FRAILTY AND OCCUPATIONAL THERAPY IN THE EMERGENCY DEPARTMENT

by

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Abstract

This paper details a health records review of older adults referred to an occupational therapy (OT) program in the emergency department (ED), examining this population's prevalence of frailty, and the impact of frailty on unscheduled return visits (URVs) to the ED. Most patients seen by an occupational therapist in the ED were frail (60.6%). Of the patients discharged home on their index ED visit, 31.0% had a URV within 30 days. There was no significant difference in URV rate between frail and non-frail populations. Compared to non-frail patients, frail patients who had a URV demonstrated greater complexity in their reasons for URVs, with functional, social/environmental and/or safety concerns, and "failure to thrive". Patients referred to OT in the ED were typically in the middle of the frailty scale (vulnerable to moderately frail), dependent in some of their activities of daily living, and had complex presentations to the ED.

List of Abbreviations Used

ED	Emergency department
URV	Unscheduled return visit
ADL	Activity of daily living
OT	Occupational therapy
CGA	Comprehensive geriatric assessment
CFS	Clinical Frailty Scale
EMR	Electronic medical record

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Chapter 1: Introduction

Frailty is a state of extreme vulnerability (Cesari et al., 2016), which has been described as "a multidimensional syndrome characterized by decreased reserve and diminished resistance to stressors" (Rodríguez-Mañas et al., 2013, p. 65). While there is no clear consensus on the pathophysiology of this syndrome (Rodríguez-Mañas et al., 2013), the presence of frailty increases an individual's risk of negative health-related outcomes, including falls, hospitalization, functional decline, institutionalization and death (Cesari et al., 2016). Frailty is not synonymous with disability, nor comorbidity; rather, current models suggest that frailty, disability, and comorbidity are concepts that are distinct but overlapping (Fried, Ferrucci, Darer, Williamson & Anderson, 2004). Furthermore, the risk of developing frailty increases with age (Rockwood et al., 2004), but it is not a universal phenomenon, as there are many older adults who are not frail (Canadian Frailty Network, 2020).

Historically, most frailty research has been within the biomedical realm, focusing on physical manifestations (Markle-Reid & Browne, 2003). This perspective was championed by Fried et al. (2001), who posited that the measurement of frailty can be reduced to a physical phenotype. However, other researchers have argued that frailty can be understood as an accumulation of deficits across multiple facets of the individual (Rockwood & Mitnitski, 2007), including occupational and environmental factors, such as "changes in everyday activities", "problems going out alone" (Rockwood et al., 2005) and "social vulnerability" (how one's social situation increases susceptibility to health or social declines) (Andrew, Mitnitski & Rockwood, 2008).

Frailty is a challenge to Canada's health system. Today there are an estimated 1.5 million frail Canadians, a number projected to rise to well over 2 million in the next ten years (Canadian Frailty Network, 2020). As the number of individuals with frailty increases, so too does the number of frail older adults being seen in the emergency department (ED) (Banerjee & Conroy, 2012; Rosenberg et al., 2014). The prevalence of frailty amongst older adults in the ED has been reported to be as high as 58-62% (Choutko-Joaquim, Tacchini-Jacquier, Pralong D'Alessio & Verloo, 2019; O'Caoimh et al., 2019; Salvi et al., 2012). Developing high quality ED-based care for these individuals is important, as an ED visit may be considered a "destabilizing event" for a frail older person (Hastings, Purser, Johnson, Sloane & Whitson, 2008, p. 1656), representing a critical period when their health is at risk for rapid deterioration, and signaling the need for specialized focused care in order to mitigate this risk. Frail individuals are at high risk for many adverse health-related declines following an ED visit, which may include unscheduled return visits (URVs) to the ED (Hastings et al., 2008).

URVs are an important measure of quality of ED care for older adults (Pereira et al., 2015). There is debate in the literature about the appropriate timeline for examining URVs. Although EDs often track return visits within 72 hours (Trivedy & Cooke, 2013; Rising, Victor, Hollander & Carr, 2014), this short time frame may not adequately capture true return rates for all ED populations, including older patients. Rising et al. (2014) suggested 9 days as the ideal cut-off point for studying URVs; however, their model is likely a better fit for a younger adult ED population. The work by Pereira et al. (2015) indicated 30 days to be the best time frame for examining ED return visits and relatedness between two visits for an older population.

Age, along with complex medical and social problems, put particular patient groups at higher risk for URVs (Trivedy & Cooke, 2013). Older patients seen in the ED and discharged home (i.e. not admitted to hospital) are at particularly high risk for URVs (Pereira et al., 2015). Older adults are more likely to return to the ED if they felt that their symptoms had not been managed adequately (Uscatescu, Turner & Ezer, 2014; Vat, Common, Laizner, Borduas & Maheu, 2015), if they felt weak and were unable to regain their autonomy (Vat et al., 2015), or if their symptoms prevented them from getting back to doing the things they usually did (Uscatescu et al., 2014). Pereira et al. (2015) found that 25% of older patients return to the ED for closely related clinical conditions.

In recognition of the need for a broader spectrum of care to treat frail older adults and with the aim of reducing adverse outcomes such as URVs, EDs have increasingly employed the services of allied health care professionals, including occupational therapists (Banerjee & Conroy, 2012; Cusick, Johnson & Bissett, 2009; James, Jones, Kempenaar, Preston & Kerr, 2016). Occupational therapists have a unique perspective when considering frailty, more in line with a multidimensional definition of the concept. They tend to include not only physical, but also psychosocial and environmental aspects in their assessments, which often affect the individual's ability to manage activities of daily living (ADLs) and maintain their functional independence (Roland, Theou, Jakobi, Swan & Jones, 2011). Thus, occupational therapists can play an important role in the identification and management of frail clients (Daniels, van Rossum, de Witte & van den Heuvel, 2008; Roland, Theou, Jakobi, Swan & Jones, 2014). Occupational therapy (OT) focuses on the tasks, or occupations, that individuals do every day, the individual's own strengths and deficits, and the environment in which the occupation is done. The research shows that interventions that include OT have a positive effect for frail individuals,

including slowing the process of disability and reducing the risk of adverse outcomes (Provencher, Demers & Gélinas, 2012).

OT's focus on function serves as an excellent complement to the medical care provided by other ED health professionals and has led to the implementation of more OT programs in the ED in recent years (Ergotherapie-urgence, 2019). Although the frailty of patients seen by OT in the ED has yet to be studied, an evaluation of an ED-based physiotherapy service found that 75% of their patients were frail (Crehan, O'Shea, Ryan & Horgan, 2013), indicating a high proportion of frail ED patients might benefit from rehabilitation services.

This study integrates and presents results from prior research that reflect three important concepts: individuals with frailty, occupational therapy practice, and the emergency department setting. To date, there is no known documentation of how many frail older adults are seen by OT in the ED. Learning more about how often and why frail older adults return to the ED, even after addressing their function through OT consultation, adds much-needed information for ED-based OT programs to be proactive in their care of this population by focusing on the factors that may lead to URVs. Reductions in URV rates amongst frail ED patients would benefit both the individual patients and the larger health system. Therefore, the goal of this study was twofold:

1. To review the current research about frailty in the ED and about OT in the ED.
2. To evaluate frailty and URVs amongst patients referred to OT in the ED.

This thesis is organized as follows:

1. Chapter 2 presents an integrative review of the literature examining frailty and OT practice in the ED setting.

2. Chapter 3 describes the methodology used for the current study that is based on the results of the integrative review.
3. Chapter 4 reports the results of the study.
4. Chapter 5 discusses and interprets the findings then applies them to clinical practice.

Chapter 2: Literature Review

This literature review seeks to examine and analyze the current research regarding frail individuals in the ED, and then current OT practice in the ED. Subsequently these concepts will be brought together to illustrate the links between OT practice, the ED practice setting, and the unique characteristics and needs of frail older patients. To examine the scope of the available literature, and to allow for comparisons across methodologies, this literature review will take the form of an integrative review, following the process detailed by Whittemore and Knafl (2005).

2.1 Search Strategy

Three databases (CINAHL, Medline, and EMBASE) were searched for research articles that included frailty and the ED, or OT and the ED. (Please see Appendix A for details of the database search strategies.) Two separate searches were completed, rather than one search for all three concepts (frailty, the ED, and OT), to ensure a comprehensive exploration and to allow for synthesis of literature on each topic. The searches were limited to articles published in 2001 or later, as this year was when Fried and her colleagues published their seminal study on the concept of frailty, identifying it as a construct separate from disability and comorbidity (Fried et al., 2001). Articles were excluded if they focused solely on the psychometric properties of a screening or assessment tool, if they were only available as abstracts of conference proceedings or presentations, if they were not available in English, or if they were protocols of upcoming studies. All studies citing these protocols were reviewed to identify any subsequent relevant papers detailing the results. Additionally, all articles that were solely "expert opinion" (e.g. letters to the editor) were omitted. Reference lists of included articles were hand-searched to find possible studies. As well, in the case of the OT in ED literature

search, additional significant research was identified by reviewing the list of evidence at www.ot-ed.com, a website dedicated to knowledge transfer about OT practice in the ED (Ergotherapie-urgence, 2019). (Please see Appendix B for details of the literature searches.)

Data from each article was extracted and organized into a table detailing primary aims of each article, study design or type of article, setting, study population, and results/conclusions, as well as how each study defined or described frailty and descriptions of OT services where applicable. (Please see Appendix C for data extraction table.) Within the tables, data was extracted using a colour coding system to identify and cluster information into themes within each section. Throughout the data evaluation stage, a constant comparison method was used to ensure that extracted data remained true to the original articles. A journal was kept detailing analysis decisions.

2.2 Results

2.2.1 Frailty in the emergency department. Out of the 647 studies identified in the search combining the concepts of frailty and the ED, 28 were included in the review. Please see Appendix B for a flow diagram of the inclusion/exclusion process, and Appendix C for details of the included studies. Twenty-one of the included studies were quantitative, one was qualitative, one mixed methods, and five were review articles.

More than half of the studies pertaining to frailty in the ED did not measure or define frailty, merely using the term “frail” as a descriptor (n=10), or defined/described frailty in a way that did not align with one of the established theories of frailty (n=5). The remainder of the articles defined frailty in a way that aligned with one of the major theories of frailty, such as the frailty phenotype or the accumulated deficits theory of frailty (n=4), or used a standardized frailty assessment tool (n=9).

Three themes were identified during analysis of the frailty/ED papers, including:

1. complexity of the frail individual presenting to the ED,
2. challenges of managing frail patients in the ED, and
3. strategies for managing frail patients in the ED.

2.2.1.1 ***Theme 1: Complexity.*** "Complex" was a word used frequently to describe frail older ED patients. This complexity took the form of comorbidity, polypharmacy, atypical presentations, cognitive or sensory impairments, falls or mobility concerns, impairments in function, or other factors. It is important to note that frailty is not synonymous with any of these factors; one may be frail without having comorbidity, polypharmacy, etc. and vice versa. However, there tended to be overlap between these factors and frailty, leading to these concepts appearing together regularly in the literature.

Comorbidity, defined as the presence of more than one distinct condition in an individual or the general disease burden a person carries, was common amongst older ED patients (Fox et al., 2016; Provencher et al. 2016). Hand in hand with comorbidity, the frail older ED population often had polypharmacy, or the use of multiple medications simultaneously, complicating their ED visit (Banerjee & Conroy, 2012; Fernández-Alonso & Martín-Sánchez, 2013). It was noted to be difficult for ED health care providers to obtain a clear medication history from an older ED patient with frailty because of the intricacy of this history or due to cognitive, sensory or communication impairments (Ellis, Marshall & Ritchie, 2014).

The incidence of cognitive impairment was higher in frailer populations (Provencher et al., 2015), and was frequently cited as a factor in the care of frail patients attending the ED (Banerjee & Conroy, 2012; Ellis et al., 2014; Fernández-Alonso & Martín-Sánchez, 2013; Fox et al., 2016; Lee et al., 2015; Salvi et al., 2008; Salvi, Rossi,

Lattanzio & Cherubini, 2017). Cognition may be impacted by the presence of dementia (Fox et al., 2016) or delirium, or sometimes both (Banerjee & Conroy, 2012; Briggs, Coughlan, Collins, O'Neill & Kennelly, 2013; Ellis et al., 2014). The busy, noisy, stimulating environment of an ED can have a deleterious effect on a frail person with sensory or cognitive impairments (Bharathan et al., 2007). Cognitive impairment was associated with an increased risk of adverse outcomes in those who were frail and attended the ED (Briggs et al., 2013; Provencher et al., 2015; Vivanti, McDonald, Palmer & Sinnott, 2009).

According to the studies included in the review, patients with frailty often presented to the ED with non-specific or vague symptoms (Banerjee & Conroy, 2012; Ellis et al., 2014; Fernández-Alonso & Martín-Sánchez, 2013), which may have indicated the presence of multiple simultaneous problems, or an unclear correlation between illness and presentation (Ellis et al., 2014). This may have been interpreted by ED staff as inability to manage at home (Rutschmann et al., 2005). Atypical presentations complicated the process of triaging a patient (Fernández-Alonso & Martín-Sánchez, 2013; Rutschmann et al., 2005; Salvi et al., 2008), gathering history (Banerjee & Conroy, 2012), making a diagnosis, or selecting an appropriate treatment (Brouns et al., 2014).

There was an association between falls and frailty in ED patients (Banerjee & Conroy, 2012; Briggs et al., 2013); Crehan et al. (2013) found that in their population of individuals presenting to the ED with a fall, 75% were frail. In fact, some authors suggested that the presence of falls alone indicated that an individual is frail (Ellis et al., 2014; Fox et al., 2016). Frailty can be associated with muscle deterioration/weakness, poor foot placement, or impairments in sensation (Vivanti et al., 2009), increasing an individual's risk of falls. Fear of falling, also known as poor fall efficacy, was also

associated with frailty, as was the use of a walking aid, such as a cane or a walker (Provencher et al., 2016). The phenotypic model of frailty includes a specific measure of slow walking speed (Fried et al., 2001), which was shown to be of particular predictive significance when looking for frailty in ED patients (Stiffler, Finley, Midha & Wilber, 2013).

Loss of functional independence was associated, but not synonymous, with frailty (Rodríguez-Mañas et al., 2013). Despite this, several studies used disability or dependence in ADLs as a proxy definition of frailty (Briggs et al., 2013; Fox et al., 2016; Iwata, Kuzuya, Kitagawa & Iguchi, 2006; Salvi et al., 2008; Salvi et al., 2017; Yash Pal, Kuan, Koh, Venugopal & Ibrahim, 2017). Frail individuals presenting to the ED sometimes had premorbid or chronic disability (Stiffler et al., 2013), or developed a new functional impairment due to the acute issue that precipitated their ED visit (Fernández-Alonso & Martín-Sánchez, 2013; Provencher et al., 2016). In some cases, they had both, such as when an acute functional decline compounded a previous baseline level of dependence. These functional impairments exacerbated the risk of adverse outcomes within or after ED (Ellis et al., 2014; Martín-Sánchez, Rodríguez-Adrada, Mueller et al., 2017; Martín-Sánchez, Rodríguez-Adrada, Vidan et al., 2017; Yash Pal et al., 2017).

Frail older people attending the ED were at high risk for adverse outcomes (Fox et al., 2016), including hospital admission (Hastings et al., 2008; Lee et al., 2015), transfer to a long-term care facility (Hastings et al., 2008), or death (Hastings et al., 2008; Martín-Sánchez, Rodríguez-Adrada, Mueller et al., 2017; Martín-Sánchez, Rodríguez-Adrada, Vidan et al., 2017). There was conflicting evidence about the relationship between frailty and repeat visits to the ED: while Hastings et al. (2008) found that frailty was not an independent predictor of repeat ED visits, Lee et al. (2015) noted a trend (albeit not

statistically significant) toward increased acute care use (including return visits to the ED) with increasing frailty scores. Their conflicting results may have been due to different follow-up periods, differences in how frailty was measured, or different subsets of the frail older ED population. Even those patients who were frail but could manage their basic ADLs without help were at risk for adverse outcomes; they tended to experience a decline in health-related quality of life after an ED visit for a minor fracture (Provencher et al., 2015) and were at increased risk of a decline in performance of ADLs after a minor injury (Provencher et al., 2016; Sirois et al., 2017).

2.2.1.2 ***Theme 2: Challenges of managing frail patients in the ED.*** The literature pointed to a fundamental mismatch between the complex care needs of older frail patients that take time to fully appreciate and address, and the traditional ED culture of speed and efficiency (Ellis et al., 2014). Usually in the ED, health care professionals appropriately focus on the immediate problem, such as a broken ankle, nausea and vomiting, or an acute derangement in blood chemistry. This focus on singular issues (Banerjee & Conroy, 2012; Fernández-Alonso & Martín-Sánchez, 2013; Rutschmann et al., 2005), along with the ever-present time pressures (Banerjee & Conroy, 2012; Ellis et al., 2014), has led to inadequate care for frail ED attendees. ED health care providers may be guilty of focusing exclusively on the most recent clinical episode and not on the person's longer trajectory (Fernández-Alonso & Martín-Sánchez, 2013). Dawood, Dobson and Banerjee (2011) add that the ED setting, "often associated with … a tendency towards biomedical, as opposed to biopsychosocial, models of care, may not be suited to the care of frail older people" (p. 18).

Additionally, often the physical environment of the ED was not designed with the specific needs of frail patients in mind (Devriendt et al., 2017; Rosenberg et al., 2014).

For example, patients are exposed to excessive noise (Bharathan et al., 2007; Ellis et al., 2014), there is a lack of diurnal variation (Briggs et al., 2013), and ED equipment can be inadequate to accommodate for physical disabilities (Rosenberg et al., 2014).

Insufficient geriatric education has been delivered to ED health care providers (Briggs et al., 2013), which has led to an inability to detect and appropriately deal with the complex needs of this population (Blakemore, 2012), and a lack of confidence or comfort in treating frail patients (Banerjee & Conroy, 2012; Ellis et al., 2014). In some circumstances, this ignorance has extended to ageism or a bias against older people (Banerjee & Conroy, 2012).

The triage process is at the crossroads of the speed-centric ED environment and the lack of education about geriatrics and frailty. The focus of triage is to identify a primary issue as quickly as possible, and so the intricacies of the frail older adult's presentation are often missed (Ellis et al., 2014; Fernández-Alonso & Martín-Sánchez, 2013). At triage, "the importance of functional decline, psychosocial dysfunction and the impact of comorbid conditions on the outcome of elderly patients in the ED are frequently underestimated" (Rutschmann et al., 2005, p. 149). This inattention to complexity has led to an inappropriate management of the frail individual's condition, including concerns about their medical treatment (Brouns et al., 2014; Martín-Sánchez, Rodriguez-Adrada, Vidan et al., 2017) due to their often-atypical presentation.

If adequate screening and assessment was completed and documented, many of these concerns could be allayed. However, as Ellis et al. (2014) point out, "[t]he scientific definitions of frailty … do not lend themselves easily to operationalized tools for the ED." (p. 2037). Multiple instruments have attempted to address this gap, but currently there is no universally accepted screening tool (Fernández-Alonso & Martín-Sánchez,

2013), and frailty screening is rarely completed in ED (Goldstein, Andrews, & Travers, 2012; Provencher et al., 2015; Provencher et al., 2016). Additionally, a comprehensive geriatric assessment is difficult to perform in the ED (Fernández-Alonso & Martín-Sánchez, 2013) due to the time constraints and the culture of the ED setting. Therefore, the literature indicated that few frail ED patients receive this gold standard of care, despite evidence that it leads to more positive outcomes.

Documentation was also an issue in ED when caring for the frail population, including the lack of a universal electronic health record (Banerjee & Conroy, 2012), missed documentation on a frail older person's status (Rodríguez-Molinero, López-Diéguez, Tabuenca, de la Cruz & Banegas, 2006), or the dearth of written advance care directives (Yash Pal et al., 2017). The lack of assessment and documentation of functional status (Rutschmann et al., 2005) can result in ED service providers making inappropriate assumptions about how well a frail person will be able to cope upon discharge from the ED (Rodríguez-Molinero et al., 2006). Alternately, patients may end up being admitted to hospital when they could be managed in the community (Ellis et al., 2014). Although admission is an appropriate plan for some frail patients, often little thought is given to the potential risks of hospitalization (such as iatrogenic functional decline and exposure to infectious diseases) and the ways to mitigate those risks (Conroy et al., 2014).

2.2.1.3 ***Theme 3: Strategies for managing frail patients in the ED.*** The studies included in this review suggested several ways in which EDs can manage the complexity of their frail patients.

The use of multidisciplinary teams is an important adjunct to medical and nursing care for older adults in the ED (Banerjee & Conroy, 2012; Blakemore, 2012; Fox et al., 2016), adding considerable value in care planning, assessing the need for hospital

admission, and evaluating issues common to older patients, such as functional decline, cognitive impairment or breakdowns in social support (Devriendt et al., 2017). Different team members (including specialist nurses, occupational and physical therapists, and social workers) emphasize different clinical concerns, and therefore are suited to address the multiple and complex issues of frail older adults (Ellis et al., 2014).

The gold standard for assessing frail older ED patients is a comprehensive geriatric assessment (CGA) (Banerjee & Conroy, 2012; Conroy et al., 2014; Ellis et al., 2014; Fernández-Alonso & Martín-Sánchez, 2013; Fox et al., 2016). A CGA is defined as "a multidimensional, interdisciplinary diagnostic process to determine the medical, psychological, and functional capabilities of a frail older person in order to develop a coordinated and integrated plan for treatment and long-term follow-up" (Banerjee & Conroy, 2012, p. 17). CGAs are often led by a geriatrician or another physician with specialization in older adults (Banerjee & Conroy, 2012; Blakemore, 2012; Conroy et al., 2014; Fox et al., 2016), but frequently incorporate assessment data provided by other health care professionals. CGAs typically include assessments of multiple domains such as cognition, mobility, ADLs, mood, continence, medications, nutrition/hydration, and social support (Banerjee & Conroy, 2012). The implementation of CGA in the ED has been associated with reductions in rates of hospital admission and subsequent re-presentation to the ED (Conroy et al., 2014).

In situations where a CGA is not feasible, the use of screening and assessment tools specific to the geriatric population helps to identify older adults who are at risk of becoming, and those who are, frail (Hastings et al., 2008; Martín-Sánchez, Rodríguez-Adrada, Mueller et al., 2017; Martín-Sánchez, Rodriguez-Adrada, Vidan et al., 2017; Provencher et al., 2015). These instruments can be roughly categorized into geriatric

screening tools and frailty diagnostic tools. Geriatric screening tools are applied to identify individuals at risk for adverse outcomes but are not sufficient to diagnose frailty. They are useful in the ED, as they are often quicker and easier than full diagnostic tools, can be completed by non-specialists, and can identify those patients that would benefit from more in-depth assessment (Lee et al., 2015). Multiple screening tools have been recommended for use in the ED, including the Identification of Seniors At Risk (ISAR) (Banerjee & Conroy, 2012; Devriendt et al., 2017; Ellis et al., 2014; Fernández-Alonso & Martín-Sánchez, 2013; Lee et al., 2015; Salvi et al., 2008), the Triage Risk Screening Tool (TRST) (Devriendt et al., 2017; Ellis et al., 2014), the Older Adult Resources and Services tool (OARS) (Ellis et al., 2014; Lee et al., 2015; Stiffler et al., 2013); furthermore, there are several other standardized and non-standardized tools in less common use (Devriendt et al., 2017). Unfortunately, no one tool has been universally accepted for the screening of frailty in older people presenting to the ED (Fernández-Alonso & Martín-Sánchez, 2013). The use of frailty diagnostic tools was less commonly cited in the literature and was noted to be difficult to operationalize in the fast-paced ED setting (Ellis et al., 2014). This may be because diagnostic tools require more time and/or expertise to administer. The tools mentioned in the reviewed articles included the Clinical Frailty Scale (CFS) (Lee et al., 2015; Provencher et al., 2015; Provencher et al., 2016; Sirois et al. 2017), the frailty phenotype (Ellis et al., 2014; Martín-Sánchez, Rodríguez-Adrada, Mueller et al., 2017; Martín-Sánchez, Rodriguez-Adrada, Vidan et al., 2017; Stiffler et al., 2013), and the Frailty Index (Fernández-Alonso & Martín-Sánchez, 2013; Hastings et al., 2008; Sirois et al. 2017). (Of note, the latter tool is known to be of greater utility in research than at the bedside, which means its use may have been over-reported in the literature.) Identifying an individual as frail increases the awareness of ED health

care providers that a particular patient is at higher risk of adverse outcomes and allows for the implementation of specialized interventions within and after the ED visit (Martín-Sánchez, Rodriguez-Adrada, Vidan et al., 2017; Provencher et al., 2016; Stiffler et al., 2013). Appropriate care could slow, halt, or even reverse a frail patient's decline in function and "cascade of dependence" (Fernández-Alonso & Martín-Sánchez, 2013, p. 275). However, there was significantly less evidence about treatment and intervention once an ED patient has been assessed and found to be frail.

Modifications to the physical ED environment may improve the match between facility characteristics and the needs of older patients (Salvi et al., 2008). The modifications found in the literature included reductions in ambient noise (Bharathan et al., 2007), the use of age friendly signs, or equipment that is suitable for addressing different mobility and functional abilities. Some locations have devoted a section of their ED to the care of geriatric and/or frail patients (Blakemore, 2012; Conroy et al., 2014), and one study examined an ED solely for older patients (Salvi et al., 2008). This approach, although resource intensive, demonstrated an increased ability to manage frailer older patients in the ED, decreasing admission rates and adverse short- and long-term outcomes (Salvi et al., 2008).

Changes to the institutional environment, in the form of policies and protocols, also had an impact on the care of frail older patients in the ED. The implementation of specific care pathways or algorithms (Conroy et al., 2014; Salvi et al., 2008) and an organizational/systems level commitment to improving geriatric care in the ED (Banerjee & Conroy, 2012) facilitated appropriate care for this population.

Alignment of ED based geriatric services with programs in the community and in the hospital (Conroy et al., 2014; Gorichky, 2015) can help to ensure seamless care for

older adults. Conroy et al. (2014) referred to this as "vertically integrated care pathways" (p. 110). Examples included allowing a CGA performed in the ED to be used as an admission document for a community-based program or service, or signaling the need for a frail patient to be preferentially placed on a geriatric ward upon admission to hospital (Fox et al., 2016). Service integration also occurred through employment of nurses or social workers who coordinate care between the ED and the community (Blakemore, 2012; Conroy et al., 2014; Devriendt et al., 2017; Gorichky, 2015) and who increase the ED knowledge base of community programs and services (Blakemore, 2012). This alignment requires information sharing between the ED, hospitals, community care providers, and out-patient programs (Banerjee & Conroy, 2012), both regarding the mutual clients of these services and the different scopes of practice of each program.

Additionally, the provision of education to ED health care providers about the characteristics and care of older adults (Devriendt et al., 2017; Salvi et al., 2008) helped minimize the gap between the needs of frail patients and the care provided in ED. Education also increased the comfort of health care providers when faced with someone older and frail (Ellis et al., 2014). In fact, staff training may be critical to the provision of safe care to this population (Banerjee & Conroy, 2012).

In summary, the literature points to the complexity of individuals who are frail and present to the ED; these individuals often have multiple comorbidities and polypharmacy, cognitive impairment, non-specific or atypical presentations, falls and mobility issues, loss of functional independence, and high risk for adverse outcomes. The ED environment is poorly matched to the complex characteristics of frail patients due to the focus on speed and efficiency, the physical environment, insufficient geriatric education amongst ED health care providers, lack of screening and assessment, and

inadequate documentation. This leads to inappropriate management of frail ED attendees, including a lack of attention to functional status, and may result in unsuitable discharge or admission to hospital. However, the included studies pointed to ways in which these challenges can be managed, thus improving the care of frail older ED patients. This included screening and assessment to identify those patients in the ED who have frailty, providing CGAs in the ED, improvements in the physical and institutional environment of the ED, and the provision of education about frailty to ED health care providers. The literature also indicated the positive effects of having multidisciplinary teams in the ED, including OT.

2.2.2 Occupational therapy in the emergency department. One hundred and three articles were located during the literature search, thirteen articles of which met the inclusion criteria and pertained to OT in the ED. (See Appendix B for a flowchart of the included articles.) Of these, four were qualitative studies, seven were quantitative, and two were review articles. Five of the studies explored the use of OT as a single discipline consult service, six described OT as part of a multidisciplinary team, and two looked at how OT functioned both individually and as part of a team in the ED. Only two papers mentioned frailty, and both used it merely as a description without further explanation or definition. Four major themes were identified within the papers:

1. Characteristics of patients who are seen by OT in the ED;
2. Focus on function;
3. Discharge planning from the ED; and
4. Outcomes of OT involvement in the ED.

2.2.2.1 ***Theme 1: Patient characteristics.*** OT typically provided service in the ED to individuals who were older (Carlill, Gash & Hawkins, 2002; Cusick et al., 2009;

Harper et al, 2013; James et al., 2016; Smith & Rees, 2004; Spang & Holmqvist, 2015); in fact, many OT programs in the ED specifically targeted senior patients (Davison, Bond, Dawson, Steen & Kenny, 2005; Hendriksen & Harrison, 2001; Shaw et al., 2003).

Mobility problems and falls were common concerns in this population (Carlill et al., 2002; Cusick et al., 2009; Harper et al., 2013; Hendriksen & Harrison, 2001; James et al., 2016; Lee, Ross & Tracy, 2001; Shaw et al., 2003; Smith & Rees, 2004; Spang & Holmqvist, 2015), as well as functional limitations in ADLs (Carlill et al., 2002; Hendriksen & Harrison, 2001). Cognitive and/or communication impairments (Shaw et al., 2003; Spang & Holmqvist, 2015) often complicated the visits of patients referred to the occupational therapist in the ED. Living alone (James et al., 2016; Lee et al., 2001; Smith & Rees, 2004) was also a trend within this population.

The individuals referred to OT in ED often had chronic medical conditions or comorbidities (Cusick et al., 2009; Spang & Holmqvist, 2015). In fact, within the ED, occupational therapists had to be aware of the medical conditions of their patients (James et al., 2016; Smith & Rees, 2004), and at times assisted the medical team in the identification of medical issues through their assessment (Carlill et al., 2002).

In summary, the patient population seen by OT programs in the ED tended to be complex.

2.2.2.2 ***Theme 2: Focus on function.*** Function was one of the primary concerns of OT in the ED (Chown, Soley, Moczydlowski, Chimento & Smoyer, 2016; Cusick et al., 2009; James et al., 2016). To identify the functional needs of their patients (Hendriksen & Harrison, 2001), occupational therapists used a holistic approach, with an emphasis on obtaining a complete picture of the person and their performance of daily activities (Spang & Holmqvist, 2015). Sometimes, standardized assessments (Cusick et

al., 2009; Spang & Holmqvist, 2015) or in-house tools were used (Lee et al., 2001), but often the OT assessment was unstructured.

OT consultation often included assessments of ADLs such as toileting or dressing (Bruun & Nørgaard, 2014; Carlill et al., 2002; Spang & Holmqvist, 2015), and personal factors like cognition (Carlill et al., 2002; Spang & Holmqvist, 2015). Falls risk factors related to task or individual features were often included in the therapist's consideration (Bruun & Nørgaard, 2014; Harper et al., 2013). When providing care in the ED, occupational therapists also contributed a perspective on how environmental factors may impact a person's ability to function safely upon discharge from the ED (Bruun & Nørgaard, 2014; Smith & Rees, 2004). This included factors that facilitate function, such as accessible housing, or that impede function, such as falls hazards in the home (Davison et al., 2005; Lee et al., 2001; Shaw et al., 2003).

Unmet functional needs that could impact patient outcomes were highlighted and rectified through OT consultation (Hendriksen & Harrison, 2001). Upon identification of functional concerns, occupational therapists offered interventions in the form of activity-based compensatory strategies, such as using energy conservation techniques (Harper et al., 2013; Smith & Rees, 2004), or individual-based interventions, such as providing a splint. OT intervention often included the provision of adaptive aids or equipment, including walking aids, bathroom equipment, and dressing aids (Bruun & Nørgaard, 2014; Carlill et al., 2002; Chown et al., 2016; Harper et al., 2013; Hendriksen & Harrison, 2001; Smith & Rees, 2004) or advising home modifications (Chown et al., 2016; Cusick et al., 2009; Smith & Rees, 2004). Some OT programs even utilized home visits to assess the individual's home environment (Cusick et al., 2009). As well, the patient's social

environment was evaluated regarding the availability of social supports (Carlill et al., 2002; Lee et al., 2001; Smith & Rees, 2004).

2.2.2.3 ***Theme 3: Discharge planning.*** The goal of OT intervention was often to support patients to return to their home environment (Carlill et al., 2002; James et al., 2016; Johnson & Cusick, 2009; Smith & Rees, 2004) by focusing on patient function (Chown et al., 2016; Cusick et al., 2009; James et al., 2016). By highlighting and rectifying unmet functional needs (Hendriksen & Harrison, 2001), occupational therapists ensured their patients were able to manage upon discharge, considering individual, environmental, and activity/occupational factors. Occupational therapists often focused on the safety of their patients and the potential risks of discharge from the ED (Chown et al., 2016, James et al., 2016; Lee et al., 2001). Organizing social supports upon discharge was within the scope of the ED-based occupational therapist (Smith & Rees, 2004). This could include community resources, services and programs (Carlill et al., 2002; Cusick et al., 2009; Harper et al., 2013; Hendriksen & Harrison, 2001; Johnson & Cusick, 2009; Lee et al., 2001; Smith & Rees, 2004), to which the occupational therapist could either directly refer a patient, or recommend a patient follow up independently upon discharge from the ED.

The OT effort in discharge planning aided 'flow' of complex patients through the ED (Carlill et al., 2002; Chown et al., 2016; Cusick et al., 2009; Hendriksen & Harrison, 2001; James et al., 2016; Lee et al., 2001). Discharge planning within the ED environment required speed and efficiency on the part of the occupational therapist (James et al., 2016; Spang & Holmqvist, 2015) in order to work effectively within the ED culture.

To facilitate discharge planning, occupational therapists were often members of a team, working alongside other allied health professionals such as physiotherapists (Bruun & Nørgaard, 2014; Davison et al., 2005; Harper et al., 2013; Spang & Holmqvist, 2015) and social workers (Carlill et al., 2002), as well as doctors and nurses. Interdisciplinary collaboration was an important theme in the OT/ED literature (Chown et al., 2016; Smith & Rees, 2004; Spang & Holmqvist, 2015).

Occupational therapists working in the ED regularly collaborated with health professionals in other settings. When discharge to a previous living environment was not possible due to significant barriers to function and safety or other reasons, OT intervention sometimes included facilitating transfer to a different appropriate care setting (Carlill et al., 2002; Chown et al., 2016), such as a subacute rehabilitation facility. Even when a patient required hospital admission from the ED, the occupational therapist occasionally provided services to admitted ED patients awaiting an in-patient bed in the hospital and liaised with in-patient health care teams (Bruun & Nørgaard, 2014).

2.2.2.4 ***Theme 4: Outcomes.*** Involving OT in the care of ED patients provided prevention strategies against adverse secondary consequences (Bruun & Nørgaard, 2014). However, ED-based studies of OT services or multidisciplinary services that include OT showed conflicting results about preventing hospital admissions (Davison et al., 2005; Harper et al, 2013; Shaw et al., 2003; Smith & Rees, 2004). There was also inconsistency in the included studies about the effect of OT services on repeat ED visits. Davison et al. (2005) found that when examining older adults who presented to ED with a fall, an intervention that included an OT assessment of home hazards did not significantly affect the number of repeat ED visits due to falls in the following year. This finding was similar to results from Shaw et al. (2003), who also did not find a change in fall-related ED

presentations in cognitively impaired subjects who received a multifactorial intervention including OT. However, a review of Australian allied health practices in the ED did show a reduction in repeat ED presentations when a multidisciplinary care coordination team was implemented in the ED (Johnson & Cusick, 2009). These varying results may have been due to differences in the makeup of the health care teams, targeted patient populations, or types of interventions. The literature indicated that OT involvement in the ED did enhance patient safety (Bruun & Nørgaard, 2014; Johnson & Cusick, 2009) and reduced the number of falls after an ED visit, but did not affect the number of people who fall (Davison et al., 2005; Shaw et al., 2003). None of these studies considered the frailty of the study subjects, nor were they able to tease out the impact of the OT assessment/intervention specifically. Reasons for return to ED were considered only with respect to falls, not any other factors that may have impacted the study subject's return.

In summary, in the ED, the patient population that derived the most benefit from OT consultation was usually older, with complex functional, mobility and social characteristics. Occupational therapists focused on the function of these individuals, including a patient's own personal factors, the activities or tasks they needed to do, and the environment in which they did these tasks. The assessment and identification of patient function by occupational therapists facilitated discharge planning in the ED, but the research showed conflicting results about the effect of OT consultation on ED patient outcomes.

2.3 Discussion

Frailty is a difficult concept to define; even a panel of internationally renowned experts in the field could not come to a consensus on its definition, nor how to measure it (Rodríguez-Mañas et al., 2013). Additionally, the concept of frailty is evolving as more

research is done in this area. Given this, it is no surprise that the literature on frailty as it relates to the ED was vague and inconsistent. Within the ED literature, the majority of studies either defined or described frailty in a way that did not align with one of the major theoretical models of frailty, or did not measure or define frailty at all, merely using the term 'frail' as a descriptor. This was particularly true of the research regarding OT practice in the ED, in which frailty was rarely mentioned and never defined. Although the OT/ED literature did not often refer to frailty overtly, the characteristics of patients typically referred to OT were complex and similar to those that are frail: older, with falls or mobility problems, with functional limitations, and with chronic medical conditions or comorbidities. In other words, frailty may be a factor in the types of patients who are referred to OT in the ED. This hypothesis, along with the dearth of data regarding frailty amongst OT patients, suggests that further research in this area is indicated.

While the literature in this review regarding frailty in ED patients stressed factors such as comorbidity and polypharmacy, the included studies also acknowledged functional factors like falls and loss of independence. These last two concepts showed up more frequently in the OT/ED literature, which tended to focus more on function, including mobility problems, falls and difficulty performing ADLs, than on medical diagnoses. This is consistent with the tenets of the OT profession and reflects the development of rehabilitation approaches in the area of frailty (Daniels et al., 2008). A contrast could be seen between the biomedical frame of reference used in the ED (Markle-Reid & Browne, 2003) and the biopsychosocial approach of the OT profession (Bergman et al., 2004, as cited in Daniels et al., 2008) in the conceptualization of frailty. This latter approach better matched the multifaceted needs of individuals with frailty, including frail individuals who attend the ED.

Environmental factors played a significant role in the care and outcomes of frail people, particularly in discharge planning from the ED. Occupational therapists include the environment in their holistic assessment of an individual; therefore, they are well suited to address these factors when someone with frailty attends the ED. The physical environment, including home setup and presence or absence of adaptive aids and equipment, could become a facilitator or a barrier to discharge from the ED. Assessing the environment is within the scope of the ED-based occupational therapist. A frail person's social environment, such as the presence of family and friends or community supports, can similarly 'make or break' a discharge plan. The literature indicated that OT consultation helped facilitate connections between frail ED attendees and community services and programs, thereby strengthening their social support with the aim of reducing the risk of adverse secondary outcomes, such as re-presentation to the ED.

Studies included in this review acknowledged the inherent complexity that comes with frailty, which extends beyond the person's physical or medical presentation, including the aforementioned issues regarding function and environmental factors. Complexity is at the heart of the fundamental mismatch between the care needs of frail individuals and the care provided in the ED. Functional impairments, falls or mobility related concerns, breakdowns in social support, and environmental factors all impacted the outcomes of frail older ED patients. Dealing with these concerns effectively requires time, patience, and professionals with specialized training. Often these issues are not identified or managed well in the ED setting, where speed and efficiency are prioritized, and where a focusing on a single problem is common, without consideration of the individual's longer trajectory or non-medical factors that may contribute to their presentation (e.g. environmental, social, or functional factors).

This mismatch may contribute to the adverse outcomes for which frail ED patients are at risk, including falls, hospitalization, institutionalization and death. This is because difficulty maintaining homeostasis in the context of perturbations is a hallmark trait of frailty. An ED visit, in and of itself, may be considered a "destabilizing event" (Hastings et al., 2008, p. 1656), along with whatever precipitated the ED visit, pain or other symptoms, invasive procedures, excess noise, lack of diurnal variation, and a myriad of other factors that are likely to individually or in combination tip the delicate balance of a frail individual's constitution. The included studies identified that even patients who are independent in their ADLs but frail are at risk for adverse outcomes. However, the available research was divided on the impact that frailty can have on repeat ED visits. Involving occupational therapists in the care of ED patients may reduce the risk of adverse secondary consequences, but again, there was conflicting evidence in the research about whether providing OT in the ED reduces the risk of repeat visits to the ED.

The literature emphasized the use of standardized geriatric screening and frailty diagnostic tools to improve care of frail older adults in the ED by identifying patients who are at risk for adverse outcomes. There was a consistent message in the included studies that identification of individuals who are frail and those who are at risk of becoming frail is a necessary first step in their care, but the research also acknowledged that screening and assessment tools are rarely used.

The included studies identified that the needs of complex frail older patients are best served when collaborative care is provided. This theme appeared frequently in the literature, often pointing to occupational therapists working not only with physicians and nurses, but also with other allied health professionals, such as physiotherapists and social workers. The use of multidisciplinary teams is an important adjunct to standard medical

and nursing services, as different team members have diverse clinical foci, and therefore are suited to address the multiple and complex issues of frail older adults (Ellis et al., 2014).

To summarize, this literature review found that frailty was a difficult concept to define in the ED research, but may be a significant factor in the care of older adults in the ED, indicating the need for more research in this area. Frail patients tend to have complex presentations, as do patients seen by OT in the ED, suggesting an overlap between these two populations. The complexity of these frail ED patients tended to cause challenges in their management, potentially leading to adverse outcomes after an ED visit, such as return visits to the ED. However, there were some strategies amongst the included articles that improved the care of this complicated population. These included screening and assessment for frailty in the ED, and the provision of multidisciplinary care, including OT, which focuses on the function and safety of ED patients, and discharge planning from the ED. The included articles were divided on whether frailty or providing OT in the ED had an effect on return visits to the ED.

Chapter 3: Study

The goal of the study conducted for this thesis was to determine the characteristics of patients referred to OT in the ED, and to determine the impact of frailty on URVs in older ED patients.

3.1 Study Objectives

The study sought to answer the following research questions:

3.1.1 Research question 1. What proportion of older non-admitted adults seen by OT in the ED are frail?

3.1.2 Research question 2a. What percentage of older non-admitted adults seen by OT in the ED and discharged to their previous living environment have URVs to the ED within 30 days?

3.1.3 Research question 2b. Is the percentage of older adults seen by OT in the ED who subsequently have URVs to the ED significantly different for frail individuals as compared to non-frail individuals?

3.1.4 Research question 3a. What are the reasons for URVs to the ED by older non-admitted patients seen by OT in the ED who were subsequently discharged to their previous living environment?

3.1.5 Research question 3b. Are the reasons for URVs to the ED different for frail patients as compared to non-frail patients amongst older non-admitted adults seen by OT in the ED who were subsequently discharged to their previous living environment?

3.2 Methods

Ethics approval was obtained through the Alberta Health Research Ethics Board and through Dalhousie University's Health Sciences Research Ethics Board.

3.2.1 Study design and setting. To answer the research questions, a health records review was conducted of patients who were referred to the OT service in the ED of an adult acute care hospital located in one Canadian metropolitan centre between January 1, 2016 and October 31, 2018. This ED sees approximately 80,000 patients annually, 29% of which are older adults (C. Kee, personal communication, August 31, 2020).

In addition to medical care, nursing and OT, the ED in this study also provided access to other health care professionals, including social workers, pharmacists, and Transition Services nurses. Transition Services "provides the link between acute care clients and services available in the community" (Alberta Health Services, 2018), which included making referrals to subacute rehabilitation programs, communicating with assisted living and long term care facilities, and liaising with Home Care programs.

From this ED, there were three main settings to which patients could be transferred: discharge back to their previous living environment (with or without additional support), admission to the hospital, or admission to a subacute rehabilitation facility. Occasionally, patients were discharged to other locations, such as a respite bed at a long term care facility, or a shelter for persons experiencing homelessness.

In the study location, most nursing and physician documentation occurred in the paper chart, while most other health care professionals, including OT, documented digitally.

3.2.2 Occupational therapy services. The ED in this study has provided OT services in some capacity since 2012 using varying models of service delivery.

ED health care providers referred to the OT service when a patient's function was the primary discharge concern. This often included situations in which a patient's

symptoms were affecting their function, after a fall or near fall, when there was a new impairment in the use of one or more limbs, and/or when there were concerns about a patient's function prior to the ED visit. No specific conditions were excluded, but the service did not see patients under the age of 18.

The goals of the OT consult were to identify any functional barriers to discharge back to the patient's home environment by assessing the patient's baseline and current level of function, to determine if there were any functional impairments present at baseline, and to detect any discrepancies between baseline and current function. Baseline function was defined as the patient's function prior to the onset of the injury or illness or other precipitating factor that brought them into ED. Current function was how the patient was functioning at the time of the ED visit or since the injury/illness/other precipitating factor occurred. OT assessments and interventions focused on basic and instrumental ADLs, mobility and falls risk, cognitive function, and home environment (including physical and social factors). The OT consult was conducted by gathering data from the patient's medical chart, receiving verbal reports from other ED medical professionals (e.g. physicians, nurses), conducting a semi-structured patient interview, gathering collateral information from a close informant (if required and if consent was provided by the patient) and observing the patient's current function. The occupational therapist was tasked with forming an impression and making recommendations for discharge disposition based on the results of their assessment. Generally, discharge was recommended when an individual could meet their basic needs in their home environment, with or without additional equipment, modifications or supports. Discharge was not recommended if the individual was unable to meet their needs in their

environment even with additional supports and/or if the situation was believed to be unsafe for them.

3.2.3 Study population: inclusion and exclusion criteria. From the hospital's workload statistics program, which tracks the number and type of interactions between rehabilitation professionals and patients, a list was generated of all patients who had contact with an occupational therapist in the ED. The list of patients from the workload statistics program was linked to the electronic medical records (EMRs) of those patients. The EMRs were reviewed to apply the inclusion and exclusion criteria to each record.

Patients were included in the study if they:

- received face-to-face OT services in the ED;
- were age 65 or older at the time of the index ED visit;
- received a full OT consultation (i.e. where the assessment included screening both the individual's baseline and current function);
- were assigned a frailty score during their index ED visit, or had enough information on their chart to be assigned a frailty score post hoc; and
- visited the ED between January 1, 2016 to October 31, 2018.

On November 1, 2018, a major change in the provision of rehabilitation services to the ED was implemented: physiotherapy services were added in the ED; OT and physiotherapy services were extended to evening and weekend hours; and new referral criteria were implemented. Thus, visits after this date were significantly different and would have introduced confounding variables into the study. January 1, 2016 was chosen as a cut-off date as it was estimated to provide close to the required sample size for the

power calculation based on previous evaluations of the OT program in this ED (Trenholm & Pratt, 2016; Trenholm, 2014).

Patients were excluded from this study if they:

- were seen by the OT service in the ED only after they had an admission order.

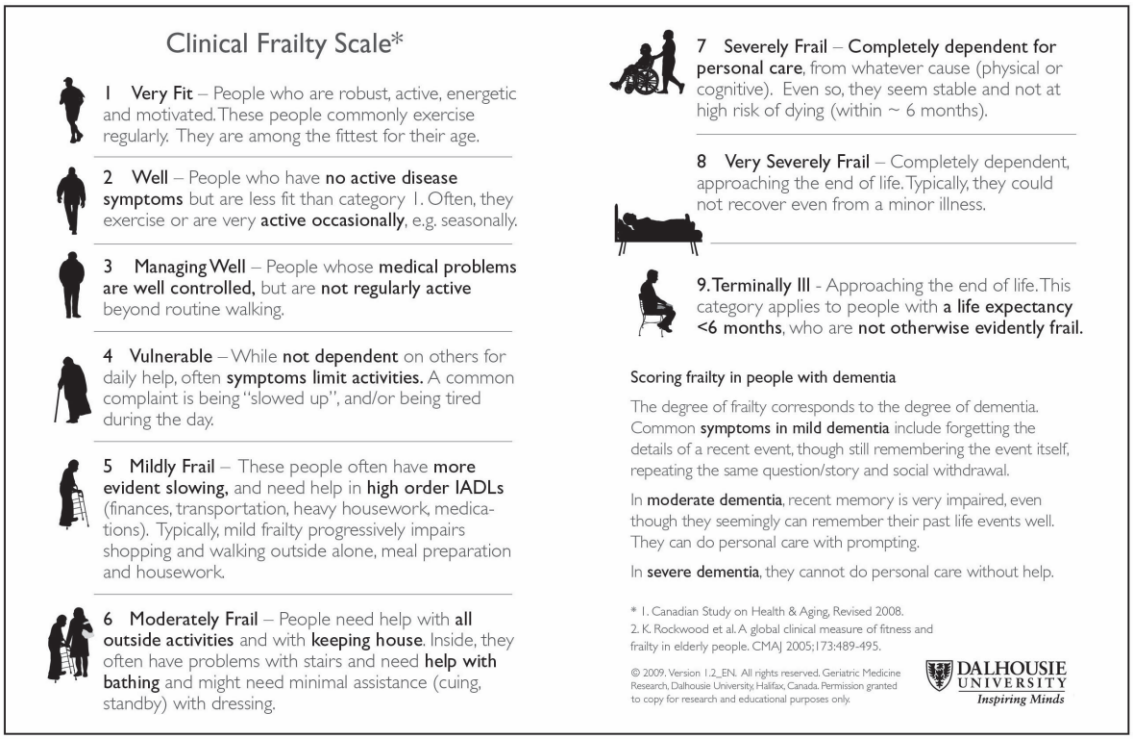
3.2.4 Data collection methods. Study data were collected and managed using REDCap electronic data capture tools, using standardized case record forms generated by the primary investigator.

Data extraction was conducted by the primary investigator and a research assistant to reduce bias and increase rigor of this study. Initially 10 charts were independently evaluated by both individuals to ensure consistency of data collection and agreement of terms. During subsequent data extraction and entry, whenever the research assistant was unsure, the record was verified by the primary investigator.

3.2.5 Outcome measures.

3.2.5.1 ***Clinical Frailty Scale.*** The Clinical Frailty Scale (CFS) (Rockwood et al., 2005) was chosen as the measure of frailty. The CFS is a 9-point ordinal scale, using both pictorial and written descriptions, which is administered by a health care professional using their clinical judgment to categorize the frailty of a patient. This scale takes into consideration the patient's level of activity, how well any chronic conditions are managed, level of support required for basic and instrumental ADLs, life expectancy (in the case of palliation), and cognitive functioning (Moorhouse & Rockwood, 2012). (See Figure 1: Clinical Frailty Scale.)

Figure 1. Clinical Frailty Scale. From "Clinical Frailty Scale" by Geriatric Medicine Research, 2009. https://www.dal.ca/sites/gmr/our-tools/clinical-frailty-scale.html. Copyright 2009 by Geriatric Medicine Research, Dalhousie University. Reprinted with permission.



The OT documentation included a CFS score for the majority of patients seen between October 2017 and October 2018. If a patient didn't have a CFS score assigned at the time of the initial ED visit (hereafter referred to as their "index visit"), a score was derived post hoc from the OT documentation and charting completed by the ED physician, nursing staff, or other health care professionals. Applying the CFS retrospectively using information from the patient's chart is a method which has been proven to show substantial agreement with interview-based scoring (Davies, Whitlock, Gutmanis & Kane, 2018). Any patients who had not previously been assigned a CFS score and could not be given a post hoc score due to lack of pertinent information in their

medical record were excluded from analysis. Patients scoring 1 – 4 ("Very Fit" to "Vulnerable") on the CFS were considered non-frail, while those scoring 5 – 9 ("Mildly Frail" to "Terminally Ill") were considered frail (Dent, Kowal & Hoogendijk, 2016).

3.2.5.2 ***Additional patient information.*** Additional information was extracted from the patient's index visit EMR and paper chart that could potentially affect their discharge disposition and return rate to the ED. Although frailty was the primary factor of interest for this study, other patient factors were examined, including age, sex (male, female), residence (independent living, assisted living, long term care, or other), and, if living independently, the presence or absence of publicly funded Home Care services and whether the patient lived alone or with others. In addition, factors related to their index ED visit were extracted; this information included the number and type of OT intervention(s) provided (equipment, referrals within the ED, community referrals, education [other than teaching regarding the use of equipment]) and consults to other health care professionals within the ED (Transition Services, social work, pharmacy).

3.2.5.3 ***Unscheduled return visits.*** URVs were defined as visits to the ED that could not be explained by scheduled reasons, such as to obtain delayed test results or to see a specialist in the ED. In cases where the patient had more than one URV in the 30 days following the index ED visit, only the first URV was examined. Multiple URVs were not included in the analysis because they had the potential to skew the study data by placing a greater emphasis on outlying individual patients who were frequent users of the ED (Trivedy & Cooke, 2013).

3.3 Research Question 1

What proportion of older non-admitted patients seen by OT in the ED are frail?

3.3.1 Determining the proportion of frail patients. Descriptive statistics were used to determine the proportion of frail individuals within the sample population (number of frail individuals/total number in sample population). Characteristics of the frail population were compared to the non-frail population, using the chi-square statistic to compare categorical variables. This was to determine whether there were any patient characteristics associated with frailty amongst the study population.

3.4 Research Questions 2a & 2b

What percentage of older non-admitted patients seen by OT in the ED and discharged to their previous living environment have URVs to ED within 30 days? Is the percentage of those who have URVs to ED significantly different for frail patients as compared to non-frail patients?

3.4.1 Determining rates of URVs. A subset of the data from Research Question 1 was used to answer Research Questions 2a and 2b, including only patients who were discharged from the ED on their index ED visit. Patients who were admitted could clearly be identified and excluded, but in order to determine patients who were discharged to a location other than their home, EMR documentation by other health care professionals was studied. In particular, Transition Services' notes were reviewed, as these nurses were involved any time a patient was transferred to a subacute rehabilitation facility or respite bed at a long term care facility. These patients were excluded from further analysis.

Each patient's visit history was examined within the EMR. Patients were included in the analysis if they had at least one subsequent return visit to an ED within 30 days of the index visit. Return visits to the ED were examined to determine whether they were URVs; if so, they met the inclusion criteria.

Prior to determining the percentage of patients in the sample population who had a URV, the proportions of patients discharged from the ED on their index visit and patients who were discharged to their previous living environment was determined through descriptive statistics. Additional analysis was conducted to determine if there were any patient characteristics associated with discharge disposition (i.e., discharged versus admitted, discharged to previous living environment versus to other living environment). Descriptive statistics were used to calculate the percentage of patients in the sample population who had a URV to the ED within the 30 days following their index ED visit, and to determine if any patient characteristics were associated with URVs. Analysis was completed to examine whether there were any significant relationships between patient characteristics and number of days to URV. Finally, the relationship between the frailty score and discharge disposition was examined to determine if there were any significant differences between frail and non-frail patients with regards to discharge disposition. Statistical significance for all of these steps was calculated using chi-square for all categorical variables, ANOVA for the continuous variables as compared to categorical variables, and Spearman's rho for correlations between continuous variables.

3.5 Research Questions 3a & 3b

What are the reasons for URVs to the ED by older non-admitted patients seen by OT in the ED who were subsequently discharged to their previous living environment? Are the reasons for URVs to the ED different for frail patients as compared to non-frail patients amongst older non-admitted adults seen by OT in the ED who were subsequently discharged to their previous living environment?

All patients included in analysis for Research Questions 2a and 2b (i.e. patients who had a URV to ED within 30 days of their index ED visit) were included in the analysis for Research Questions 3a and 3b.

3.5.1 Determining reason(s) for return to ED. The reason(s) for the patient's index ED visits and URV were extracted from the EMR and the paper chart. Descriptions of the reason for each visit were extracted from several sources: the triage nurse's documentation (including the patient's report of why they came to the ED); documentation by the bedside nurse; the ED physician's documentation; the OT documentation; and documentation from any consultants or specialists (e.g. Transition Services, social work, pharmacy, or medical consultants).

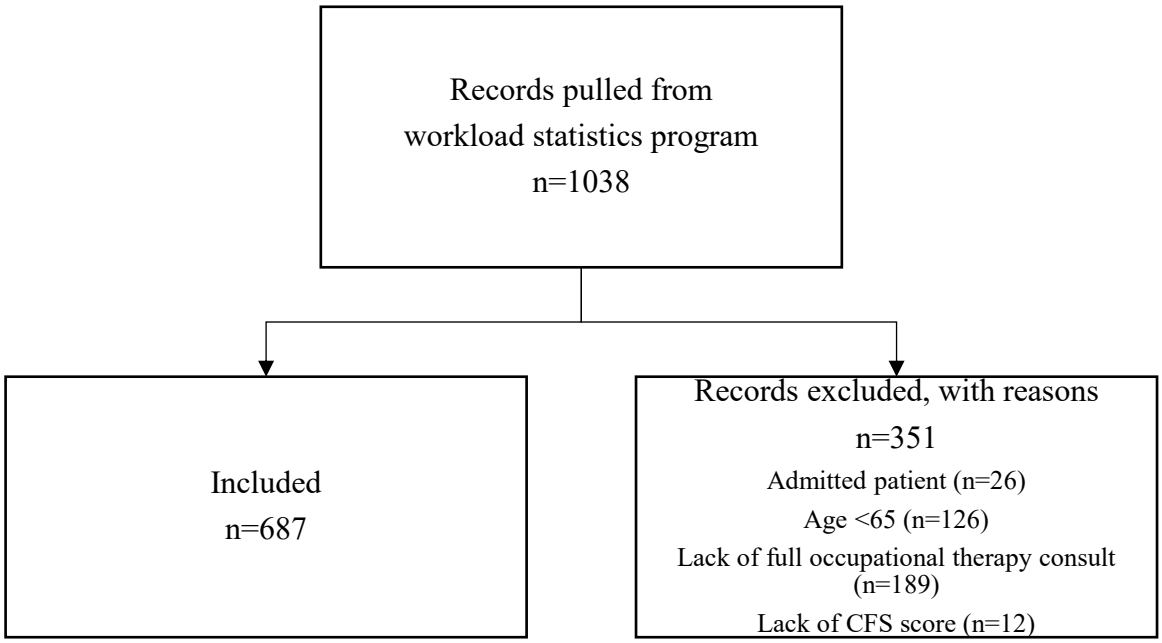
The documentation on the reason(s) for the ED visits was text, thus this qualitative information was analyzed using the framework analysis approach (Ritchie & Spencer, 1994). Framework analysis provides structure and coherence to the process of evaluating qualitative data through the steps of familiarization, identifying a thematic framework, indexing themes, creating a chart of themes and subthemes, and then mapping and interpreting the results. Familiarization was achieved through the repeated review of all of the qualitative data for content. Initial themes were identified and coded. These themes were then grouped to reflect larger over-arching thematic units and structured into a thematic framework. A research assistant and the primary investigator's thesis advisor each reviewed the data from 20 patients, 10 frail and 10 not frail, to ensure the thematic framework was comprehensive enough to reflect all of the themes found in the data, but allowed for an inductive process to include additional themes when necessary. The thematic framework was reapplied to the data, indexing and coding all of the themes systematically. A chart was created to extract essential information contributing to each

patient's ED presentation so that the most salient themes could be visualized and synthesized. Frail and non-frail patients were grouped separately to compare and contrast differences between the two populations. Finally, the chart data was mapped to create a typology of patients and assess the relationships between frailty and reasons for URVs.

Chapter 4: Results

A total of 1038 records were pulled from the workload statistics program. Patient records were excluded by applying the inclusion/exclusion criteria (26 were excluded due to being admitted patients, 126 due to age, 189 due to lack of a full OT consultation, and 12 due to lack of CFS score and inability to score the CFS post hoc). A total of 687 patients met all inclusion criteria (seen by OT in the ED between the dates of January 1, 2016 and October 31, 2018, over the age of 65, received full OT consult, and received CFS score). Please refer to Figure 2 for the patient flow diagram.

Figure 2. Flow diagram of records of patients age 65 and older seen by occupational therapy in the emergency department, with reasons for exclusion from study.



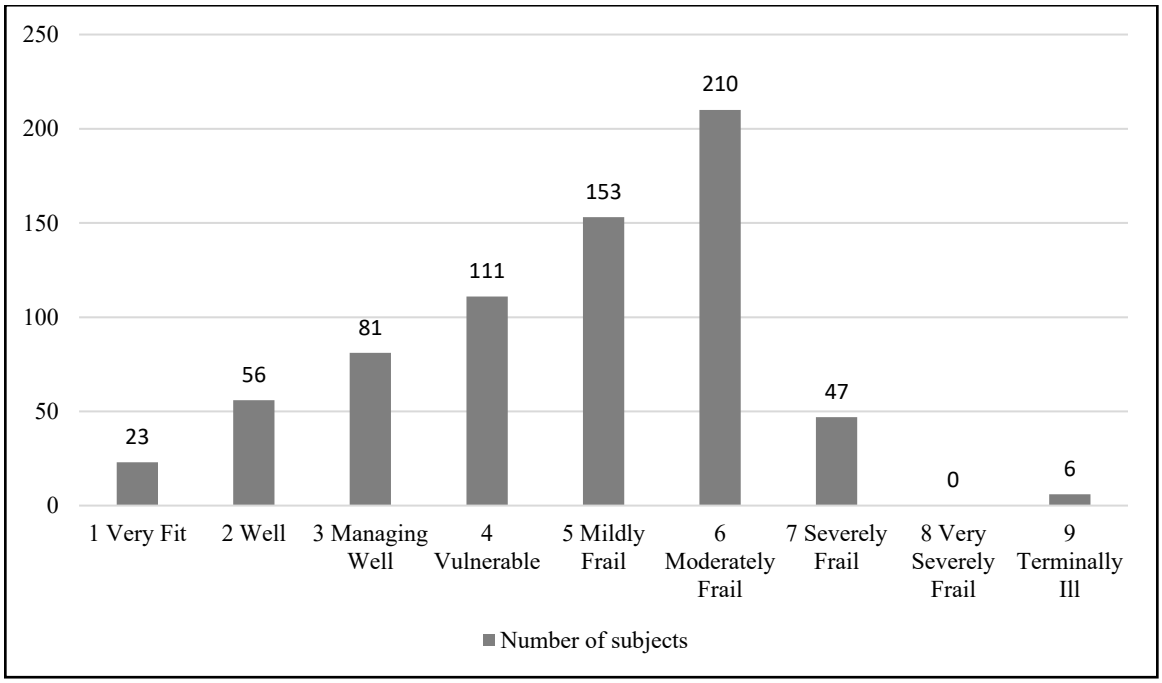
The mean age of all included patients was 84.1 years (standard deviation of 7.5 years; range 65.3 to 103.8 years). The CFS score was documented during the index ED visit for 194 patients (28.2%); the remaining 493 (71.8%) had enough data to assign a post hoc CFS score.

4.1 Research Question 1

What proportion of older non-admitted patients seen by OT in the ED are frail?

4.1.1 Frailty amongst patients seen by OT in the ED. Of the patients who met the inclusion criteria, 416 (60.6%) were considered frail and 271 (39.4%) were not frail. Figure 3 shows the distribution of CFS scores.

Figure 3. Clinical Frailty Scale Score of patients age 65 and older seen by occupational therapy service in the emergency department, n=687.



4.1.2 Other characteristics of patients seen by OT in the ED. This population was predominantly female (66.8%). Most resided in independent living (92.4%); of these, about half lived with others (46.6%), and about half were connected with publicly funded Home Care (47.7%).

Table 1 details patient characteristics of the study population.

Table 1. Characteristics of patients age 65 and older seen by occupational therapy in the emergency department, n=687.

Characteristic	**n (%)**
Clinical Frailty Scale score	
Documented in electronic medical record	194 (28.2)
Score 1-4 (Not frail)	271 (39.4)
Score 5-9 (Frail)	416 (60.6)
Age	
65-74	98 (14.3)
75-84	239 (34.8)
85-94	319 (46.4)
95+	31 (4.5)
Female	459 (66.8)
Type of residence	
Independent living	635 (92.4)
Lived alone	339 (53.4)
Received Home Care	303 (47.7)
Assisted living	47 (6.8)
Long term care	4 (0.6)
Other housing	1 (0.1)
Type of occupational therapy intervention(s) provided [a]	
Equipment	180 (26.2)
Referrals to other professionals in the ED	460 (67.0)
Community referrals	129 (18.8)
Education	207 (30.1)
Consults by other ED health care professionals [b]	
Transition Services	530 (77.1)
Social work	30 (4.4)
Pharmacy	17 (2.5)

ED = emergency department

[a] Patients could receive more than one intervention; therefore, numbers do not add to the total.

[b] Patients did not always receive other consults; therefore, numbers do not add to the total.

4.1.3 Frail versus non-frail patient characteristics. The characteristics of the frail population were compared to the non-frail population to determine whether frailty

was associated with any other variables. Please see Table 2 for details. Values significant at p <0.05 are italicized.

Table 2. Patient characteristics of older non-admitted patients seen by occupational therapy in the emergency department, examining associations with frailty.

	Non-frail patients (CFS score 1-4) n=271	**Frail patients (CFS score 5-9) n=416**	**p-value**
Age in years, n (%)			
65 – 74	55 (20.3)	43 (10.3)	*<0.00001*
75 – 84	109 (40.2)	130 (31.2)	
85 – 94	101 (37.3)	218 (52.4)	
95 +	6 (2.2)	25 (6.0)	
Female, n (%)	178 (65.7)	281 (67.5)	0.61
Type of residence, n (%)			
Independent living			
Lives alone	131 (48.3)	208 (50.0)	*<0.00001*
Lives with others	136 (50.2)	160 (38.5)	
Assisted living	3 (1.1)	44 (10.6)	
Long term care	0 (0.0)	4 (1.0)	
Other	1 (0.4)	0 (0.0)	
Home Care client, n (%)	34 (12.5)	320 (76.9)	*<0.00001*
Type of OT interventions, n (%) [a]			
Equipment	97 (35.8)	83 (20.0)	*<0.00001*
ED referrals	145 (53.5)	315 (75.7)	*<0.00001*
Community referrals	65 (24.0)	64 (15.4)	*0.005*
Education	71 (26.2)	136 (32.7)	0.07
Number of OT interventions, n (%)			
None	36 (13.3)	44 (10.6)	0.84
One	130 (48.0)	208 (50.0)	
Two	73 (26.9)	110 (26.4)	
Three	26 (9.6)	45 (10.8)	
Four	6 (2.2)	9 (2.2)	

	Non-frail patients (CFS score 1-4) n=271	Frail patients (CFS score 5-9) n=416	p-value
Consults to other ED health care professionals, n (%) [b]			
Transition Services	167 (61.6)	363 (87.3)	*<0.00001*
Social Work	10 (3.7)	20 (4.8)	0.48
Pharmacy	7 (2.6)	10 (2.4)	0.88

CFS = Clinical Frailty Scale; OT = occupational therapy; ED = emergency department
[a] Patients could receive more than one intervention; therefore, numbers do not add to the total.
[b] Patients did not always receive other consults; therefore, numbers do not add to the total.

Comparing the frail to the non-frail population, there was a statistically significant relationship between frailty and type of residence, with frail individuals being much more likely to reside in assisted living or long term care than non-frail individuals. Frail patients were also significantly more likely to receive Home Care services. Also, the frail population was significantly older.

4.2 Research Question 2a

What percentage of older non-admitted patients seen by OT in the ED and discharged to their previous living environment have URVs to ED within 30 days?

4.2.1 Patient characteristics associated with discharge. Of the patients seen by OT in the ED, 486 patients (70.7%) were subsequently discharged from the ED on their index visit. Please see Table 3 for analysis of patient characteristics associated with discharge.

Table 3. Patient characteristics of older patients seen by occupational therapy in the emergency department, examining associations with discharge on index emergency department visit.

	Patients discharged n=486	**Patients admitted n=201**	**p-value**
Age in years			
Mean (standard deviation)	84.0 (7.5)	84.3 (7.8)	0.73
Range	65.4 – 100.8	65.3 – 103.8	
Female, n (%)	340 (70.0)	119 (59.2)	*0.006*
Type of residence, n (%)			
Independent living			
Lives alone	245 (50.4)	94 (46.8)	0.33
Lives with others	209 (43.0)	87 (43.3)	
Assisted living	28 (5.8)	19 (9.5)	
Long term care	4 (0.8)	0 (0.0)	
Other	0 (0.0)	1 (0.5)	
Home Care client, n (%)	227 (46.7)	127 (63.2)	*0.000085*
OT interventions, n (%) [a]			
Equipment	172 (35.4)	8 (4.0)	*<0.00001*
ED referrals	274 (56.4)	186 (92.5)	*<0.00001*
Community referrals	123 (25.3)	6 (3.0)	*<0.00001*
Education	172 (35.4)	35 (17.4)	*<0.00001*
Number of OT interventions, n (%)			
None	72 (14.8)	8 (4.0)	*<0.00001*
One	186 (38.3)	152 (75.6)	
Two	143 (29.4)	40 (19.9)	
Three	70 (14.4)	1 (0.5)	
Four	15 (3.1)	0 (0.0)	
Consults to other ED health care professionals, n (%) [b]			
Transition Services	365 (75.1)	165 (82.1)	*0.047*
Social Work	19 (3.9)	11 (5.5)	0.36
Pharmacy	10 (2.1)	7 (3.5)	0.27

OT = occupational therapy; ED = emergency department

[a] Patients could receive more than one intervention; therefore, numbers do not add to the total.

[b] Patients did not always receive other consults; therefore, numbers do not add to the total.

Patients who already received Home Care services were more likely to be admitted on their index ED visit.

Most individuals were discharged to their previous living environment (76.3%). Individuals who were discharged to other environments, such as a subacute rehabilitation facility, were excluded from further analysis. Table 4 details patient characteristics associated with discharge to the previous living environment versus other living environments.

Table 4. Patient characteristics of older non-admitted patients seen by occupational therapy in the emergency department who were discharged on their index emergency department visit, examining associations with discharge to previous living environment.

	Patients discharged to previous living environment n=371	**Patients discharged to other living environments n=115**	**p-value**
Age in years			
Mean (standard deviation)	83.8 (7.7)	85.0 (6.7)	0.14
Range	65.4 – 100.8	68.8 – 100.7	
Female, n (%)	248 (66.8)	92 (80.0)	*0.007*
Type of residence, n (%)			
Independent living			
Lives alone	176 (47.4)	69 (63.3)	0.06
Lives with others	169 (45.6)	40 (36.7)	
Assisted living	22 (5.9)	6 (5.2)	
Long term care	4 (1.1)	0 (0.0)	
Other	0 (0.0)	0 (0.0)	
Home Care client, n (%)	167 (45.0)	60 (52.2)	0.18
OT interventions, n (%) [a]			
Equipment	165 (44.5)	7 (6.1)	*<0.00001*
ED referrals	166 (44.7)	108 (93.9)	*<0.00001*
Community referrals	117 (31.5)	6 (5.2)	*<0.00001*
Education	149 (40.2)	23 (20.0)	*0.000078*

	Patients discharged to previous living environment n=371	Patients discharged to other living environments n=115	p-value
Number of OT interventions, n (%)			
None			
One	70 (18.9)	2 (1.7)	*<0.00001*
Two	102 (27.5)	84 (73.0)	
Three	115 (31.0)	28 (24.3)	
Four	70 (18.9)	0 (0.0)	
	14 (3.8)	1 (0.9)	
Consults to other ED health care professionals, n (%) [b]			
Transition Services	255 (68.7)	110 (95.7)	*<0.00001*
Social Work	18 (4.9)	1 (0.9)	0.054
Pharmacy	5 (1.3)	5 (4.3)	*0.048*

OT = occupational therapy; ED = emergency department

[a] Patients could receive more than one intervention; therefore, numbers do not add to the total.

[b] Patients did not always receive other consults; therefore, numbers do not add to the total.

Patients were somewhat more likely to be discharged to an environment other than their home if they lived alone.

4.2.2 Patient characteristics associated with URVs. Of the 371 patients discharged to their own home on their index ED visit, 117 (31.5%) subsequently had a return visit to an ED within 30 days. Two of these visits (1.7%) were considered scheduled visits and were therefore excluded from further analysis, leaving 115 (31.0%) included records. Therefore, of the entire study population (n=687), 16.7% had URVs. The demographics of the patients who had a URV compared to those who did not have a URV are as follows, in Table 5.

Table 5. Patient characteristics of older non-admitted patients seen by occupational therapy in the emergency department who were discharged to their previous living environment on their index emergency department visit, examining associations with unscheduled return visits.

	Patients with URV n=115	**Patients without URV n=256**	**p-value**
Age in years			
Mean (standard deviation)	84.3 (6.9)	83.5 (8.0)	0.34
Range	67.1 – 98.1	65.4 – 100.8	
Female, n (%)	79 (68.7)	169 (66.0)	0.61
Type of residence, n (%)			
Independent living			
Lives alone	55 (47.8)	121 (47.3)	0.99
Lives with others	52 (45.2)	117 (45.7)	
Assisted living	8 (7.0)	14 (5.5)	
Long term care	0 (0.0)	4 (1.6)	
Other	0 (0.0)	0 (0.0)	
Home Care client, n (%)	58 (50.4)	109 (42.6)	0.16
OT interventions, n (%) [a]			
Equipment	50 (34.5)	115 (44.9)	0.80
ED referrals	59 (51.3)	107 (41.8)	0.09
Community referrals	31 (27.0)	86 (33.6)	0.20
Education	34 (29.6)	115 (44.9)	*0.005*
Number of OT interventions, n (%)			
None	20 (17.4)	50 (19.5)	0.06
One	41 (35.7)	61 (23.8)	
Two	34 (29.6)	81 (31.6)	
Three	14 (12.2)	56 (21.9)	
Four	6 (5.2)	8 (3.1)	
Consults to other ED health care professionals, n (%) [b]			
Transition Services	83 (72.2)	172 (67.2)	0.34
Social Work	8 (7.0)	10 (3.9)	0.21
Pharmacy	1 (0.9)	4 (1.6)	0.59

URV = unscheduled return visit; OT = occupational therapy; ED = emergency department

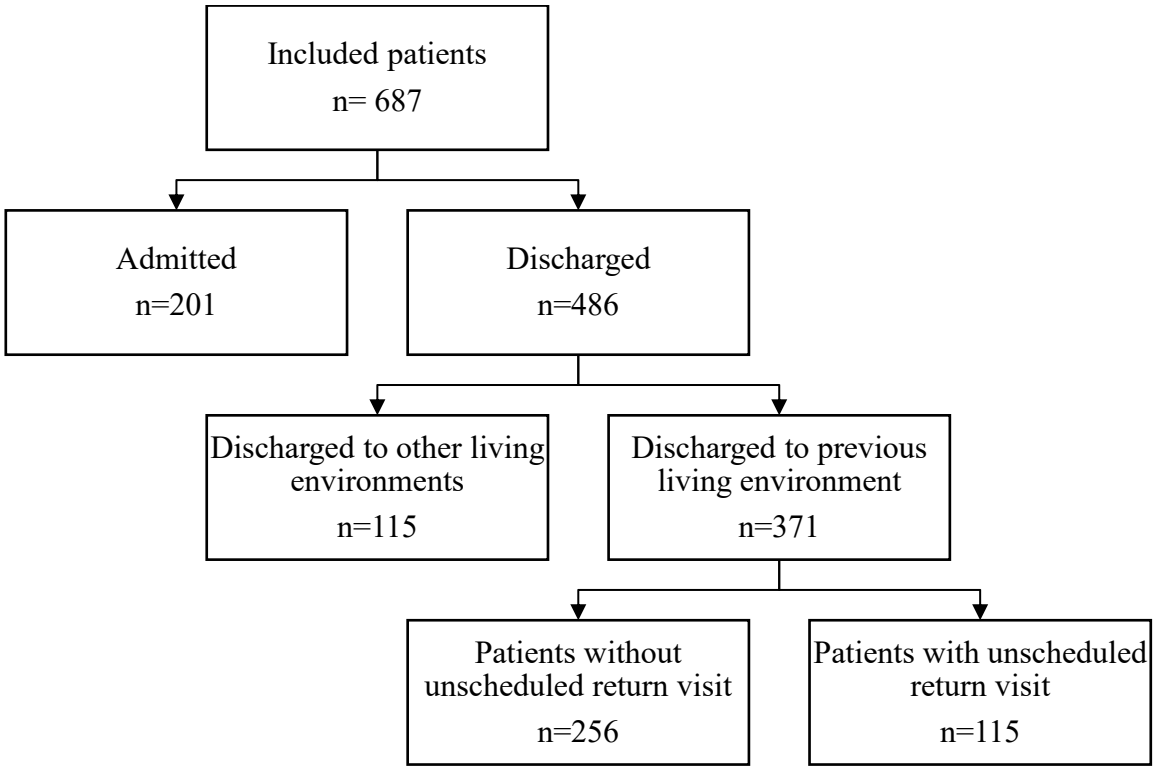
[a] Patients could receive more than one intervention; therefore, numbers do not add to the total.

[b] Patients did not always receive other consults; therefore, numbers do not add to the total.

None of the relationships were statistically significant at $p < 0.05$, except for the provision of education as an OT intervention.

Figure 4 shows the flowchart of patients through the study, according to their discharge disposition and occurrence of URVs.

Figure 4. Patient flow diagram of patients age 65 and older seen by occupational therapy in the emergency department, by discharge disposition and occurrence of unscheduled return visits.



Analysis of patient characteristics and number of days to URV is presented in Table 6.

Table 6. Patient characteristics of older non-admitted patients seen by occupational therapy in the emergency department who were discharged to their previous living environment on their index emergency department visit, examining associations with number of days to unscheduled return visit.

	Number of days to URV	**p-value**
Age in years		0.18
Sex, mean (SD)		
Female	10.87 (8.18)	0.72
Male	10.28 (7.89)	
Type of residence, mean (SD)		
Independent living		
Lives alone	10.11 (7.89)	0.73
Lives with others	11.12 (8.32)	
Assisted living	11.88 (8.25)	
Long term care	N/A	
Other	N/A	
Home Care client, mean (SD)		
Yes	12.10 (8.38)	0.06
No	9.25 (7.53)	
OT interventions, mean (SD) [a]		
Equipment	9.30 (7.40)	0.11
ED referrals	10.64 (7.35)	0.95
Community referrals	9.61 (7.02)	0.39
Education	11.03 (8.46)	0.77
Number of OT interventions, mean (SD)		
None	11.70 (9.78)	0.16
One	11.83 (7.45)	
Two	9.71 (8.85)	
Three	6.64 (3.95)	
Four	14.50 (5.72)	
Consults to other ED health care professionals, mean (SD) [b]		
Transition Services	11.22 (8.15)	0.26
Social Work	11.13 (7.75)	0.87
Pharmacy	5.00 (N/A)	0.48

URV = unscheduled return visit; SD = standard deviation; OT = occupational therapy; ED = emergency department
[a] Patients could receive more than one intervention; therefore, numbers do not add to the total.
[b] Patients did not always receive other consults; therefore, numbers do not add to the total.

There was an association between being on Home Care and the length of time before a URV that approached statistical significance.

4.3 Research Question 2b

Is the percentage of those who have URVs to the ED significantly different for frail patients as compared to non-frail patients?

4.3.1 URVs amongst frail versus non-frail patients. There was no statistically significant difference in the rates of URVs amongst frail versus non-frail patients (p=0.17), although the percentage of frail patients who had a URV was slightly higher (33.9%), as compared to non-frail patients (27.2%). The following table, Table 7, compares the frailty category and discharge disposition. All statistically significant values (with a p-value <0.05) are in italics.

Table 7. Discharge disposition and unscheduled return visit data, examining associations with frailty.

	Non-frail patients (CFS score 1-4) n=271	**Frail patients (CFS score 5-9) n=416**	**p-value**
Discharged, n (%)	214 (79.0)	272 (65.4)	*0.0001*
Discharged to previous living environment, n (%)	165 (77.1)	206 (75.7)	0.73
At least one URV to ED within 30 days, n (%)	45 (27.2)	70 (33.9)	0.17
Number of days to URV			
Mean (standard deviation)	9.2 (7.6)	11.6 (8.3)	0.14
Range	1 - 30	0 - 30	

CFS = Clinical Frailty Scale; URV = unscheduled return visit; ED = emergency department

The only statistically significant relationship found was between frailty and discharge disposition on the index ED visit, with frail patients significantly more likely to be admitted.

On average, the patients who had a URV, frail or not, returned to ED 10.69 days following their index ED visit (standard deviation 8.01; range 0 – 30 days). To further examine the relationship between severity of frailty and number of days to URV, an ANOVA was calculated to compare each CFS score category. There was significant variance within groups, and the p-value was 0.72 (not statistically significant).

4.4 Research Question 3a

What are the reasons for URVs to the ED by older non-admitted patients seen by OT in the ED who were subsequently discharged to their previous living environment?

Using the framework analysis steps suggested by Ritchie and Spencer (1994), the qualitative data was examined.

4.4.1 Thematic framework of reasons for URVs. From the initial themes, a thematic framework was created by collapsing similar subthemes into larger thematic units (see Table 8).

Table 8. Thematic framework of reasons for unscheduled return visits to the emergency department by patients age 65 and older seen by occupational therapy in the emergency department.

Theme	Subtheme	Definition	Examples
Functional factors	Personal physical factors	Factors intrinsic to the patient that were physical in nature	Mobility impairment, weakness, falls
	Personal cognitive and/or psychological factors	Factors that related to the patient's cognitive or psychological status,	Dementia, delirium, anxiety, medication non-

		or to choices the patient had made	compliance, substance abuse

Theme	Subtheme	Definition	Examples
Social and/or environmental factors		Factors that related to the patient's social context or their environment	Caregiver burnout, social isolation, housing issues (e.g. homelessness, eviction)
Medical factors		Factors that indicated the patient had medical issues requiring a doctor's attention	Fractures, abnormal lab results requiring treatment, severe pain, chronic comorbidities, issues with medications
Safety factors		When the patient's physical, cognitive/psychological, or social/environmental factors were so extreme that someone had deemed the patient to be unsafe	Cognitive impairment with behaviours such as wandering, very high falls risk

Many individuals had multiple reasons that led to their presentation to the ED, each with their own code. Additionally, various sources of information identified differing reasons for the ED visit. For example, in one case the triage note indicated a patient presented to the ED due to symptoms of a urinary tract infection, the ED physician diagnosed the infection but also noted that the patient's Parkinson's disease contributed to her presentation, and the OT documentation indicated the patient's daughter brought the patient to the ED because her mother was more confused than normal, had had a fall the previous evening, and was concerned about her safety.

4.5 Research question 3b.

Are the reasons for URVs to the ED different for frail patients as compared to non-frail patients amongst older non-admitted adults seen by OT in the ED who were subsequently discharged to their previous living environment?

4.5.1 Multiple themes amongst frail patients. Generally, frail patients tended to have multiple themes identified as contributing to their repeat presentation to the ED. For example, one non-frail patient presented to the ED on his index visit with musculoskeletal back pain. He was provided with analgesia, was seen by the occupational therapist, who recommended he attend out-patient physiotherapy, and was discharged home. His URV was for an unrelated medical matter (transient abdominal pain) without any other themes. Another patient who was frail also had musculoskeletal back pain on her index ED visit, but that pain led to her having difficulty ambulating. Although it was recommended that she go to a subacute rehabilitation facility as she was unable to meet the needs of her home environment, she was discharged home at risk at the request of her family, who reported her underlying cognitive impairment made it difficult for her to manage in unfamiliar environments. She ended up returning to the ED for the same issue (low back pain and difficulty mobilizing). Her URV was deemed to be due to medical (pain), physical functional (difficulty ambulating) and cognitive functional (dementia) reasons. It was often challenging to discern which factor came first or was a more significant contributor to frail patients' presentations to the ED; however, in non-frail patients, the primary reason for the URV was often easier to identify.

4.5.2 Functional factors. Although almost all of the patients had some medical reason identified for their URV, there tended to be more functional reasons amongst frail patients than non-frail patients. The only patient who returned to the ED for exclusively

functional reasons was frail. While functional impairments sometimes contributed to an individual being deemed as frail, functional decline and frailty are not synonymous (Fried et al., 2004), and the presence of functional impairments at baseline was not sufficient to have the URV coded as being due to function. The functional impairment needed to be a major contributing factor to the person's URV in order to be coded as such. Amongst non-frail patients, all URVs were, at least in part, due to medical reasons. However, there were six frail patients whose URVs were not due to any clear medical reason; that is, they returned to the ED exclusively due to factors related to function, social and/or environmental factors, and/or concerns regarding safety. For example, one frail patient returned to the ED because of increasingly frequent falls without a readily diagnosed medical reason. He had recently been discharged from a community-based program due to his falls, as they felt he could no longer function in this program, but this led to his wife expressing caregiver burnout as she was struggling to provide all of his care in the home. Thus, his URV was due to physical functional and social factors.

4.5.3 Social and/or environmental factors. Within the frail group, social and/or environmental reasons for URVs were more apparent. These reasons appeared more frequently and were often more prominently emphasized in the records of frail patients. One frail patient, for example, returned to the ED with reports of extreme values in her blood sugars, in the context of insulin-dependent diabetes. The patient reported that she was having difficulty affording the costs of her medications, including her insulin, and had no friends or family who could help her out (social factors). Another frail patient attended the ED twice because he was unable to access his third-floor walk-up apartment (environmental factor) in the context of progressively worsening osteoarthritis in his knees.

4.5.4 Safety factors. Concerns about an individual's function and/or social/environmental factors were sometimes so extreme that someone (the patient themselves, their loved ones, Home Care staff, ED health care providers, etc.) felt that it impacted the person's safety. Safety concerns were rare amongst non-frail patients but were identified more frequently in the frail population. Examples included patients wandering outside of their home due to cognitive impairment, Home Care no longer being able to meet the patient's care needs, or general concerns about the individual's welfare.

4.5.5 Relatedness of visits. When relatedness between the index visit and URV were examined, there was no notable difference between frail and non-frail patients. Regardless of their frailty, patients frequently returned to the ED for primarily or secondarily related issues. Primary issues were when the patient returned to the ED for the same problem twice. For example, one non-frail patient came to the ED on their index visit reporting pain and swelling to her right foot. She was diagnosed with cellulitis and discharged home on antibiotics. She returned for her URV because her foot remained painful and edematous despite having completed the course of antibiotics. Secondary issues occurred when the patient did not present with the same issue on their URV, but there was still a clear link between the index visit and URV. For example, one frail patient came to the ED initially due to back pain. She was discharged home with a new prescription for pain medications. These medications increased her confusion upon discharge, and her URV was attributed to delirium.

4.5.6 "Failure to thrive". A recurrent theme not specified within the thematic framework became apparent, that of "failure to thrive", "FTT", "failure to cope", or "failure to manage". These instances appeared much more frequently amongst frail

patients than non-frail. In this study, the terms were used, most often by the ED physician, to designate a patient who had extreme difficulties managing in their home environment for reasons that could not be clearly attributed to a medical cause. For example, one patient presented to ED for their URV because they were sent in by a Home Care nurse due to concerns about decreasing mobility, weakness and falls. It was also noted that the individual's mentation was impaired. Although his spouse had been assisting him, as well as receiving Home Care services, the person's care needs had exceeded what could be provided in the home. A medical work up found nothing of note on his blood work or diagnostic imaging. The ED physician diagnosed him with "FTT" before recommending him for admission to the hospital.

"Failure to thrive" was not included in the thematic framework, as it was felt to reflect more on the health care provider using the term, rather than the patient.

Chapter 5: Discussion

This study sought to understand the prevalence of frailty in patients referred to an occupational therapy service in an emergency department setting, whether patients seen by OT in the ED who were discharged home had subsequent URVs to the ED, whether frailty affected the rate of URVs, and the reasons for which those URVs occurred, both in frail and non-frail patients.

5.1 Frailty and Other Characteristics of Patients Seen by OT in the ED

The population of older ED patients seen by OT had a high proportion of frail individuals, with more than 60% of patients scoring 5 or higher on the CFS. This was similar to previous estimates of frailty prevalence amongst older ED patients (Choutko-Joaquim et al., 2019; O'Caoimh et al., 2019; Salvi et al., 2012), and close to the 75% prevalence of frailty in patients referred to an ED-based physiotherapy service (Crehan et al., 2013). The majority of patients in the current study were mildly or moderately frail, with no patients deemed "Very Severely Frail" (a score of 8 on the CFS). This is in keeping with previous research that has indicated a low prevalence of patients with very severe frailty in the ED (Kaeppeli et al., 2020) (although this study required consent, limiting the number of individuals with advanced dementia and those more likely to be very severely frail).

The high proportion of mildly to moderately frail individuals indicates that frailty may be a factor in referral patterns to OT services in the ED. Individuals who are at the beginning to middle stages of frailty may have functional, cognitive or mobility impairments that make them appropriate for OT consultation, but are not so frail that they lack rehabilitation potential. This agrees with the work of Daniels et al. (2008), who

indicated that rehabilitation may be most effective if targeted at frail individuals before they experience severe disabilities.

The current study also showed that frail patients were more likely to reside in assisted living or long term care, or to have Home Care services if from independent living, indicating that frail ED attendees were more likely to require assistance with ADLs (Ellis et al., 2014; Stiffler et al., 2013). Dependence in ADLs also makes frail ED patients more likely to be referred to OT, which focuses on the performance of daily tasks or occupations (Hendriksen & Harrison, 2001). Because impairments in ADLs can impact an individual's capacity to be discharged from the ED safely (James et al., 2016), it follows that ED-based OT services would see more frail patients. Although previous literature has indicated that frailty and disability are distinct but related concepts (Fried et al., 2004), this study has shown that, amongst patients referred to OT in the ED, frailty and disability often overlap.

A greater number of OT interventions provided to a patient was significantly associated with being discharged from the ED, and also with being discharged to the person's own home rather than another environment. Patients who went home on their index ED visit warranted more OT intervention to support this discharge plan, including equipment, education, and referrals to other services in the community. The relationship between the number of OT interventions provided and URVs approached but did not quite achieve statistical significance.

5.2 Rates of URVs Amongst Patients Seen by OT in the ED

The second research question identified what percentage of patients referred to OT in the ED had a URV to the ED after being discharged to their previous living environment. In this study, 16.7% of the total population had a URV. A similar study

conducted amongst a general older ED population (admitted and non-admitted patients) found a lower 30-day return rate (6.1%) (Pereira et al., 2015). The current study found 31% of patients discharged back to their home environment on their index ED visit returned to an ED within 30 days. Lee et al. (2015) showed a lower 6-month return rate amongst older ED patients who were discharged back to their own home, at 21.6%. However, that study only examined seniors who were independent in their basic ADLs and whose ED visit was due to a minor injury. The results of the current study were within the range found in a rapid evidence review by Trivedy and Cooke (2013) (0.4-43.9%), but that study had varying time scales from two to 180 days.

This study showed that individuals with frailty were more likely to be admitted to hospital or discharged to a location other than their previous living environment, thus excluding them from further analysis of rates and reasons for URVs. This may have had an impact on subsequent findings. Also, individuals who were receiving publicly funded Home Care were significantly more likely to be frail, and significantly more likely to be admitted. This indicates that the ability of frail individuals to live independently was already tenuous, so that an event causing an ED visit destabilized their homeostasis enough to prevent them from being discharged safely (Hastings et al., 2008).

5.3 Rates of URVs Amongst Frail Versus Non-Frail Patients

The percentage of frail patients with a URV was not significantly different as compared to their non-frail counterparts, and there was no statistically significant relationship between being frail and a greater number of days to URV. These findings support previous research showing that frailty is a predictor of many adverse health-related outcomes after an ED visit, but not repeat visits to the ED (Hastings et al., 2008). The concentration of higher numbers of individuals in the current study scoring as

"Vulnerable", "Mildly Frail" and "Moderately Frail" (CFS scores of 4, 5 and 6, respectively) may have led to this finding, as there was a greater number of individuals clustered around the frail/not frail cut-off point. Perhaps using a different cut-point to establish which patients were frail and which were not, or if frailty had been analyzed as a continuum rather than as discrete categories (Markle-Reid & Browne, 2003), the results may have differed. This could be a focus of future research.

Additionally, the demographics of patients who had a URV compared to those that did not have a URV were not statistically significant. This finding led to a closer examination of the number of days between the index visit to the URV. However, additional analysis found no statistically significant relationships between patient characteristics and how long they were able to avoid a repeat visit to the ED. The only relationship approaching statistical significance was that with Home Care: clients receiving Home Care services who had a URV were able to extend the time between the two visits for almost three days longer than those individuals not on Home Care. Although this seems to indicate that the provision of in-home care services supports individuals in keeping them at home longer between ED visits, there is little research in this area.

5.4 Reasons for URVs

Qualitative analysis was completed to determine the reasons for URVs by patients who were seen by the OT service in the ED and subsequently discharged to their previous living environment, and to examine whether frailty had an influence on the reasons for return to the ED. Most individuals from the study population, frail or not, had multifactorial return presentations to the ED. However, frail patients tended to have a greater number of codes for their URVs, indicating a greater complexity in their

presentation, in keeping with findings in previous literature (Banerjee & Conroy, 2012; Fernández-Alonso & Martín-Sánchez, 2013; Provencher et al., 2016). This complexity was highlighted in the presence of functional, social/environmental, and/or safety concerns as contributing factors to the frail individual's reason for coming to the ED. The frail patient's primary complaint was also sometimes difficult to ascertain, perhaps due to the presence of multiple concurrent issues or an elusive connection between the individual's illness and their presentation (Ellis et al., 2014). Often the various facets of their reasons for the ED visit were reflected by various members of the health care team (Banerjee & Conroy, 2012; Ellis et al., 2014). The presence of an occupational therapist on the ED health care team may have increased the recognition of functional concerns. These functional issues could lead to repeat ED presentations (Cusick et al., 2009; James et al., 2016) or the patient's inability to return home safely (Chown et al., 2016; James et al., 2016; Lee et al., 2001).

The use of "failure to thrive" and related terms for some older ED patients was important finding. "Failure to thrive" has previously been defined as "a syndrome of global decline that occurs in older adults as an aggregate of frailty, cognitive impairment, and functional disability, complicated by medical comorbidities and psychosocial factors" (Kumeliauskas, Freutel & Holroyd-Leduc, 2013, pp. 49-50). In this study, these terms were used to designate an individual who had difficulties managing at home, and for whom a clear medical cause could not readily be found. The term was used most often by ED physicians, although there was occasional use by other ED health care providers. Amongst the patients in the current study, "failure to thrive" or similar terms were used in place of a more specific label (such as declining cognition or frequent falls), perhaps indicating the health care provider's narrow understanding of the frail individual's

complex presentation (Rutschmann et al., 2005). The use of a non-descript label rather than a more specific diagnosis found through exploration of an individual's unique functional, cognitive, or complicated medical issues (Tsui, Kim & Spencer, 2020) is one example of how the ED fails to meet the needs of frail older adults. The complexity of the frail individual is not well managed in an ED setting, which promotes a medical model (Dawood et al., 2011), frequently focuses on a single episode rather than the individual's history and context (Fernández-Alonso & Martín-Sánchez, 2013), and prioritizes speed and efficiency (Dawood et al., 2011, Ellis et al., 2014).

The significant associations found in the quantitative analysis plus the themes from the qualitative data paint a picture of a typical patient referred to OT in the ED, which is someone who: scores between 4 and 6 on the CFS ("Vulnerable" to "Moderately Frail"), and is likely to be dependent in at least some of their ADLs (as evidenced by the high prevalence of Home Care). This type of patient may be managing tenuously in their home environment, with functional concerns that put them at risk for admission to hospital or discharge to an environment other than their own home. They have complex presentations to the ED, with social, environmental, functional and/or safety concerns, as well as medical issues. They may be labelled as having "failure to thrive".

The provision of occupational therapy as part of a multidisciplinary team in the ED improves the care of this type of patient by addressing their functional impairments (Chown et al., 2016; Cusick et al., 2009; James et al., 2016), which may otherwise be overlooked (Rutschmann et al., 2005). OT is more likely to treat a frail individual with a biopsychosocial approach, rather than a biomedical one (Bergman et al., 2004, as cited in Daniels et al., 2008), thus better matching their complex presentations (Dawood et al., 2011). Occupational therapists have skills critical in the assessment of frail individuals

and in addressing the factors that place them at risk of adverse outcomes (James et al., 2016), such as repeat ED visits.

5.5 Study Limitations

Although this study included all patients seen by OT in the ED over a 34 month span, it included data only from one program in one ED. Additionally, the majority of the patients referred to the service were seen by a single occupational therapist, who was primarily assigned to this caseload.

It was not possible to obtain all demographic information that could have impacted URV rates or returns, such as socioeconomic status or ready access to a family doctor, as these pieces of information were not readily available in the medical records. However, every effort was made to consider other patient-specific factors that could affect return visits to the ED.

The majority of patients received a CFS score post hoc based on review of their medical records. Although this method has been proven to have substantial agreement with scores assigned during patient interview (Davies, Whitlock, Gutmanis & Kane, 2018), it is possible that scoring the CFS during the individual's ED visit may have revealed information not otherwise recorded in the medical record that could have altered their score. This limitation was mitigated by excluding any patients for whom there was not enough pertinent information in their medical record to confidently derive a CFS score.

5.6 Implications for Practice

Given the significant prevalence of frailty amongst the population referred to OT in the ED and previously identified concerns about their risk of adverse outcomes,

occupational therapists working in this setting should be aware of the impact frailty can have for their patients.

If identified early in an individual's ED visit, the presence of mild to moderate frailty could even be considered a trigger for an OT consult. However, for this strategy to be effective, greater recognition of frailty in the ED setting would be key, including the widespread use of frailty diagnostic tools, such as the CFS.

Frail or not, the individuals who require OT consultation in ED often had URVs to the ED. ED-based occupational therapists therefore should be sensitive to factors that may lead to repeat ED visits, including functional (physical, cognitive or psychosocial), social/environmental, and/or safety concerns. The use of the term "failure to thrive" or similar terms should signify to the occupational therapist that there is likely an underlying issue, such as frequent falls or declining cognition, which is within their purview to further assess and to identify how it may impact the individual's function. Within the ED health care team, occupational therapists have the knowledge and the responsibility to advocate for an appropriate discharge disposition for their frail older patients who have these issues.

5.7 Conclusion

This study sought to determine the prevalence of frailty amongst ED patients referred to OT and found that more than 60% of these individuals were frail. Frailty did not affect the rates of return to the ED within 30 days. However, frail individuals were more complex in the reasons for their secondary presentations to the ED. The complexity that is associated with frailty is difficult to manage in an ED setting, but the provision of occupational therapy services improves the quality of care for these individuals.

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Appendix A

Database Search Strategies

1. Frailty in the emergency department

Database		CINAHL Full Text		PubMed- MEDLINE		EMBASE	
Frailty concept		S1	(frail OR frailty)	S1	(frail[All Fields] OR frailty[All Fields])	S1	(frail OR frailty)
Emergency department concept		S2	("emergency department" OR "emergency room" OR ("accident and emergency"))	S2	(("emergency department"[All Fields] OR "emergency room"[All Fields]) OR "accident and emergency"[All Fields])	S2	'emergency department' OR 'emergency room' OR 'accident and emergency'
Both concepts		S3	S1 AND S2	S3	S1 AND S2	S3	S1 AND S2
Limiters Applied	Published Date	20010101 - 20171231		(("2001/01/01"[PDAT] : "2017/12/31"[PDAT])		(2001:py OR 2002:py OR 2003:py OR 2004:py OR 2005:py OR 2006:py OR 2007:py OR 2008:py OR 2009:py OR 2010:py OR 2011:py OR 2012:py OR 2013:py OR 2014:py OR 2015:py OR 2016:py OR 2017:py)	
	Language	English					
	Age	Aged: 65+ years Aged, 80 or over				Aged Very elderly	
Total		N = 52		N = 203		N = 392	
Grand total		N = 647					

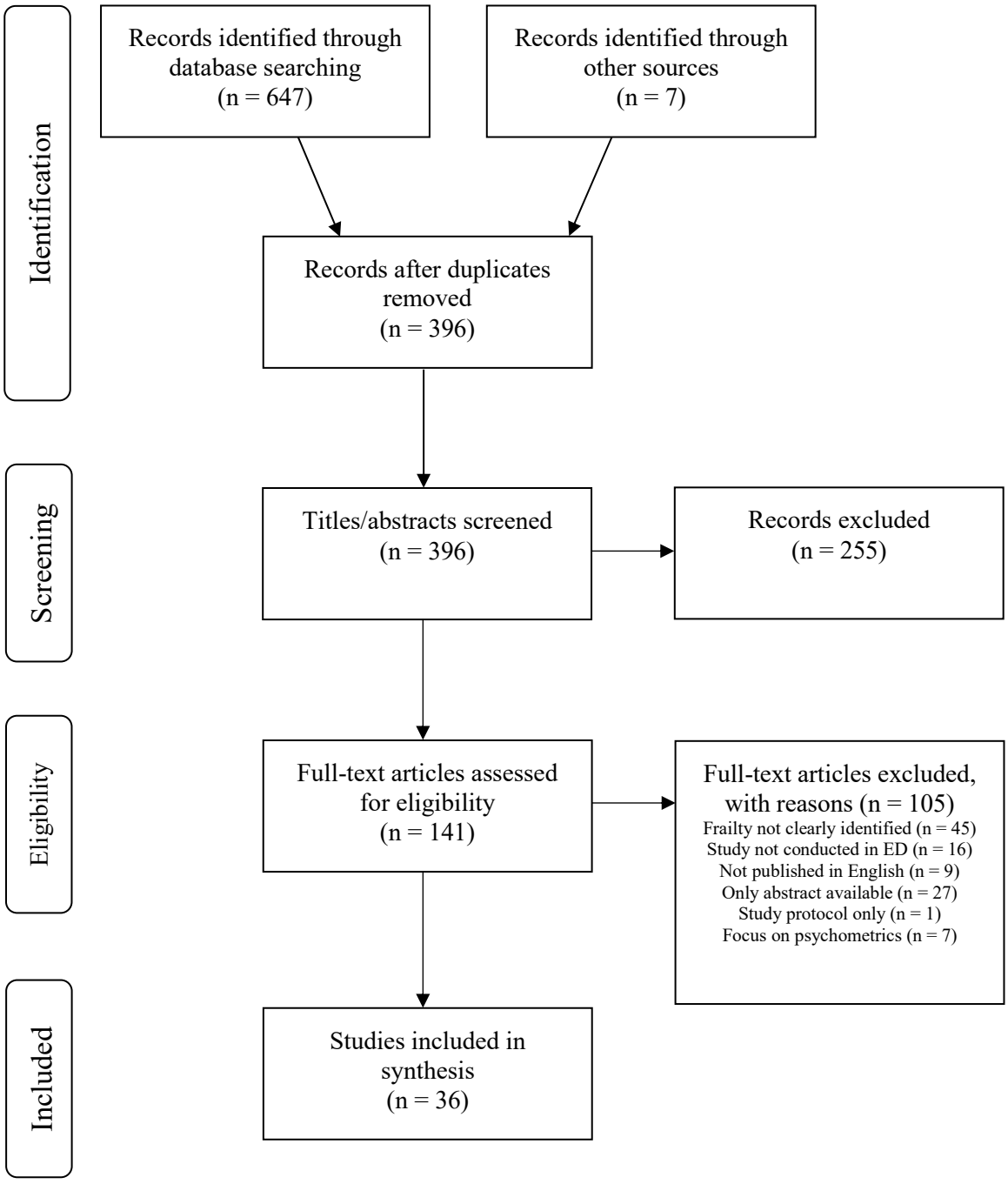
2. Occupational therapy practice in the emergency department

Database	CINAHL Full Text		PubMed- MEDLINE		EMBASE	
Occupational therapy concept	S1	("occupational therapy" OR "occupational therapist")	S1	("occupational therapy" OR "occupational therapist")	S1	("occupational therapy" OR "occupational therapist")
Emergency department concept	S2	("emergency department" OR "emergency room" OR ("accident and emergency"))	S2	(("emergency department"[All Fields] OR "emergency room"[All Fields]) OR "accident and emergency"[All Fields])	S2	'emergency department' OR 'emergency room' OR 'accident and emergency'
Both concepts	S3	S1 AND S2	S3	S1 AND S2	S3	S1 AND S2
Limiters Applied: Published Date	20010101 - 20171231		(("2001/01/01"[PDAT] : "2017/12/31"[PDAT])		(2001:py OR 2002:py OR 2003:py OR 2004:py OR 2005:py OR 2006:py OR 2007:py OR 2008:py OR 2009:py OR 2010:py OR 2011:py OR 2012:py OR 2013:py OR 2014:py OR 2015:py OR 2016:py OR 2017:py)	
Language	English					
Age	No age limit applied					
Total	N = 15		N = 25		N = 63	
Grand total	N = 103					

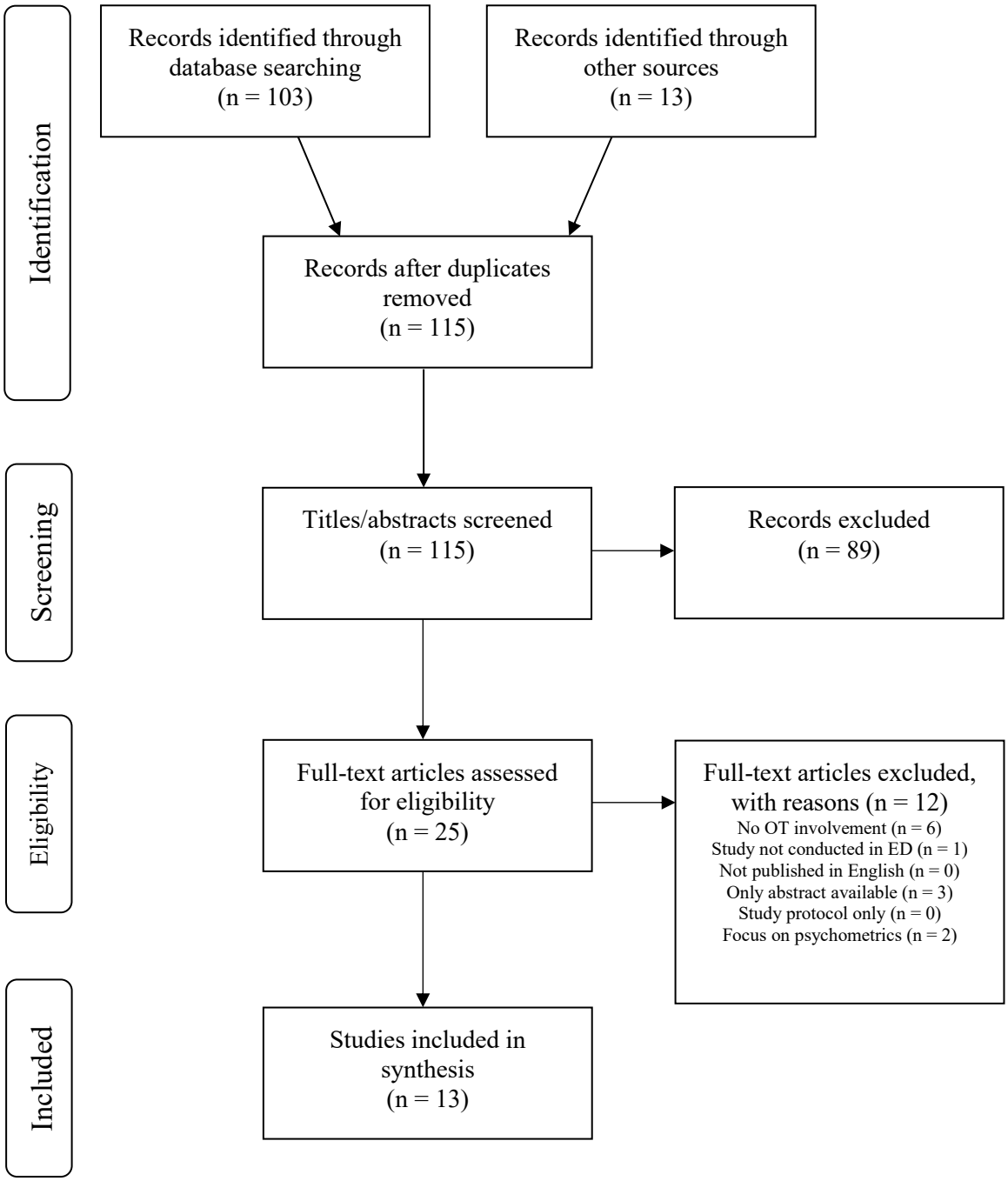
Appendix B:

Literature Search Results

1. Frailty in the emergency department



2. Occupational therapy in the emergency department



Appendix C

Data Extraction Tables

Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results / Conclusions
Frailty in the Emergency Department Setting							
Banerjee & Conroy (2012)	To provide a guide on care for older people over the first 24 hours of an urgent care episode; to help decrease variations in practice; to influence the development of appropriate services across the urgent care system; to identify and disseminate best practice; to influence policy development	Expert opinion with voting using a modified nominal group technique	ED; UK	Not applicable	Aligned with one of the major theoretical definitions of frailty	As part of multidisciplinary team; involved in assessment, intervention and discharge planning	All older people accessing urgent care should be routinely assessed for frailty syndromes (falls, immobility, delirium/dementia, polypharmacy, incontinence, end of life care). The presence of one or more frailty syndrome should trigger a more detailed comprehensive geriatric assessment, including an interdisciplinary team, standardized instruments, and consideration of function and social supports. Access to multidisciplinary teams should be available urgently. There is currently inadequate training focusing on the care needs of older adults in the ED.
Bharathan, Glodan, Ramesh, Vardhini, Baccash, Kiselev et al. (2007)	To learn noise levels and time- and place-patterns of noise in an urban community teaching hospital and affiliated nursing home; to compare levels and patterns of noise in hospital and nursing home; to learn sources of noise	Quantitative; observational study	Teaching hospital (including ED) and nursing home; USA	Patients on the study wards	Used only as a descriptor without definition	None	In both settings, acute care hospital and nursing home, noise pollution was above the recommended limit. The highest noise level was recorded in the ER, which was active around the clock. Therefore, frail patients are exposed to high noise levels, which are associated with negative outcomes.
Blakemore (2012)	To describe how the Emergency Frailty Unit operates, to summarize its evaluation	Mixed methods evaluation	ED; UK	Patients of the Emergency Frailty Unit aged 85 and older; staff of the Emergency Frailty Unit	Used only as a descriptor without definition	As part of multidisciplinary team; specific role of OT not described	Specialist unit set up set up within a large UK ED to provide care to frail older adults. Multidisciplinary care is provided, including OT, specialist nurses, geriatrician, physiotherapist, and "community matrons". Admission and readmission rates fell for patients aged 85 or older. Positive staff opinion.

Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results / Conclusions
Frailty in the Emergency Department Setting							
Briggs, Coughlan, Collins, O'Neill & Kennelly (2013)	To prospectively profile and characterize all nursing home residents presenting to an urban hospital ED in order to clarify some current and future challenges of providing emergency care to this group.	Quantitative; prospective cohort study	ED; UK	All nursing home residents presenting to one ED over an 18-week period	Used only as a descriptor without definition	None	Nursing home patients were complex (pre-morbid functional loss, limited mobility, multiple medical comorbidities, polypharmacy, dementia). 70% of nursing home patients were admitted to hospital. 28% returned to ED at least once within the study period. Over half of all visits were considered "potentially preventable" (low acuity). 35% had delirium, which was associated with significantly worse outcomes (admission, mortality).
Brouns, Dortmans, Jonkers, Lambooij, Kuijper & Haak (2014)	To gain insight into the prevalence, etiology, clinical presentation, and treatment of clinically relevant hyponatremia in elderly medical patients presenting to the emergency department; to determine differences in presentation and outcome of elderly patients with hyponatremia versus elderly patients with normal serum sodium levels and the impact of the severity of hyponatremia on patient outcomes	Quantitative; retrospective cohort study	ED; Netherlands	All patients aged 65 years or older who were referred to the emergency department for internal medicine and had the presence of hyponatremia as identified by laboratory investigation	Used only as a descriptor without definition	None	Only a minority of patients received appropriate diagnostic work up. Hyponatremia, regardless of underlying pathophysiology, is an indicator of poor prognosis, such as longer hospital stays and higher mortality rates.
Conroy, Ansari, Williams, Laithwaite, Teasdale, Dawson et al. (2014)	To report findings of a controlled evaluation of the impact of an embedded CGA in the Emergency Frailty Unit of the ED	Quantitative; historical cohort design	ED; UK	Patients of the Emergency Frailty Unit aged 85 and older	Used only as a descriptor without definition	As part of multidisciplinary team; specific role of OT not described	Clinical and statistically significant reduction in admissions and readmissions in people aged 85+ following discharge from the ED
Crehan, O'Shea, Ryan & Horgan (2013)	To describe the profile of community dwelling older adults over 65 who were referred for physiotherapy in the Emergency Department after a fall	Quantitative; prospective observational study	ED; UK	40 subjects age 65 + referred to ED physiotherapy service after a fall	Standardized frailty assessment tool used (Fried frailty phenotype)	None	75% of subjects were frail and an additional 15% were prefrail. 100% of subjects scored below normal on Timed Up and Go.

Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results / Conclusions
Frailty in the Emergency Department Setting							
Devriendt, De Brauwer, Vandersanen, Heeren, Conroy, Boland et al. (2017)	To investigate the current support for frail older patients in the ED, and collaborations between geriatric services and EDs in Belgian hospitals	Qualitative; cross-sectional survey	ED; Belgium	Heads of geriatric services	Used only as a descriptor without definition	As part of multidisciplinary team; specific role of OT not described	Informal agreements exist between geriatric services and ED. A geriatrician is available for consultation in most EDs, supported by multidisciplinary team involvement. Geriatric services screened high risk patients and provided geriatric training for ED staff. ED infrastructure was felt to be insufficient to provide quality care to older people.
Ellis, G., Marshall, T., & Ritchie, C. (2014).	To describe population demography and implication for ED; to summarize assessments of older adults in the ED, as well as the factors of caregivers, nursing homes, palliative care, and age attuning hospital services; to summarize established and emergent interventions	Review; type of review not specified	ED; UK	Not applicable	Aligns to major theoretical definition of frailty	As part of multidisciplinary team; involved in assessment, intervention and discharge planning	Assessments of older adults in the ED are often complicated by frailty, functional impairment, delirium and cognitive impairment, polypharmacy, and falls. Issues pertaining to carers, nursing homes and palliative care must be addressed. Age-attuned hospitals incorporate established interventions such as CGAs. Emergent interventions, such as discrete beds in the ED for older adults, may also enhance care.
Fernández-Alonso & Martín-Sánchez (2013)	To update the definition of older frail patients in the ED, and to identify geriatric evaluations adapted to the ED and possible models of intervention	Review; type of review not specified	ED; Spain	Not applicable	Aligns to major theoretical definition of frailty	As part of multidisciplinary team; involved in assessment.	Identification of frail older adults in the ED involves frailty screening scales, diagnostic scales of frailty, and geriatric assessment. Assessments should address clinical, functional, mental and social areas, and quality of life. Intervention models in the ED are lacking.
Fox, Pattison, Wallace, Pradhan, Gaillemin, Feilding et al. (2016)	To establish the feasibility of a geriatrician working with the multidisciplinary team when embedded in the ED	Feasibility study	ED; UK	Patients managed in the ED by a geriatrician-led multi-disciplinary team	Does not align with major theoretical definition of frailty	As part of multidisciplinary team; involved in assessment.	A geriatrician-led multidisciplinary team comprehensive geriatric assessment is a feasible model in the ED and compares favourably to other models regarding discharge rates from ED, hospital lengths of stay, and readmission rates.

Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results / Conclusions
Frailty in the Emergency Department Setting							
Goldstein, Andrew, & Travers (2012)	To understand how the concept of frailty is being applied in the EMS and emergency medicine literature; to understand which measures have been validated for use in this population; to determine what can be recommended.	Narrative review	Not applicable	Patients age 60+ receiving care by EMS or in the ED.	"No articles specifically using a measure of frailty in the pre-hospital setting or emergency department were identified."	None	Zero articles were identified that implemented a validated measure of frailty in the ED setting. Risk assessments were conducted, which, although they don't measure frailty per se, do aim to identify patients at high risk of adverse outcomes.
Gorichky (2015)	To discuss and present positive results regarding implementation of an ED care coordinator role designed to serve older adults and their families	Review; type of review not specified	ED; USA	Not applicable	Used only as a descriptor without definition	None	A care coordinator in the ED can benefit those patients at risk of returning to ED due to lack of support in the home. It can also benefit the system through avoidance of costs related to unnecessary admissions.
Hastings, Purser, Johnson, Sloane & Whitson (2008)	To determine whether frail older adults, based on a deficit accumulation index, are at greater risk of adverse outcomes after discharge from the ED; to examine the association between frailty and any adverse outcome, outpatient ED visits, and more serious events, defined as hospitalization, nursing home admission, or death.	Quantitative; secondary analysis of Medicare Current Beneficiary Survey	ED; USA	Community dwelling subjects who were age-entitled to Medicare (aged >= 65), were not enrolled in HMOs, and had at least one outpatient ED visit during the study period. Subjects were then divided into quartiles based on their score on a Deficit Accumulation Index measurement of frailty.	Standardized frailty assessment used (deficit accumulation model/frailty index; no cut off score was used to mark subjects as "frail" vs " not frail")	None	The proportion of subjects who experienced any adverse outcome within 30 days of ED discharge increased according to the number of deficits. There was little difference in the cumulative proportion of patients who experienced a repeat visit according to the Deficit Accumulation Index. A more significant separation according to level of frailty was observed when serious outcomes (hospitalization, nursing home admission, or death) were considered.

Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results / Conclusions
Frailty in the Emergency Department Setting							
Iwata, Kuzuya, Kitagawa & Iguchi (2006)	To provide a description of the ED visits of nonagenarian patients with respect to demographics and the main causes of ED visits and subsequent admissions to the hospital.	Quantitative; prospective study	ED; Japan	275 consecutive nonagenarian patients who visited the study ED	Used only as a descriptor without definition	None	Relatively few subjects were classified as emergency patients. 65.1% of subjects were hospitalized. Most of the patients had geriatric problems such as disability (78%), comorbidity (86%) and polypharmacy (82%).
Lee, Sirois, Moore, Perry, Daoust, Griffith et al. (2015)	To describe acute healthcare use (return to the ED or hospitalisations) 3 to 6 months following minor injury among previously independent seniors following discharge from an ED; to identify predictors of acute health care use within 6 months after minor injury	Quantitative; prospective observational cohort study	ED; Canada	ED patients age >= 65 years could independently perform seven basic activities of daily living prior to their ED visit, and were discharged back to their home from the ED following a minor traumatic injury.	Standardized frailty assessment tool suggested (Clinical Frailty Scale)	None	21.6% of subjects had an acute care encounter within 6 months of discharge from ED. Two factors were predictive of return visits to the ED following minor injuries: cognitive impairment, and the mechanism of injury, specifically pedestrians struck by a vehicle or recreational accidents.
Martín-Sánchez, Rodríguez-Adrada, Mueller, Vidán, Christ, Peacock et al. (2017)	To determine the effect of frailty on risk of 30-day mortality in non-severely disabled older patients with acute heart failure attended in EDs	Quantitative; retrospective preplanned secondary analysis of the Older-Acute Heart Failure Register, a prospective observational multicentre cohort study	ED; Spain	Older patients included in the Older-Acute Heart Failure Register with a completed frailty assessment who did not have severe functional dependence or previous diagnosis of dementia	Standardized frailty assessment tool used (Fried frailty phenotype)	None	36.3% of subjects fulfilled the frailty criteria. The overall rate of 30-day mortality was markedly different between frail and non-frail patients. The presence of frailty was independently associated with 30-day mortality.

Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results / Conclusions
Frailty in the Emergency Department Setting							
Martín-Sánchez, Rodríguez-Adrada, Vidan, Llopis García, González del Castillo, Rizzi, et al. (2017)	To determine the impact of frailty and disability on 30-day mortality and determine whether the addition of these variables improved predictive ability of a heart failure specific risk stratification tool for older patients seen in the ED	Quantitative; retrospective analysis of the Older Acute Heart Failure Key Data (OAK) Registry, which is a prospective observational multicentre cohort study	ED; Spain	Older patients included in the OAK Registry with completed frailty and disability assessments and data related to vital status during the first 30 days after the index ED visit	Standardized frailty assessment tool used (Fried frailty phenotype)	None	66.4% of patients without severe functional dependence met the frailty criteria. The presence of frailty in moderately dependent, severe disability, and very severe disability groups was independently associated with 30-day mortality compared with non-frail, no or mildly dependent patients. Assessment of frailty and functional status should be conducted in ED for pts with acute heart failure.
Provencher, Sirois, Émond, Perry, Daoust, Lee et al. (2016)	To compare functional decline in ADLs in independent older adults visiting EDs for minor injuries according to their frailty and cognitive status	Quantitative; prospective multicentre study within the Canadian Emergency Team Initiative research program on mobility and aging	ED; Canada	Aged 65 and older, presented at the ED with a chief complaint of a minor injury, were independent in activities of daily living (ADLs) in the 4 weeks before the injury, and were discharged home from the ED within 48 hours.	Standardized frailty assessment tool suggested (Clinical Frailty Scale)	None	8.2% subjects were vulnerable, 5.6% were mildly frail, 1.3% were moderately frail. Frail individuals with and without cognitive impairment were at significantly greater risk of decline in ADLs at 3 months after ED visits for minor injuries than non-frail individuals. At 6 months, the three groups (frail with cognitive impairment, frail without cognitive impairment, non-frail with cognitive impairment) were at significantly greater risk of ADL decline than the reference group (non-frail without cognitive impairment).
Provencher, Sirois, Ouellet, Camden, Neveu, Allain-Boulé, et al. (2015)	To compare the health-related quality of life measures of seniors visiting EDs for minor fractures, according to their frailty status.	Quantitative; prospective sub-study within the Canadian Emergency Team Initiative research program on	ED; Canada	Aged 65 and older, presented at the ED with a chief complaint being a minor fracture, were independent in ADLs in the 4 weeks preceding the	Standardized frailty assessment tool suggested (Clinical Frailty Scale)	None	11.1% were mildly to moderately frail. Participants with minor fractures who were frail (but independent in basic ADLs before the injury) had worse physical and mental health related quality of life up to 6 months after ED discharge than their fitter counterparts.

Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results / Conclusions
Frailty in the Emergency Department Setting							
		mobility and aging		injury, and were sent home.			
Rodríguez-Molinero, López-Diéguez, Tabuenca, De La Cruz, & Banegas (2006)	To evaluate the accuracy of physician recognition of ADL impairment in older ED patients; to evaluate the accuracy of medical records regarding ADLs in older ED patients; to measure the prevalence with which functional status was noted on ED medical records; to examine whether such annotation was associated with physicians gaining more accurate knowledge of their patient's functional status	Quantitative; cross-sectional study	ED; Spain	Any patient in the study ED aged 80 years and older, or 65 years and older suffering from two or more chronic diseases	Does not align with major theoretical definition of frailty (described as any person aged 80 years and older, or alternatively, any person aged 65 years and older suffering from two or more chronic diseases)	None	Functional data are poorly documented (altogether lacking in 75% of medical records analyzed). Physician judgment identified dependence in some basic ADLs (dressing and bathing) but not in other functional areas (continence, transfers).
Rutschmann, Chevalley, Zumwald, Luthy, Vermeulen, & Sarasin (2005)	To describe the clinical characteristics of a population of elderly patients who present to the ED with a complaint of "home care impossible"; to assess how these patients were evaluated and triaged in the ED	Quantitative; exploratory observational study	ED; Switzerland	Patients older than 65 years presenting to the ED, and in which "home care impossible" was considered as the main reason for admission	Used only as a descriptor for anyone requiring home care assessment	None	After initial medical evaluation in the ED, a diagnosis considered acute (because it required treatment without delay) was established in 51% of the patients. In the remaining 49%, evaluation provided no acute conditions and their chief problem was considered as true insufficient social, familial and/or nursing support.
Salvi, Morichi, Grilli, Giorgi, Spazzafumo, Polonara et al. (2008)	To describe patient characteristics and 6-month mortality, ED return, hospitalization, and functional decline, comparing a geriatric ED with a conventional ED.	Quantitative; prospective observational cohort study	ED; Italy	100 patients aged 65 and older presenting to each ED; the geriatric ED took only non-trauma patients.	Does not align with major theoretical definition of frailty (population described as frail based on high levels of comorbidity, disability, and	None	The patients in the geriatric ED group were at baseline older and medically and socially frailer, as suggested by the higher number of widow(er)s, paid caregivers and ambulance arrivals. However, there were not the expected differences seen in admission rates; early, late or recurrent ED visits; or in 6-month hospital admissions and functional decline. Non-inferiority, and perhaps slight superiority, of geriatric ED was suggested, as compared to conventional ED treatment for the target population.

Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results / Conclusions
Frailty in the Emergency Department Setting							
					cognitive impairment)		
Salvi, Rossi, Lattanzio & Cherubini (2017)	To verify the role of polypharmacy and excessive polypharmacy as independent risk factors for adverse health outcomes after an ED visit.	Quantitative; observational cohort study	ED; Italy	All residents from the region aged 65 years and older who accessed the ED in a six-month period	Used only as a descriptor without definition	None	Polypharmacy is generally associated with worse outcomes after an ED visit, independently of being admitted or discharged. 30-day and 6-month ED return, and 6-month hospitalization are associated with both polypharmacy and excessive polypharmacy. Polypharmacy could be a marker of disease severity with worse prognosis as well as clinical complexity, frailty and geriatric syndromes. A cut-off of 6 or more daily drugs may be the best for defining "generic" polypharmacy in the ED setting, to be used in risk stratification tools for adverse outcomes in elderly ED patients.
Sirois, Griffith, Perry, Daoust, Veillette, Lee et al. (2017)	To describe frailty status in community-dwelling seniors presenting to EDs with minor injuries; to examine the association between frailty status and functional decline in these seniors; to compare the capacity of the Study of Osteoporotic Fracture frailty index (SOF) and the Canadian Study of Health and Aging Clinical Frailty Scale (CSHA-CFS) and emergency physician clinical judgment to predict declining function in this population	Quantitative; prospective multicentre study within the Canadian Emergency Team Initiative research program on mobility and aging	ED; Canada	Age >=65 years, ED consultation within 2 weeks of a minor injury, independence in basic ADLs prior to the injury and home discharge.	Standardized frailty assessment used (compared the Study of Osteoporotic Fracture frailty index (SOF) assessment of frailty to the Clinical Frailty Scale, both of which align with the deficit accumulation model of frailty.)	None	The 3-month incidence of functional decline was 12.1%. SOF-defined prefrail and frail patients were 11.0 and 15.9 times greater risk of declining function than robust patients. According to the CFS, mildly/severely frail patients were around 2.5 times more at risk of declining function. There were 9.9% to 11.7% individuals qualifying as frail and 32.7% to 38.2% as prefrail.

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Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results / Conclusions
Frailty in the Emergency Department Setting							
Stiffler, Finley, Midha & Wilber (2013)	To determine the prevalence of frailty in older ED patients; to assess the correlation of self-reported speed and weakness to measured values and the association between frailty and function	Quantitative; cross-sectional study	ED; USA	ED patients who were age 65 years or older, community dwelling, a discharged to their own homes after their ED evaluation	Standardized frailty assessment ol used ied frailty enotype); mpared to non-standardized tool that used self-report and aligned with one of the major theoretical definitions of frailty (Fried frailty phenotype)	None	20% of study participants were frail. Self-reported weakness and slowness does not correlate well with objective tests of strength and walking speed. Frailty and individual components of the Fried criteria both correspond with declines in independence in ADLs among older ED pts.
Vivanti, McDonald, Palmer & Sinnott (2009)	To identify associations between malnutrition falls risk and hospital admission among older people presenting to ED.	Quantitative; prospective cross-sectional study	ED; Australia	Convenience sample of patients age 60 and older who presented to the ED during the study period, subsequently categorized into "non-faller", "frail mechanical fall" and "active mechanical fall" groups.	Used only as a descriptor for type of fall, not the subject themselves	None	15% of all patients were malnourished. 28% had had a fall of any type. Patients from the "frail mechanical fall" group were more likely to be malnourished, as compared to non-fallers and to the "active mechanical fall" group. Malnourished patients were more likely to have had a fall in the previous 6 months. Malnourished patients were at greater risk of admission to hospital.
Yash Pal, Kuan, Koh, Venugopal & Ibrahim (2017)	To determine the incidence and nature of death among patients aged 65 years or older in an ED, and to characterize their trajectories of dying.	Quantitative; retrospective chart review	ED; Singapore	All patients aged 65 years or older who died in the study ED	Used only as a descriptor for any patients who were bed-bound or who	None	51.3% of patients who died in the ED had identifiable chronic illness, frailty, or advanced cancer. Of these, 46.5% had severe premorbid functional limitations. Only 14.9% had advanced directives regarding resuscitation status. 74.3% received aggressive resuscitative measures in the ED.

Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results / Conclusions
Frailty in the Emergency Department Setting							
					had cognitive impairment		

Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results/ Conclusions
Occupational therapy in the emergency department							
Bruun & Nørgaard (2014)	To explore the impact of occupational therapy and physiotherapy on acute care wards, including the emergency department, and to determine the value of the therapies in an acute care patient pathway	Qualitative; used a chart audit, a questionnaire and focus groups	Acute care; Denmark	Physicians and nursing staff from both ED and "collaborating departments" completed the survey and the focus groups.	None	As a stand-alone discipline and as part of multidisciplinary team; involved in assessment, intervention and discharge planning.	Questionnaire found that the impact of OT was higher in the ED than for collaborating departments. Focus groups participants indicated that both therapies facilitate patient flow and increased safety for both patients and staff in acute care and the ED. OT in the ED in particular may have contributed to a decline in readmission rates (participant impression). Both therapies in ED facilitate discharges and transfer to the acute care wards.
Carlill, Gash & Hawkins (2002)	To investigate whether a joint OT/social work service facilitated safe discharges from the ED and prevented unnecessary admissions.	Quantitative; retrospective case-note analysis	ED; UK	Patients referred to the service. No specific referral criteria, other than that the patient was medically stable for discharge. Average age of referred patients: 77.95 years. Reasons for referral: mobility concerns, assessment of function in ADLs, concerns about coping at home, request for home visit. Reasons for admission: inability to mobilize or transfer at all or safely (OT specific)	None	As part of multidisciplinary team; involved in assessment, intervention and discharge planning	Most patients discharged back home (81.3%). Based on opinion of authors, 48% of discharges were directly related to the OT/social work service.
Chown, Soley, Moczydlowski, Chimento, & Smoyer (2016)	To determine the perception of occupational therapists working in the ED setting regarding quality of patient care, the opinion of other health care providers, and the impact on the future of the OT profession.	Qualitative; semi-structured individual interviews analyzed using phenomenological methods	ED; USA	Occupational therapists who provided ED service part or full time in past six months	None	As a stand-alone discipline and as part of multidisciplinary team; involved in assessment, intervention and discharge planning.	One major impact of the OT service was to provide discharge recommendations that ensured patient safety. Occupational therapists had a role in determining "the next step", or plan of action. However, there was an identified lack of education on the part of the ED staff. Factors were identified that may impact the future of OT service in the ED.

Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results/ Conclusions
Occupational therapy in the emergency department							
Cusick, Johnson & Bissett (2009)	To describe occupational therapy practice in the emergency department in Australia	Qualitative; used surveys	ED; Australia	Occupational therapists who currently worked or previously had worked in an emergency department.	None	As a stand-alone discipline; involved in assessment, intervention and discharge planning	The primary role of the occupational therapist in the ED was to assess the function of patients in the ED to determine the most suitable plan: discharge from ED or admission to the hospital. Although the study looked solely at OT practice, the therapists reported they often worked in multi- or interdisciplinary teams. Most patients seen by the OT service were geriatric. About half used standardized assessments. Interventions often included equipment prescription, education to patients/families, referrals to community programs, and home visits/home modifications.
Davison, Bond, Dawson, Steen & Kenny (2005)	To determine how a multifactorial program aimed at falls prevention affected cognitively intact older people with recurrent falls.	Quantitative; randomized controlled trial	ED; UK	Aged 65 or over, presented to ED with fall or fall-related injury, had had at least one additional fall in the past year, and were cognitively intact	None	As part of multidisciplinary team; involved in assessment and intervention.	Falls (by self-report using falls diary) reduced by 36%, but number of fallers did not; reduced frequency of falls. Home factors identified in 48% of subjects. OTs attended patients 0-4 times, median of one. Median follow up time 32 days after ED visit. Improvement in falls efficacy. No difference in ED returns or hospital admissions, but decreased hospital length of stay.
Harper, Gibson, Barton, Petta, Pearson & Celenza (2013)	To describe characteristics of patients who present to the ED with a fall, and to assess whether a multidisciplinary care coordination team (CCT) based in the ED improved patient outcomes.	Quantitative; historical cohort design of retrospectively gathered data from electronic health record	ED; Australia	Age 65 +, presenting to ED after a fall	None	As part of multidisciplinary team; involved in assessment, intervention and discharge planning.	About 18% of all ED patients over the age of 65 presented with a fall. There was a trend towards higher urgency of the patients referred to the CCT. CCT referral was associated with lower rates of representation and readmission.

Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results/ Conclusions
Occupational therapy in the emergency department							
Hendriksen & Harrison (2001)	To evaluate the feasibility of providing an OT service in the ED, and to identify the potential of this service to better meet the functional needs of older ED patients	Quantitative; randomized controlled trial	ED; UK	Age 75+ with primary diagnosis of limb, rib, or back trauma	None	As a stand-alone discipline; involved in assessment, intervention and discharge planning	Statistically significant difference between intervention and control groups regarding functional score at follow-up. No statistically significant difference in patient anxiety. Half of patients would have otherwise been discharged from ED with unmet functional needs in one or more very basic ADLs. At 7-day follow up, a small but clinically significant number of control group subjects still had problems in toileting, bed transfers, chair transfers, and/or general mobility.
James, Jones, Kempenaar, Preston, & Kerr (2016)	To critically analyze research evidence available regarding OT service provision in the ED	Critical review	ED; included studies from UK and Australia	Not applicable	None	As a stand-alone discipline; involved in assessment, intervention and discharge planning	7 included studies (4 of which are also included in this narrative review). Limited quality of research available; only one study included a control group, whereas most relied on expert opinion, program description, or anecdote. Most OT services aimed to facilitate safe patient discharges from the ED and avoid unnecessary admissions to hospital. Core OT skills specific to ED identified.

Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results/ Conclusions
Occupational therapy in the emergency department							
Johnson & Cusick (2009)	To describe the context of Australian EDs, as well as factors affecting ED usage, allied health roles in the ED, practices and outcomes. To provide an overview of key issues to help inform ED stakeholders (educators, researchers, therapists, management) of patient and ED needs, and identify areas of education, quality projects and research.	Review; type of review not specified	ED; Australia	Not applicable	None	As part of multidisciplinary team; involved in assessment, intervention and discharge planning	The ED is primarily focused on addressing immediate medical concerns. EDs in Australia are facing a crisis due to the demand for their services. Many factors affect ED use, with some patients attending the ED for lower acuity problems, which is being labelled as "inappropriate" use. Allied health teams, which include occupational therapists, have been implemented in the ED to address the needs of patients.
Lee, Ross & Tracy (2001)	To describe an ED based rehabilitation consultation service, to evaluate outcomes for patients who received functional assessments in the ED, and to explore the utility of the provision of functional assessments in the ED setting	Quantitative; process evaluation study for program evaluation	ED; Canada	80 patients who received functional assessment in the ED from one of the rehabilitation professionals	Used only as a descriptor without definition	As part of multidisciplinary team; involved in assessment and discharge planning	Most patients were older (mean age 74.6 years), female, lived alone, and had limited social and medical support in the community. Most presented to ED due to a fall. Many did not use a mobility device, but about half were unable to complete the functional performance tests. There was a tendency towards admission as disability and handicap test scores increased. Living alone was also associated with admission.

Shaw, Bond, Richardson, Dawson, Steen, McKeith & Kenny (2003)	To study the effect of a multifactorial intervention for people who were older, cognitively impaired and presented to the ED with a fall	Quantitative; randomized controlled trial	ED; UK	Age 65+ with cognitive impairment/dementia presenting to ED after a fall	None	As part of multidisciplinary team; involved in assessment and intervention.	No significant differences between intervention and study groups for any outcomes, including number of fallers, number of falls, time to first fall, injury rate, ED visits related to falls, hospitalizations related to falls, mortality. 10% fewer patients fell post intervention but this was not statistically significant. Low compliance by subjects for most interventions, and lowest for environmental modifications.
Citation	Aim of study	Design, type of article	Setting	Participants	Description/ definition of frailty	Description of OT involvement	Results/ Conclusions
Occupational therapy in the emergency department							
Smith & Rees (2004)	To evaluate referrals of older adults to an ED-based OT program in terms of beds saved after OT intervention	Quantitative; retrospective chart review	ED; UK	Adults over the age of 45 who attended the ED and were referred for OT assessment	Used only as a descriptor without definition	As a stand-alone discipline; involved in assessment, intervention and discharge planning	Most patients were female, older (mean age of 80 years), lived alone, presented with a fall. 85% of patients referred to OT were discharged home. 59% were referred to social services. 5.8% were admitted to hospital within 30 days of the OT assessment. 306 saved admissions were identified, with an estimated 2224.7 bed days saved over 3 years.

Spang & Holmqvist (2015)	To describe the perceptions of occupational therapists working in emergency department settings	Qualitative; semi-structured individual interviews analyzed using qualitative content analysis	ED; Sweden	14 occupational therapists who worked in the ED of their respective hospitals	None	As a stand-alone discipline; involved in assessment and intervention.	Occupational therapists described "feeling established through deliberate occupation-based work" by using "strategies that enable occupational therapy practice in the emergency department" that include "balancing changing circumstances", "making occupational therapy visible", and "building bridges between occupational therapy colleagues and other healthcare professionals". They also identified "I am an occupational therapy professional" as a theme, with "context-based descriptions" and "years of pride". "Developing practice" was identified as another theme, with its associated "opportunities and hinderances".

Appendix D

Permission to Use the Clinical Frailty Scale

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INTENDED USE (Select all that apply):

☑ Reprint — *Provide publication details:* As part of research paper in Canadian Journal of Occupational Therapy

☑ Research study / clinical trial — *Describe use in study:* Assess frailty of ER patients — *Expected duration of study:* Start date Jan 2019 End date April 2020

☑ Routine clinical care
Will the CFS© be incorporated into an electronic medical/health record (EMR)? ☑ Y ☐ N
If yes, please identify whether an EMR company is involved (e.g., Epic, Meditech): Sunrise Clinical Manager

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