adequate to satisfy the purpose.

A limitation to this study was the age of the NICE guidelines on rehabilitation after critical illness. A lot has been learned about ICU survivorship since the NICE guidelines on rehabilitation after critical illness were published nine years ago. Specifically, post-intensive care syndrome became a term, and further literature on the causes, symptoms, prevention, and management of post-intensive care syndrome have become available. An updated version of the NICE guidelines and audit support tool have not yet been published.

5.2 Key Findings

There were a few key findings with respect to the applicability of the chart abstraction tool to a Canadian tertiary care hospital setting. The proposed NICE recommendations are summarized into key points of physical and non-physical morbidity short clinical assessment, rehabilitation planning, information giving, and functional assessment. A further discussion of the proposed recommendations will be analyzed with respect to available post-intensive care syndrome literature.

The first recommendation for rehabilitation care planning proposed by the NICE (2009) guidelines was the identification of a rehabilitation care pathway coordinator. The data abstraction revealed that in this hospital, the ICU physician acted as the pathway coordinator in

ICU, and multiple health care professionals (i.e.: medical physician, physiotherapist, dietician, speech language pathologist) coordinated rehab care in the ward setting based on their area of expertise. However, no published literature could be found supporting a recognized/single provider in a coordinator role as proposed by NICE. The NICE guidelines did not clarify whether the rehabilitation care pathway coordinator is required to be the same health care professional for the duration of the patient's hospital stay. However, the NICE guidelines do recommend the involvement of health care professionals with expertise in rehabilitation to assess, develop and deliver a rehabilitation program throughout the hospital stay (NICE recommendation 1.1.3 and 1.1.16). The literature supports a team approach in rehabilitation care pathway coordination (Iwashyna et al., 2018; Mehlhorn et al., 2014). The hospital where the study was conducted identified that the most responsible physician and similarly the attending physician were accountable for patients under their care. While I agree with the idea of one rehabilitation care pathway coordinator, I also agree with supporting literature that post-intensive care syndrome rehabilitation requires a multidisciplinary team approach. I believe a discipline with experience in rehabilitation and knowledge of post-intensive care syndrome would be best fit for the role of a rehabilitation care pathway coordinator to work in collaboration with the most responsible physician to make the necessary multidisciplinary team referrals. Presumably, a rehabilitation care pathway coordinator working alongside the most responsible physician could ensure adequate rehabilitation is provided to the ICU survivor.

5.3 Physical and Non-Physical Morbidity Short Clinical Assessment

NICE proposed a short clinical assessment “to identify patients who may be at risk of developing physical and non-physical morbidity” (NICE, 2009, p. 9) during the critical care stay, before discharge from critical care, and during ward-based care. An emphasis on screening and

assessing for post-ICU deficits is prevalent in the literature with a goal to provide prompt intervention(s) (Connolly et al., 2015; Elliot et al., 2014; Iwashyna & Netzer, 2012; Jones et al., 2003; Jutte et al., 2015; McFetridge, 2011; Mehlhorn et al., 2014). Currently, there is no universal validated and reliable tool(s) to screen and/or assess for post-critical care morbidity in the ICU and post-ICU period (Connolly, 2015; Connolly et al., 2015; Elliot et al., 2014; Iwashyna et al., 2018; Iwashyna & Netzer, 2012; Jutte et al., 2015; McFetridge, 2011; Mehlhorn et al., 2014; Turnbull et al., 2016). The NICE guidelines support a health care practitioners' clinical assessment as adequate to assess for physical and non-physical morbidity after critical illness (NICE, 2009). In the literature, there is consensus regarding the need to incorporate practitioner expertise of physiotherapy, occupational therapy and dietary support in rehabilitation care planning to prevent and recognize post-intensive care syndrome (Connolly et al., 2015; Elliot et al., 2014; Iwashyna et al., 2018; Jackson et al., 2012; Jutte et al., 2015; McFetridge, 2011).

5.3.1 During the critical care stay

Prevention efforts in the ICU setting can reduce post-critical care morbidity (Elliot et al., 2014; Iwashyna et al., 2018; Jutte et al., 2015; McFetridge, 2011; Mehlhorn et al., 2014). In the charts audited for the study, performing a short clinical assessment to determine a patient's level of risk in developing physical and non-physical morbidity was not of relevance or deemed necessary in the ICU setting. The ICU in the setting considered all critically ill patients at some extent of risk in developing physical, cognitive and psychological impairments after critical illness, therefore rehabilitative regimes were consistently implemented as part of usual care. For example, the chart audit revealed regular comprehensive nursing assessments at the time of ICU admission, immediate physiotherapy assessments and physical rehabilitation goal setting, and

dietary assessments of nutritional needs to prevent future disability. Baseline function and risk factors were established through completion of the 48/6 '*pre-admission screening questionnaire*', and '*patient profile and pre-admission risk factors*' document. Medication reconciliation was completed by the critical care pharmacist at the time of ICU admission, likely in an effort to prevent patient exacerbation of pre-existing condition(s) (Iwashyna et al., 2018; Jutte et al., 2015). In the hospital where the chart audit occurred, staff used standardized care bundles to avoid complication and reduce morbidity as part of usual nursing care involved the PAD bundle, ventilator management bundle, and the ABCDE bundle. Since the hospital policy was to ensure that delirium was assessed within 48 hours of admission to ICU, it is encouraging to note that delirium was assessed in all patients, since delirium is a predominant documented risk in the ICU (Iwashyna et al., 2018; Jutte et al., 2015; NICE, 2009). The implementation of standardized bundles and the multidisciplinary team approach used in this hospital, are generally thought to be the most effective strategy in the ICU to minimize the severity of physical, cognitive and psychological impairments after critical illness (Balas et al., 2013; Iwashyna et al., 2018).

5.3.2 Before discharge from critical care

Of the top five documented risk(s) in the charts audited for this study, only one was non-physical (i.e.: delirium). The documented top four physical morbidity risks are supported in the literature due to ICU-AW (Elliot et al., 2014; Iwashyna et al., 2018; McFetridge, 2011) through an objective practitioner assessment. Data on the short clinical assessments were extracted from the physiotherapists, RNs, speech language pathologists, occupational therapists, psychiatrists, and neurologists' patient assessments. To improve the usability and the relevance of the chart abstraction tool, an audit of multidisciplinary team members suggested in the rehabilitation care

pathway planning should be included in the tool to evaluate hospital collaboration and appropriate patient therapy. Although the ICU in context had a standardized document to reassess the patient before critical care discharge in correspondence to the NICE recommendation 1.1.8, it was inconsistently completed. One of the goals published by the Society of Critical Care Medicine is to enhance post-intensive care syndrome education to health care professionals who care for the ICU and post-ICU population (Elliot et al., 2012). It is unclear why the patient reassessment on the standardized document before discharge from critical care was not being persistently completed, however a general lack of awareness of post-intensive care syndrome could potentially be a factor (Elliot et al., 2012).

Although literature reports high prevalence of cognitive and psychological symptoms of post-intensive care syndrome (i.e.: impairments to executive functioning, memory/attention, mental processing speed, anxiety, depression, and PTSD) (Iwashyna et al., 2018; Jutte et al., 2015), only two patients (2/50) had a documented formal psychological functioning assessment (mental status examination) by psychiatry. Four ICU patients had a documented occupational therapy assessment before critical care discharge (4/50). One of the documented occupational therapy assessment was titled ‘initial screen’ which was performed on two ICU patients (2/50). The ‘initial screen’ assessment reviewed patient supports/resources, discharge environment, self-care, mobility, leisure, productivity, and physical and cognitive status. The ‘activities of daily living and instrumental activities of daily living’ patient assessment performed by occupational therapy explored medication, finance, shopping and meals, transport, cognition, general appearance, and safety; which was only performed on two other patients (2/50).

Literature consensus on utilizing expert consultation in post-ICU rehabilitation planning is considered an optimal method of developing a patient care plan (Iwashyna et al., 2018; Jutte et

al., 2015; NICE, 2009). It may be appropriate that a total of six patients (6/50) received a formal documented cognitive and psychological morbidity assessment before discharge from critical care, or perhaps it was reflective of a research gap in unclear timing of when to assess for cognitive and psychological impairments after critical illness (Mehlhorn et al., 2014), or that such expertise is required in only certain cases. However, due to the high prevalence of post-intensive care syndrome, Iwashyna et al. (2018) argue each ICU survivor should undergo an assessment of the unintentional physical, cognitive and psychological symptoms after critical illness at some point before hospital discharge.

5.3.3 During ward-based care

Few short clinical assessments documenting physical and non-physical morbidity were documented in the charts. In the charts audited for this study, a clinical assessment was completed on the standardized document before critical care discharge and guided the receiving medical team with regards to the ICU survivor's rehabilitation care pathway. Therefore, perhaps since the discharge assessment guided care in this Canadian hospital setting, a short clinical assessment was neither repeated nor documented on the general ward (NICE recommendation 1.1.14). The usability of the chart abstraction tool auditing the completed short clinical assessment would be enhanced if a time-frame of when to perform the assessment was provided.

Although the NICE guidelines and broader literature cannot confirm consistent assessment tools for post-intensive care syndrome, the Canadian hospital had identified standardized tools for use. Relevance of the chart abstraction tool in auditing for risks of physical, cognitive, and psychological symptoms after critical illness would be improved by considering all ICU survivors are at risk. Therefore, an audit of suggested assessment tools to assess for physical, cognitive and psychological impairment after critical illness would be of

added relevance to the Canadian tertiary care hospital. The 48/6 model of care used in the Canadian hospital had core assessment tools for the general medical team to employ if a patient risk factor had been identified by the ICU team or from the '*pre-admission screening questionnaire*' (FH, 2018). The core assessment tools for cognitive risks completed for a few patients implicated in this study included the Confusion Assessment Method (CAM), Mini-Cog, Glasgow Coma Scale (GCS), 0–10 numeric pain scale, and the OPQRSTUV pain assessment. The swallowing screening tool and fall and injury reduction flowsheet were completed for some patients in this chart audit for further evaluation of identified physical morbidity risks. PTSD, anxiety, depression, impairments to physical strength, and pulmonary function are considered important components of post-intensive care syndrome by the NICE guidelines and supporting literature (Elliot et al., 2012; Connolly et al., 2015; Iwashyna et al., 2018; Jutte et al., 2015; NICE, 2009). However, the corresponding core-assessment tools were not documented in any of the patient charts. Further, not all of the core assessment tools were regularly completed by health care professionals for all ICU survivors; documentation showed that the core assessment tool(s) were employed based on professional discretion. The NICE guidelines and supporting literature did not identify the appropriate time and frequency to assess for post-intensive care syndrome (Connolly, 2015; Connolly et al., 2015; Mehlhorn et al., 2014; NICE, 2009). The literature recognizes that there is variation in how and when to assess for post-intensive care syndrome (Mehlhorn et al., 2014). In the charts audited for this study, the timing and frequency of administered physical and cognitive assessment tools varied between the ICU survivors.

5.4 Rehabilitation Planning

The data from the chart audit showcased comprehensive clinical assessments and individualized rehabilitation planning and suggests that these were usual care in the Canadian

tertiary level hospital. The NICE guidelines recommend early initiation of physical rehabilitation in the ICU and to continue throughout the patient hospital stay to reduce the inadvertent physical, cognitive and psychological impairments after critical illness (Berry et al., 2013; Iwashyna et al., 2018; Iwashyna, & Hodgson, 2016; Jutte et al., 2015; Mehlhorn et al., 2014; NICE, 2009).

Nutritional support to reduce ICU-AW and promote muscle mass (Bear, Puthuchear, & Hart, 2014; McFetridge, 2011) is recommended as part of the early rehabilitation planning in the NICE guidelines and audited as providing the patient with an individualized rehabilitation program.

The NICE guidelines highlight involvement of allied health care professionals for their competence in the rehabilitation care pathway development. The chart audit completed here revealed that multiple sources of expertise were used to establish and provide rehabilitation. In the Canadian tertiary care hospital, the health care professionals most involved in the rehabilitation care pathway development were physiotherapists, dieticians, speech language pathologists, RNs, and occupational therapists. The usability of the chart abstraction tool would be improved if an audit of the multidisciplinary team members involved in each stage of the rehabilitation care pathway planning was included for added guidance of where to locate documented rehabilitative regimes in the patient chart. Usability of the chart abstraction tool would be further improved with an audit of the suggested rehabilitation therapies appropriate for the ICU and ward-based care.

5.4.1 During the critical care stay

Documentation of rehabilitative therapies provided in the selected ICU were most often found in the nursing, physiotherapy, dietician, speech language therapist notes. The ICU in context, utilized a document developed in 2009 by the Practice Guideline Advisory Task Force of the Physiotherapy Association of BC titled 'Safe prescription of mobilizing patients in acute

care settings: what to assess, what to monitor, when not to mobilize, and how to mobilize and progress' to guide safe physical rehabilitation. In the charts audited for this study, common methods of rehabilitation included passive and/or active range of motion, placing the bed in a chair position (i.e.: cardiac chair), sitting or standing at the edge of the bed, marching on the spot, ceiling lift to a bedside chair and walking short distances. If the patient no longer required mechanical ventilation, the physiotherapists in the selected ICU for the study documented practicing breathing techniques with the patient.

The chart audit revealed almost all patients were receiving enteral or parenteral nutrition with the rates adjusted by the ICU dietician to meet the patients' nutritional requirements. If the ICU patient no longer required mechanical ventilation and there was not an enteral tube present, documentation revealed the RN performed a bedside swallowing assessment or a formal swallowing assessment was completed by the speech language pathologist if the patient had been intubated for more than 48 hours. The audited charts showed the texture of the meals provided to the patient were based on the swallowing assessment and commonly began with thickened fluids and were gradually increased to a regular texture diet as the patient tolerated.

5.4.2 Before discharge from critical care

Ongoing comprehensive assessments by interdisciplinary team members were documented for the duration of a patients' ICU stay. In the charts audited for this study, the 48/6 model of care document '*critical care summary*,' was the primary location for the RN to document new and ongoing morbidity risk(s) and rehabilitation goals. Health care professionals including physiotherapist, dieticians, and speech language pathologists most frequently documented new and ongoing assessments and rehabilitation goals on individual documents scattered on Meditech. In the Canadian ICU in the study, there was not a single document

identifying the compilation of rehabilitation assessment and goals by the health care professionals involved in the care planning. Extracting the data of new and ongoing assessments and rehabilitation plans by the health care professionals was challenging and difficult to follow to achieve a complete picture of rehabilitation for an individual patient. The patients selected for this study had an ICU stay ranging from 4 – 30 days. Therefore, it became increasingly difficult to locate the most recent rehabilitation care pathway for the patients who had a longer ICU stay, which could be problematic for patient care.

5.4.3 During ward-based care

Documentation revealed attention to rehabilitation planning during ward-based care. While the physician overlooked the care of the patient, there were 20 different consulted health care professionals who had documented a patient clinical assessment and provided rehabilitation plans of care based on their expertise (i.e.: physiotherapist, dietician, speech language pathologist, occupational therapist, psychiatrists, infectious disease, urology, home health nurse, endocrinology, internal medicine, cardiology/heart failure outreach nurse, wound care nurse). The chart audit revealed here that the comprehensive patient assessments completed by nurses supported the physicians' decision to consult members of the health care team (i.e.: occupational therapy, speech language pathology, psychiatry, respirology, urology). The chart audit also unveiled nursing staff made referrals to health care team members to help coordinate the patient rehabilitation pathway (i.e.: physiotherapy, dietary, speech language pathology, wound care). Physiotherapists (46 patients), dieticians (41 patients), speech language pathologists (35 patients), occupational therapists (30 patients), and psychiatrists (10 patients) were the five consulted health care professionals who had commonly documented rehabilitation care pathways on the general ward. In one case, an internal medicine physician was consulted by the most

responsible physician from the surgical ward to provide clinical expertise in rehabilitation planning for a patient who had an extended stay in the ICU. Two patients received individualized support on the general wards from the heart failure outreach support team. The support team consisted of a referral to an RN with expertise in cardiology, who consulted throughout the hospital to provide information and assistance in rehabilitation planning for patients having cardiac procedures. In reference to practitioner expertise, the chart audit revealed the duration of rehabilitation provided by different health care professionals varied based on the patients' clinical status and the practitioner judgment on patient progression.

ICU follow-up strategies were not audited in the chart abstraction tool. To encourage the continuity of care and ensure assessment of post-intensive care syndrome are implemented, experts recommend follow-up care for ICU survivors (Egerod et al., 2012; Iwashyna et al., 2018, Melhorn et al., 2014). Relevance of the tool would have been enhanced to the Canadian context with an audit of ICU survivor follow-up assessments, involving the planning of appropriate rehabilitative regimes in efforts to timely detect and treat the inadvertent physical, cognitive and psychological impairments after critical illness. The chart audit revealed that all ICU patients received a comprehensive assessment by an ICU outreach RN within 24 hours of ICU discharge. While the ICU outreach nurses completed patient assessments of the post-ICU patient, there was no reference to rehabilitation planning.

5.5 Information Giving

Patients and family have a need for specific information at the different stages of the rehabilitation journey (NICE, 2009). The NICE guidelines recommend pertinent information to be provided to patients and/or families consistently throughout the hospital stay and to be incorporated into the care planning (NICE, 2009). Patient and family involvement in the

rehabilitation care pathway has shown to reduce the severity of long-term psychological symptoms (anxiety, depression, PTSD) and increase autonomy (Bench, Day, & Griffiths, 2012; Elliot et al., 2014; Iwashyna et al., 2018; Jutte et al., 2015; McFetridge, 2011; Mehlhorn et al., 2014; NICE, 2009). The specific information the NICE guidelines recommend to be provided to the patients and/or family during the critical care include basic information on the critical illness and treatments, equipment used in the ICU and expected recovery illness (NICE, 2009). Information on the rehabilitation pathway and recovery, and differences between the critical care and the general-ward environment are the essential components of information the NICE guidelines recommend are provided to patients and/or families before critical care discharge (NICE, 2009). The NICE guidelines recommend specific information on the trajectory of recovery, sources of further help in the community, general guidance and managing activities of daily living and diet, exercise and medical treatment(s) in the community be provided to patients and/or families before hospital discharge (NICE, 2009). The chart abstraction tool pertaining to information giving would have had added usability if it indicated which discipline would have been appropriate to provide the information, or if methods of information giving (i.e.: pamphlet, booklet, video) were provided in the audit

5.5.1 During the critical care stay

The chart review showed that patient and family were provided with information on the critical illness and intervention(s). Such patient and/or family information was documented as provided through the use of the ICU information booklet, and family meetings with the attending physician and social worker. There is potential for the ICU booklet to be updated by providing information on conventional equipment used in the ICU to better reflect the NICE recommendation on pertinent information patients and/or families require during the critical care

stay. NICE suggests a discussion of post-ICU morbidity with the patient and/or family. While the proposed guidance may seem relevant during a time of acute illness, the Society of Critical Care Medicine and Hopkins and Girard, (2012) are encouraging the initial conversation of post-ICU physical and non-physical morbidity with the patient and family (Elliot et al., 2014).

5.5.2 Before discharge from critical care

Documentation in the patient chart revealed that the ICU in context provided a pamphlet developed in 2009 overviewing differences between critical care and general wards, as well as few common post-ICU problems. Common problems included amnesia, mood and memory, sleep, body image, voice and breathing, tiredness and exercise, pain, and nutrition. In the charts audited for this study, there was not a single document identifying a compilation of rehabilitation plans of care by the respective health care professionals involved in the care pathway. Therefore, it was difficult to extract if information on the rehabilitation pathway and recovery was provided to the patients and/or family. In attempts to reflect the proposed NICE recommendation, the development of a single document for health care professionals to document ongoing rehabilitation goals could ensure patients and family are provided with the recent rehabilitation care pathway. The single document could influence patient autonomy (Endacott & Chaboyer, 2006), but also support the continuity and progression of care throughout the patient hospital journey (Jones, 2003; Jutte et al., 2015).

5.5.3 During ward-based care

Documentation revealed information on diet and continuing treatments were commonly provided compared to physical recovery, management at home and general guidance. In the charts audited for this study, the RNs indicated diet instruction, community follow-up appointments and if handouts were provided to the patient and/or family on a '*patient discharge*

instructions' document. All of the patients in the study had a '*patient discharge instructions*' document in their medical chart. Over half of the '*patient discharge instruction*' documents indicated to follow up with a family doctor/general practitioner in one week; assuming, the patient has access to a general practitioner. Ramsay et al. (2012) further expressed concerns that general practitioners lack the time and understanding of the post-ICU trajectory. There was not an area in the patient medical chart identifying if education on physical recovery and managing daily living after hospital discharge was provided. The respective data was collected from individual health care professional documents (i.e.: physiotherapy, occupational therapy, social work). To better encompass the NICE recommendation on information giving, the pertinent education provided by each health care professional could be summarized into a single document and provided to the patient.

5.6 Functional Assessment

The NICE guidelines recommend a functional assessment be completed on all ICU survivors before hospital discharge to assess the capacity and assistance needed to undertake daily activities (NICE, 2009). The functional assessment is different from a nursing comprehensive assessment as it is intended to prepare ICU survivors for hospital discharge. The chart audit revealed over half of the ICU survivors received a functional assessment. Documentation revealed post-traumatic stress related symptom was the only dimension proposed by the NICE guidelines that was not completed as part of the assessment. In the charts audited for the study, it showed that different methods of a functional assessment were performed for the post-ICU population. Overall, performance of a single holistic assessment for all patients might improve consistency.

The chart audit revealed daily nursing comprehensive assessments of ICU survivors established which patient would benefit from further rehabilitation before hospital discharge. In this Canadian hospital setting, occupational therapy was the primary discipline consulted in performing a functional assessment focused on rehabilitation and discharge planning (28/50). While discharge planning is not the responsibility of one discipline, occupational therapy carries the skills to support successful integration back into the community (College of Occupational Therapists of British Columbia [COTBC], 2018). Following in order, other consulted health care team members included physiotherapy with nine documented assessments, psychiatry/geriatric psychiatry three assessments and neurology with one documented assessment. It became apparent from the chart audit that daily thorough nursing comprehensive assessments in this Canadian hospital setting helped shape the ICU survivors' rehabilitation pathway. The chart abstraction tool would have had increased usability to the Canadian setting if the tool audited the health care professional(s) best fit to perform the functional assessment and the method(s) of assessment.

Occupational therapy performed varying assessments including a multiple errands test, Montreal cognitive, functional cognitive, modified mini mental status, activities of daily living, graded repetitive arm supplementary program level 1 and functional assessments. Physiotherapy assessed physical strength and individualized equipment needs, psychiatry and neurology performed mental status examinations. There was not a single identified functional assessment for all post-ICU patients. Iwashyna et al. (2018) support and have implemented a cognitive, physical and psychiatric evaluation for all post-ICU patients when preparing for hospital discharge. The functional assessment tools used by Iwashyna et al., (2018) are based on personal preference but are consistent between all ICU survivors.

5.7 Future Research

There is currently limited research on the appropriate instruments used to measure the physical and non-physical symptoms inadvertently present after critical illness (Mehlhorn et al., 2012). To optimize patient health outcomes after critical illness, further research is needed to identify the appropriate timing and frequency of employing the best possible methods to assess for post-intensive care syndrome. Adequately powered research on the type, frequency, and duration of rehabilitative regimes during ward-based care for the post-ICU patient is required to help shape coordinated care (Connolly et al., 2015).

5.8 Implications for Nursing Education and Research

The findings of this study have implications pertinent to nursing education, policy and research. Post-intensive care syndrome education is an integral first step in understanding the trajectory after critical illness. The study findings suggest ‘post-intensive care syndrome’ or ‘post-ICU morbidity’ are not common medical terms utilized in this health care setting perhaps due to the unfamiliarity of the defining characteristics. The study finding also suggest the daily nursing comprehensive assessment establishes the basis of the patient rehabilitation pathway. Therefore, nursing staff have an essential role in identifying and communicating signs of post-intensive care syndrome to the medical team. Elliot et al. (2014) suggest increasing awareness of common post-ICU physical and non-physical impairments after critical illness to health care professionals involved in the rehabilitation pathway and to the public. Increasing health care staff and public awareness of post-intensive care syndrome may result in improved understanding and positive health outcomes. Individual nurses with an interest and comfort in post-ICU morbidity education should take the role in working with nurses in leadership positions to support awareness. Taking another look and reviewing current medical team members understanding of

post-ICU morbidity from different hospital units (i.e.: ICU, medical, surgical) is recommended as an ideal starting point. After reviewing the common knowledge, proposing an education program on the impact of critical illness, prevention, post-intensive care syndrome recognition and adequate treatment of the physical and non-physical symptoms of post-ICU morbidity is recommended to members involved in the ICU survivorship pathway.

Policy development is not a fast process. In the meantime, health care settings and individual nurses have the responsibility in ensuring all patients receive the best possible care in the most opportune way. This study has shown that it is feasible to collect data on post-ICU recovery in a Canadian tertiary level hospital. In future nursing research, the results of this study and the proposed recommendations published by the NICE guidelines on rehabilitation after critical illness should be presented in a meeting to health care professionals involved in the rehabilitation care planning (i.e.: intensivists, physicians, registered nurses, critical care and general ward educators, physiotherapists, occupational therapists, speech-language pathologists, pharmacists, respiratory therapists and dieticians). Individual nurses with expertise and post-intensive care syndrome knowledge could review each of the proposed NICE recommendations with the health care professionals and with their expertise determine its applicability to the context. The outcome of the meeting could be the first step in helping shape an ICU survivorship care pathway and policy.

5.9 Conclusion

There is a need for coordinated and comprehensive care through a multidisciplinary team approach to support critical care survivors in their post-ICU journey, similar to that of care pathways for stroke, surgery, and cancer (Connolly et al., 2015; Iwashyna et al., 2018; Jutte et al., 2015; McFetridge, 2011). The NICE guidelines on rehabilitation after critical illness

recognized the need for institutional coordination and developed a set of recommendations to better support the health outcomes of ICU survivors. The proposed NICE recommendations were not all transferable to the Canadian context as evidenced in the chart abstraction tool. The NICE chart abstraction tool required clarity to improve usability, specifically on the recommended multidisciplinary team members involved in rehabilitation care pathway coordination throughout the stages of the ICU care pathway. For enhanced relevance of the chart abstraction tool to the Canadian tertiary care hospital, the addition of post-intensive care syndrome prevention, management, and treatment strategies throughout the rehabilitation pathway should have been audited to evaluate the current implemented rehabilitative regimes. There is potential for the Canadian context to update current practices pertaining to the provision of information provided to patients and family throughout the rehabilitation pathway, presumably as reflected in documentation, to reflect the applicable NICE recommendation.

In a multidisciplinary team approach, RN's carry the fundamental education and experience to join the critical care research momentum on strategies to identify and treat post-intensive care syndrome. Not all proposed NICE recommendations on rehabilitation after critical illness will be applicable to each context. However, the chart abstraction tool provides a framework to support the review of ICU survivorship at an individual institutional level. Essentially, the NICE guidelines on rehabilitation after critical illness contribute to a quality improvement initiative on optimizing the health outcomes of ICU survivors.

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Appendices

Appendix A The National Institute for Health and Care Excellence (NICE) Critical Illness Rehabilitation Audit Support Tool

Patient identifier:	Sex:	Age:	APACHE II Score
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Critical care admission data			
1	Date and time of admission: ____/____/____ : ____ hrs		
2	Primary reason for admission: <ul style="list-style-type: none"> Planned local medical Planned local surgical Unplanned local medical/surgical Planned transfer in Unplanned transfer in Repatriation 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Comments:

3	Location prior to admission:
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No.	Data item no.	Criteria	Yes	No	NA/ Exceptions ^a	NICE guideline ref.
During the critical care stay						
1	1.1	Did the patient have a named healthcare professional to coordinate their rehabilitation care pathway?	<input type="checkbox"/>	<input type="checkbox"/>		1.1.1
	1.2	If ‘Yes’; What was the profession of this person:				
	1.3	Does this person have the appropriate competencies to coordinate the rehabilitation care pathway?	<input type="checkbox"/>	<input type="checkbox"/>		
2	2.1	Did the patient have a short clinical assessment to determine their risk of developing physical and non-physical morbidity?	<input type="checkbox"/>	<input type="checkbox"/>		1.1.2

No.	Data item no.	Criteria	Yes	No	NA/ Exceptions ^a	NICE guideline ref.
	2.4	Date and time of this assessment: ____/____/____ : ____ hrs				
For those patients identified as at risk of physical and non-physical morbidity:						
3	3.1	Was a comprehensive clinical assessment performed to identify their current rehabilitation needs?	<input type="checkbox"/>	<input type="checkbox"/>		1.1.3
4		Based on the comprehensive clinical assessment (data item 3.1):				1.1.4
	4.1	Were short-term rehabilitation goals agreed?	<input type="checkbox"/>	<input type="checkbox"/>		
	4.2	Were medium-term rehabilitation goals agreed?	<input type="checkbox"/>	<input type="checkbox"/>		
	4.3	Did the rehabilitation include an individualised, structured rehabilitation programme?	<input type="checkbox"/>	<input type="checkbox"/>		1.1.6
Information giving:						

No.	Data item no.	Criteria	Yes	No	NA/ Exceptions ^a	NICE guideline ref.
5		Did the patient receive the following information during their critical care stay:			A / B	1.1.7
	5.1	<ul style="list-style-type: none"> Information about their critical illness, interventions and treatments 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	5.2	<ul style="list-style-type: none"> Information about the equipment used during their stay 	<input type="checkbox"/>	<input type="checkbox"/>		
	5.3	<ul style="list-style-type: none"> Information about any possible short-term and/or long-term physical and non-physical problems which may require rehabilitation 	<input type="checkbox"/>	<input type="checkbox"/>		

	6.3	Non-physical: <ul style="list-style-type: none"> • None • Recurrent nightmares • Intrusive memories of traumatic events which occurred prior to admission • New and recurrent anxiety or panic attacks • Expressing a wish not to talk about their illness or changing the subject quickly • Other(s): (state) 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
	6.4	Date and time of this assessment: ___/___/___ ___ : ___ hrs				
For those patients identified as at risk:						
7a	7.1	Was a comprehensive reassessment performed to identify their current rehabilitation needs?	<input type="checkbox"/>	<input type="checkbox"/>		1.1.9
7b	7.2	Were the rehabilitation goals agreed or reviewed and updated based on the comprehensive reassessment? (data item 7.1)	<input type="checkbox"/>	<input type="checkbox"/>		1.1.11

8		<p>Did the patient receive the following information before, or soon after their discharge from critical care:</p> <ul style="list-style-type: none"> • information about the rehabilitation care pathway • information about the differences between critical care and ward-based care. • Information about the transfer of clinical responsibility to a different medical team 	<input type="checkbox"/>	<input type="checkbox"/>	A	1.1.13
	8.1		<input type="checkbox"/>	<input type="checkbox"/>		
	8.2		<input type="checkbox"/>	<input type="checkbox"/>		
	8.3		<input type="checkbox"/>	<input type="checkbox"/>		
9	9.1	<p>Was the patient given the contact details of the healthcare professional(s) coordinating their rehabilitation pathway on discharge from critical care?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.1.1
	<p>Date and time of discharge from critical care: ____/____/____ ____ : ____ hrs</p>					

	10.3	Non-physical: <ul style="list-style-type: none"> • None • Recurrent nightmares • Intrusive memories of traumatic events which occurred prior to admission • New and recurrent anxiety or panic attacks • Expressing a wish not to talk about their illness or changing the subject quickly • Other(s): (state) 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
	10.4	Date and time of this assessment: ____/____/____ ____ : ____ hrs				
For those patients identified as at risk:						
11	11.1	Was a comprehensive clinical reassessment performed to identify their current rehabilitation needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.1.15
	11.2	Date and time of this assessment: ____/____/____ ____ : ____ hrs				
12	12.1	Was an individualised, structured rehabilitation programme offered, based on the comprehensive clinical reassessment and the agreed or updated rehabilitation goals set before the patient was discharged from critical care?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.1.16

Before discharge to home or community care

For those patients identified as at risk:

13	13.1	<p>For those patients who received an individualised structured rehabilitation programme during ward-based care, prior to discharge did they have:</p> <ul style="list-style-type: none"> • a functional assessment <p>If ‘Yes’;</p> <p>Did this assessment include:</p> <ul style="list-style-type: none"> • Physical dimensions: <ul style="list-style-type: none"> ○ physical problems ○ sensory problems ○ communication problems ○ social care ○ equipment needs • Non-physical dimensions: <ul style="list-style-type: none"> ○ anxiety ○ depression ○ post-traumatic stress-related symptoms ○ behavioural and cognitive problems ○ psychosocial problems 	<input type="checkbox"/>	<input type="checkbox"/>		1.1.20
14	14.1	<p>Was the patient given the contact details of the healthcare professional(s) coordinating their rehabilitation pathway on discharge?</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.1.1

Information giving:

15	15.1	Before discharge was the patient given information on the following: <ul style="list-style-type: none"> • their physical recovery • diet and other continuing treatments • managing their activities of daily living • general guidance, especially for the family and/or carer, on what to expect and how to support the patient at home. 	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	1.1.22
	15.2	Was the patient given a copy of the critical care discharge summary?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Date and time of discharge: ____/____/____ ____ : ____ hrs					

Appendix B Included recommendations apart of data abstraction

	NICE Guideline Recommendation
1.1.1	Healthcare professional(s) with appropriate competencies coordinates the patient's rehabilitation care pathway.
1.1.2	During critical care stay, and as early as clinically possible, a short clinical assessment is completed to determine the potential of physical and non-physical morbidity.
1.1.3	During critical care stay, patients at risk of physical and non-physical morbidity have a comprehensive clinical assessment to identify their current rehabilitation needs. This should include assessments by healthcare professionals experienced in critical care and rehabilitation.
1.1.4	During critical care stay, for patients at risk, agree short-term and medium-term rehabilitation goals based on the comprehensive clinical assessment. The patient's family and/or care provider should also be involved.
1.1.7	<p>Give patients the following information during their critical care stay. Also give the information to their family and or care provider, unless the patient disagrees</p> <ul style="list-style-type: none"> • Information about the patient's critical illness, interventions and treatments • Information about the equipment used during the patient's critical care stay • If applicable, information about any possible short-term and/or long-term physical and non-physical

	<p>problems which may require rehabilitation</p> <p>Deliver all the above information more than once during the patient's critical care stay</p>
1.1.8	For patients who were previously identified as being at low risk, perform a short clinical assessment before their discharge from critical care to determine their risk of developing physical and non-physical morbidity
1.1.9	<p>For patients at risk, and patients who started the individualized, structured rehabilitation program in critical care, perform a comprehensive clinical reassessment before discharge to the ward to identify their current rehabilitation needs. The comprehensive reassessment should pay particular attention to:</p> <ul style="list-style-type: none"> • Physical, sensory and communication problems • Underlying factors, such as pre-existing psychological or psychiatric distress • Symptoms that have developed during the critical care stay, such as delusions, intrusive memories, anxiety, panic episodes, nightmares, flashback episodes or depression
1.1.11	For patients at risk, agree or review and update the rehabilitation goals before discharge to the ward, based on the comprehensive reassessment. The family and or caregiver should also be involved, unless the patient disagrees.
1.1.13	<p>Give the patients the following information before, or as soon as possible after, their discharge from critical care. Also give the information to their family and/or care giver, unless the patient disagrees:</p> <ul style="list-style-type: none"> • Information about the rehabilitation care pathway.

	<ul style="list-style-type: none"> • Information about the differences between critical care and ward-based care. This should include information about the differences in the environment and staffing and monitoring levels. • Information about the transfer of clinical responsibility to a different medical team (this includes information about the formal structured handover of care recommended in ‘Acutely ill patients in hospital’ (NICE clinical guideline 50). • If applicable, emphasize the information about possible short-term and/or long-term physical and non-physical problems that may require rehabilitation. • If applicable, information about sleeping problems, nightmares and hallucinations and the readjustment to ward-based care.
1.1.14	During ward-based care, for patients who were previously identified as being at low risk before discharge from critical care, perform a short clinical assessment to determine their risk of physical and non-physical morbidity.
1.1.15	During ward-based care, for patients at risk, perform a comprehensive clinical reassessment (see recommendation 1.1.9) to identify their current rehabilitation needs.
1.1.16	During ward-based care, for patients at risk, offer an individualized, structured rehabilitation program, based on the comprehensive clinical reassessment and the agreed or updated rehabilitation goals set before the patient was discharged from the critical care.

1.1.20	<p>Before discharging a patient receiving the individualized structure rehabilitation program to home or community care:</p> <p>Perform a functional assessment which should include the physical dimensions (physical problems, sensory problems, communication problems, and social care or equipment needs) and non-physical dimensions (anxiety, depression, PTSD symptoms, behavioral and cognitive problems, psychosocial problems).</p> <p>Assess the impact of the outcomes from the functional assessment on the patient's activities of daily living and participation</p> <p>Based on the functional assessment, review, update and agree the rehabilitation goals with the patient. The family and/or caregiver should be involved if the patient agrees.</p>
1.1.22	<p>Give patients the following information before their discharge to home or community care. Also give the information to their family and/or caregiver, if the patient agrees:</p> <ul style="list-style-type: none"> • Information about their physical recovery, based on the goals set during ward-based care if applicable • If applicable, information about diet and any other continuing treatments • Information about how to manage activities of daily living including self-care and re-engaging with everyday life • If applicable, information about driving, returning to work, housing and benefits • Information about local statutory and non-statutory support services, such as support groups • General guidance, especially for the family and/or caregiver, on what to expect and how to support the patient at home. This should take into account both the patient's needs and the family's/caregiver's needs

	Give the patient their own copy of the critical care discharge summary
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Appendix C **Patient demographic and health services use extraction form**

- 1) APACHE II score:
- 2) Mortality (date of death if available):
- 3) Number of ICU days:
 - Date of ICU admission:
 - Date of ICU discharge:
- 4) Date(s) of readmission to ICU:
 - Readmission diagnosis:
 - Length of readmitted days to ICU:
- 5) Number of hospital days:
 - Date of hospital admission:
 - Date of hospital discharge:
- 6) Date(s) of readmission to hospital:
 - Diagnosis:

Appendix D Patient health services use extraction - dates

Data	Dates
Number of ICU days during initial hospital admission	Date of ICU admission – date of ICU discharge
Number of hospital days during initial hospital admission	Date of hospital admission – date of hospital discharge
Mortality	
Readmitted to ICU during initial hospital stay	
Number of readmitted days to ICU during initial hospital stay	Date of ICU readmission – date of ICU discharge
Readmission diagnosis to ICU during initial hospital stay	
Readmission to the hospital one year within hospital discharge	
Length of readmitted hospital days within one year of hospital discharge	Date of hospital readmission – date of hospital discharge
Readmission diagnosis to hospital within one year of hospital discharge	
Readmission to ICU within one year of hospital discharge	
Number of readmitted ICU days within one year of hospital discharge	Date of ICU readmission – date of ICU discharge

Readmission diagnosis to ICU within one year of hospital discharge	
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Appendix E **Rehabilitation pathway data coding**

Critical care admission data

Audit question	Coding
Primary reason for admission:	
Planned local medical	A
Planned local surgical	B
Unplanned local medical/surgical	C
Planned transfer in	D
Unplanned transfer in	E
Repatriation	F

Data item no. 2.2/6.2/10.2

Audit Question	Coding
What physical risk(s) were identified?	
None	A
Unable to get out of bed independently	B
Anticipated long duration of critical care stay	C
Obvious significant physical or neurological injury	D
Lack of cognitive functioning to continue exercise independently	E

Unable to self ventilate on 35% oxygen or less	F
Presence of premorbid respiratory or mobility problems	G
Unable to mobilize independently over short distances	H
Other(s): state	I

Data item no. 2.3/6.3/10.3

Audit Question	Coding
What non-physical risk(s) were identified?	
None	A
Recurrent nightmares	B
Intrusive memories of traumatic events which occurred prior to admission	C
New and recurrent anxiety or panic attacks	D
Expressing a wish not to talk about their illness or changing the subject quickly	E
Other(s): state	F

Data item no. 13.1

Audit Question	Coding
Did the functional assessment include the following physical and non-physical dimensions?	
Physical problems	A
Sensory problems	B
Communication problems	C
Social care	D
Equipment needs	E
Anxiety	F
Depression	G
Post-traumatic stress-related symptoms	H
Behavioral and cognitive problems	I
Psychosocial problems	J

Data item no. 15.1

Audit question	Coding
Before discharge was the patient given information on the following?	
Their physical recovery	A
Diet and other continuing treatments	B

Managing their activities of daily living	C
General guidance, especially for the family and/or carer, on what to expect and how to support the patient at home	D

Appendix F Physical and Non-Physical Dimensions in Functional Assessment

Physical dimensions	
Physical problems	Weakness, inability/partial ability to sit, rise to standing, or to walk, fatigue, pain, breathlessness, swallowing difficulties, incontinence, inability/partial ability to self-care
Sensory problems	Changes in vision or hearing, pain, altered sensation
Communication problems	Difficulties in speaking or using language to communicate, difficulties in writing
Social care or equipment needs	Mobility aids, transport, housing, benefits, employment and leisure needs
Non-physical dimensions	
Anxiety, depression, and PTS-related symptoms	New or recurrent somatic symptoms including palpitations, irritability and sweating; symptoms of derealisation and depersonalization; avoidance behavior; depressive symptoms including tearfulness and withdrawal; nightmares, delusions, hallucinations and flashbacks
Behavioral and cognitive problems	Loss of memory, attention deficits, sequencing problems, deficits in organizational skills, confusion, apathy, disinhibition, compromised insight

Other psychological or psychosocial problems	Low self-esteem, poor or low self-image and/or body image issues, relationship difficulties including those with the family and/or carer
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