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Emergency Department Use by Older Adults: A Literature Review on Trends, Appropriateness, and Consequences of Unmet Health Care Needs

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Abstract

Older adults use emergency departments (EDs) more than any other age group and are more prone to subsequent adverse events. This article reviews the literature on ED use by older adults within the context of evaluating their need for emergency care and the extent to which access to primary and supportive care services affect use. While a substantial research literature describes general patterns of ED use, there is much less research on ED use as a function of other health service use. Gaps in the research literature result in a limited understanding of the full scope of the issue and opportunities for practice and policy intervention.

Keywords

emergency departments, older adults, Andersen's health behavior model, repeat visits

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Introduction

Hospital emergency departments (EDs) provide a crucial public service but international research, including studies from Canada, the United States, and Europe, has demonstrated that ED crowding is a widespread and growing problem (Aminzadeh & Dalziel, 2002; Boyle, Pineault, & Roberge, 1992; Derlet, Richards, & Kravitz, 2001; Richardson, Asplin, & Lowe, 2002; Wolinsky et al., 2008). Concerns about overcrowding are furthered by a growing population of older adults with increasingly complex health care needs. Older adults use proportionally more ED services than any other age group and their use has increased over the past several years even as use by other age groups has decreased (Chan, Schull, & Schultz, 2001; Nawar, Niska, & Xu, 2007). Although a large proportion of older adults require hospital care at the time they present to the ED, the extent to which visits could be avoided, either through early prevention or access to alternative settings, is less clear. A better understanding of the reasons why older adults use EDs and the potential opportunities for intervention is essential to planning informed strategies to meet the health care needs of an aging population.

New Contribution

Several studies have shown that older adults use EDs more often and for more urgent problems than any other age group. This research, along with innumerable editorials and thought pieces, has concluded that the aging population will overwhelm our emergency care systems at least partly because these systems are not adequately designed to meet the complex needs of older adults. Despite these concerns and the volume of literature, the focus of much of the research in this area has been relatively narrow.

This systematic literature review contributes in three main ways. First, rather than describing older adults' ED visits as simple and discrete events, our review emphasizes the complexity of these visits by analyzing multiple aspects both leading up to and following the ED encounter. Next, unlike prior reviews on this topic which either exclude or do not distinguish older adults living in long-term care facilities from those living in the community (Aminzadeh & Dalziel, 2002; Bridges, Meyer, & Spilsbury, 2000; McCusker, Karp, Cardin, Durand, & Morin, 2003; Moons, Arnauts, & Delooz, 2003; Salvi et al., 2007), our review devotes special attention to nursing home residents as an overlooked subpopulation. Finally, our review explores the limitations and gaps in the available literature on ED use by older adults in an effort to guide future research on this topic.

Conceptual Model

This systematic literature review was premised on a modified version of Andersen's (1995) health behavior model. The original model depicts health services utilization

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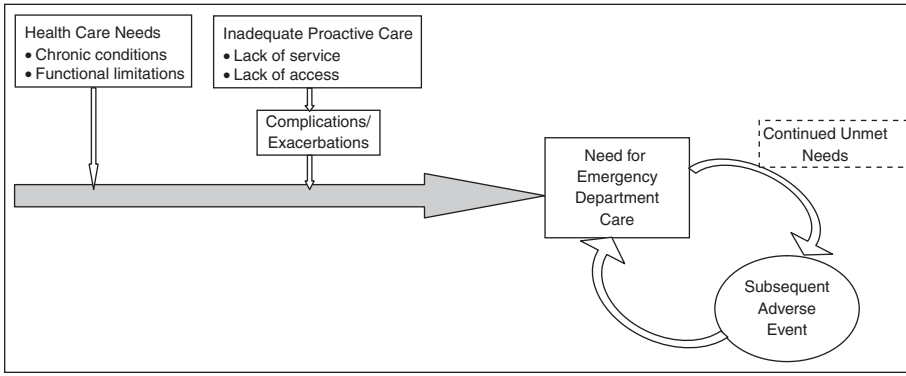

Figure 1. Conceptual model illustrating factors that influence emergency department use by older adults
Source: Adapted from Andersen (1995) and McCusker et al. (2003).

as the result of characteristics in three broad categories: (a) need factors, which are defined as medical diagnoses and other health problems; (b) predisposing factors, which are defined as characteristics associated with the likelihood of using health care such as beliefs; and (c) enabling factors, which are defined as individual and community level characteristics that are associated with the ability to access health services (Andersen, 1995). The model was developed to study disparities in access to health care, which are highlighted when need factors are not the primary predictors of utilization. Andersen's model has been used to study access to different types of health services, including primary care (Nabalamba & Millar, 2007), psychiatry (Smith, 2003), dental care (Swank, Vernon, & Lairson, 1986), and hospice (Miller, 2004). The model has also been adapted to describe ED use such that the likelihood of an individual using an ED is affected by his or her medical need and factors that decrease access to primary care (McCusker et al., 2003).

We further modified the adapted model to more specifically represent ED use by older adults (Figure 1). Unlike other forms of health services utilization described by the Andersen model, ED use is almost exclusively reactive to an emergent health problem. In many circumstances, ED use at the time it is sought is unavoidable, necessary, and appropriate; however, in many others, ED use results from persistently unmet needs that culminate in a health crisis. In the latter case, ED use may also be viewed as an expression of health system failure. To describe how health system failure leads to ED use by older adults, the model needs to be reconceptualized along two major lines.

First, we reconceptualize need factors to focus on the necessity of care in the ED at the time of the ED visit rather than on more general need for health care, as in the original model. Older adults have more health care needs than others due to a higher prevalence of chronic conditions, multimorbidity, and functional impairments. Yet older adults' greater health needs should not necessarily mean that they have greater needs for ED

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care or that their complex needs are best met in the ED. Within our conceptual model, need for care in the ED is a function of illness acuity or the immediacy with which an older person requires acute care services. Need for care in the ED is also affected by opportunities to obtain necessary care in alternatives to the ED setting. In this review, need for ED care is described using measures of appropriateness of older adults' ED visits.

Second, we reconceptualize enabling factors as those that should be preventive of ED utilization. Although morbidity is a determinant of general health care utilization, our model posits that morbidity should not necessarily be a determinant of ED utilization. We argue that underlying medical conditions should be monitored and controlled through primary care services to prevent exacerbations or complications. As well, supportive care services should be used to address functional limitations to prevent adverse outcomes such as falls or medication errors. Within this context, we consider primary and supportive care services to be forms of "proactive" care. As such, while age and morbidity may increase use of primary and supportive care services, optimal provision of proactive care should prevent some or much ED use. When proactive care is unavailable, inaccessible, or inadequate, the health care needs of older adults go unmet and the necessity for care in the ED increases. In other words, for older adults, the need for ED care is driven in part by their underlying morbidity as well as access to and availability of primary and supportive care services that adequately manage their underlying morbidity.

Events following an ED visit, such as a repeat visit, hospitalization, or nursing home admission, are often appropriate for meeting immediate needs but require us to consider how these outcomes could have been averted. In many cases, events following an ED visits may also be viewed as further markers of health system failure to meet the ongoing needs of older adults. The focus on acute management in the ED coupled with inadequate access to appropriate follow-up care may lead to further decline and poor outcomes for older adults with slowly evolving health problems. Adverse events subsequent to an ED visit are included in our review to emphasize the mismatch between traditional health system structure and the complex nature of older adults' health care needs.

Method

We conducted a systematic search of the literature on emergency department use by older adults to centralize findings and to identify goals for future research.

Search Strategy

We used multiple search strategies to identify relevant published literature. First, we searched Medline using the following combination of keywords: emergency AND (department* OR unit* OR room*) AND ("older adult" OR elderly). We subsequently

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searched Medline again in August 2008, using the same keywords to identify more recently published literature. Second, to ensure that we captured studies that included nursing home residents, we searched Medline and CINAHL using the following keywords: emergency AND (unit OR department OR room) AND ("nursing home" OR "home for the aged" OR "nursing home patients" (in CIHAHL only). In all cases, we searched for keywords in the title and abstract fields, did not set year restrictions, and limited searches to English language articles. Third, we obtained a search from the Seniors Health Research Transfer Network Library Service on January 14, 2008, under the topic "The elderly and emergency department overcrowding". Finally, we conducted hand searches of all literature to further identify manuscripts that had not been identified in any of the primary searches.

We scanned each search list for duplicates as well as titles and abstracts that were overtly irrelevant to our interest. Of the remaining articles, we reviewed the full article to identify those that focused on ED use by the population of interest.

Article Inclusion

The primary search strategies yielded a total of 233 articles. Twenty duplicates were immediately removed and a further 64 articles were deemed irrelevant based on their title or abstract. Four articles could not be obtained either through the online library service or interlibrary loan lending service.

A total of 145 articles were deemed relevant from the primary searches. A further 46 articles were found through hand searches of these manuscripts.

For the purpose of this review, we further restricted article inclusion to empiric studies (either quantitative or qualitative analysis of primary or secondary sources) and did not include editorials, letters, or news items ($n = 25$). We did not exclude other literature reviews if they covered relevant topics. We found a substantial number of articles that described a single project or intervention to improve ED care but did not report on research findings ($n = 14$). These were not included in this review article. See Figure 2 for an outline of the search strategy.

Results

We identified 55 relevant research studies that addressed ED use by older adults (Table 1). Our findings are presented in five sections. In the first, we set the context by describing patterns of ED use by older adults. The second, third, and fourth sections are organized around the main arguments in our conceptual model. The second describes older adults' need for ED care as measured by indicators of appropriateness and contrast this with younger adults' need. The third focuses on the effect of proactive care, specifically primary and supportive care, on preventing ED use by older adults. The fourth describes adverse events following ED visits to illustrate the persistence of older adults' unmet needs. The last section describes research on ED use by nursing

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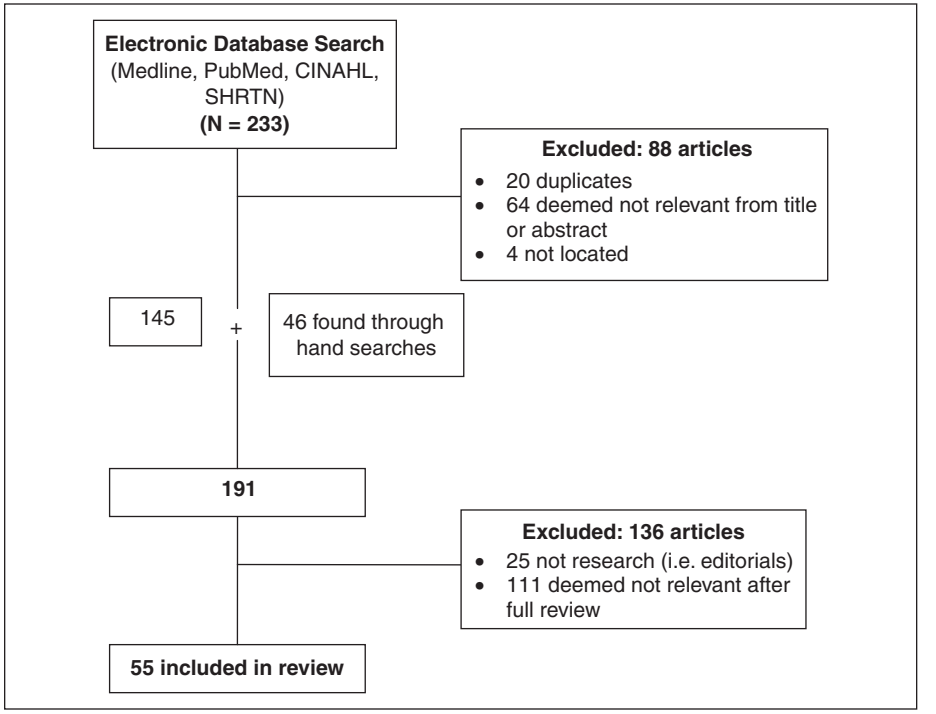

Figure 2. Flow chart showing search and exclusion criteria

home residents; where available, data are presented in the same sequence as the first four sections.

Emergency Department Use by Older Adults

Four previously published literature reviews on ED use by older adults all show international consensus on the greater use by this age group (Aminzadeh & Dalziel, 2002; Grief, 2003; McCusker et al., 2003; Salvi et al., 2007). These findings persisted across countries with different health care systems and underlying population distributions. The largest review, by Aminzadeh and Dalziel (2002), reported on findings from 11 international large- and small-scale studies conducted in North America, Europe, Asia, Australia, and Israel. They found that visits by older adults accounted for 12% to 21% of all ED encounters but in all cases accounted for a disproportionate share of visits.

Reasons for Emergency Department Visits. Older adults are most commonly seen in the ED for medical problems such as cardiac, respiratory, and cerebrovascular-related conditions, but also have a high rate of fall-related injuries. The percentage of patients presenting with medical complaints, as opposed to surgical ones, increases with age and these account for nearly 80% of all visits by older adults (Ettinger, Casani, Coon,

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Table 1. Summary of Included Articles and Contribution to the Literature Review

					Contribution to Literature Review				
Author(s)	Year	Country	Data Source	Sample Size	ED Use by Older Adults	Need for ED Care	Proactive Care to Prevent the Need for ED Care	Adverse Events After ED Use	Nursing Home Residents
Ackermann et al.	1998	U.S.	Chart review	873	×				×
Baum and Rubenstein	1987	U.S.	Chart review	1,620	×	×			
Bergman and Clarfield	1991	Canada	Chart review	112		×			×
Brooks et al.	1994	U.S.	Chart review	359		×	×		×
Caplan et al.	1998	Australia	Patient survey	486				×	
Carmel et al.	1990	Israel	Chart review	1,231	×				
Carter and Gupta	2008	U.S.	NHAMCS	25,975[a] (visits)	×				
Carter et al.	2006	U.S.	NHAMCS	10,586[a] (visits)	×		×		×
Chin et al.	1999	US	Patient survey	983				×	×
Chou et al.	2009	Taiwan	Chart review	635 (visits)	×				×
Denman et al.	1989	U.S.	Patient and physician survey	200		×		×	
Dove and Dave	1986	U.K.	National census, chart review	3,000 (visits)	×				
Downing and Wilson	2005	U.K.	Administrative data	~2.9 million	×	×			
Ettinger et al.	1987	U.S.	Chart review	1,080	×	×			
Finn et al.	2006	Australia	Chart review	541		×			×

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Table 1. (continued)

Author(s)	Year	Country	Data Source	Sample Size	Contribution to Literature Review				
					ED Use by Older Adults	Need for ED Care	Proactive Care to Prevent the Need for ED Care	Adverse Events After ED Use	Nursing Home Residents
Finucane et al.	1999	Australia	Chart review	300	×				
Friedmann et al.	2001	U.S.	Patient survey	463				×	
George et al.	2006	U.K.	Chart review	21,712 (1990); 35,640 (2004); (visits)	×	×			
Gerson and Shvarch	1982	U.S.	Administrative data (EMS, Ohio)	14,400 (EMS response)		×			
Gillick and Steel	1983	U.S.	Chart review	454		×			×
Hastings et al.	2007	U.S.	Administrative data	942				×	
Hastings, Oddone, et al.	2008	U.S.	MCBS plus claims data	1,851				×	
Hastings, Purser, et al.	2008	U.S.	MCBS	1,851				×	
Hustey et al.	2007	U.S.	Patient survey	650				×	
Ionescu-Ittu et al.	2007	Canada	Administrative data (Quebec)	95,173			×		
Jablonski et al.	2007	U.S.	Staff interviews	42[b]		×			×

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Table 1. (continued)

Author(s)	Year	Country	Data Source	Sample Size	Contribution to Literature Review				
					ED Use by Older Adults	Need for ED Care	Proactive Care to Prevent the Need for ED Care	Adverse Events After ED Use	Nursing Home Residents
Jones et al.	1997	U.S.	Chart review, transfer forms, physician survey	709	×	×			×
Kerr and Byrd	1991	U.S.	Chart review (including transfer logs)	123	×	×			×
Lishner et al.	2000	U.S.	Administrative data (Washington)	354,782	×				
Lowenstein et al.	1986	U.S.	Chart review, patient survey	468	×				
McCusker et al.	2000	Canada	Patient survey, administrative data (Quebec)	1,122				×	
McCusker et al.	2007	Canada	Administrative data (Quebec)	140,379				×	
McCusker et al.	2001	Canada	Patient and caregiver survey	388				×	
Meldon et al.	2003	U.S.	Patient survey	647				×	
Nawar et al.	2007	U.S.	NHAMCS	115,323[a] (visits)		×			
Oates et al.	1997	Australia	Chart review	66		×			
Parboosingh and Larsen	1987	Canada	Patient survey	75		×			

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Table 1. (continued)

Author(s)	Year	Country	Data Source	Sample Size	Contribution to Literature Review: ED Use by Older Adults	Need for ED Care	Proactive Care to Prevent the Need for ED Care	Adverse Events After ED Use	Nursing Home Residents
Roberts et al.	2007	U.S.	NHAMCS	Not reported		×			
Rosenblatt et al.	2000	U.S.	Health Care Financing Administration's National Claims History File	354,782	×		×		
Shah et al.	2007	U.S.	NHAMCS	14,052[a] (visits)		×			
Shah et al.	2003	U.S.	Chart review, patient survey	930		×			
Singal et al.	1992	U.S.	Chart review	593	×	×			
Strange et al.	1992	U.S.	Billing data	~1.2 million		×			
Wilber et al.	2006	U.S.	Patient survey	90	×				
Wilson & Truman	2005	Canada	Administrative data (Alberta)	41,803	×		×		×
Wofford et al.	1995	U.S.	Administrative data (EMS, North Carolina)	4,688		×			
Wolinsky et al.	2008	U.S.	Survey on Assets and Health Dynamics Among the Oldest Old	4,337	×	×			

ED = emergency department; NHAMCS = National Hospital and Ambulatory Medical Care Survey; EMS = Emergency Medical Services; A&E = accident & emergency department; MCBS = Medicare Current Beneficiary Survey.
a. National estimates derived from weighted survey results.
b. 42 informants describing 16 transfers to the ED.

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Muller, & Piazza-Appel, 1987; Singal et al., 1992). In contrast, surgical complaints and accidents are the most common reasons for visits among younger ED patients (Aminzadeh & Dalziel, 2002; Bridges, Meyer, & Spilsbury, 2000; Ettinger et al., 1987; Moons et al., 2003; Singal et al., 1992). The most common medical complaints among older adults include chest pain (4.2%), congestive heart failure (2.9%), abdominal pain (2.8%), pneumonia (2.3%), and syncope (2.3%; Lishner, Rosenblatt, Baldwin, & Hart, 2000). Downing and Wilson (2005) analyzed ED visits in the United Kingdom over a 3-year period and found that cardiac conditions were the most common diagnoses among older adults and were seven times more common than among younger adults (9.9% vs. 1.4%).

Two reasons for visits garnered special attention in the research literature on ED use by older adults: injuries due to falls and self-care problems. Each is discussed below.

Injuries. Injuries have been found to account for 59.9% of younger patients' visits and 33.1% of older patients' visits (Downing & Wilson, 2005). While injuries are a leading cause of ED use in all age groups, the literature shows that the mechanisms for injury differ between younger and older adults. In a retrospective chart review of patients in six EDs in the United States, Singal et al. (1992) found that injury was more common for patients younger than the age of 65, but was the second most common reason for presentation in both younger and older groups (25% vs. 18%). They also found that falls were more than twice as often the cause of injury in older patients than in younger patients (71% vs. 28%). The likelihood of a fall-related injury increased with age and accounted for 83% of injuries in patients older than 85 years.

One study focused exclusively on the epidemiology of injuries among older adults treated in the ED. Using the National Hospital and Ambulatory Medical Care Survey (NHAMCS), Carter and Gupta (2008) looked at visits for injuries over 5 years. They estimated that older adults made nearly 21 million injury-related visits to the ED in the United States, representing an annual per capita rate of roughly 12 visits per 100 older adults. This visit rate was nearly double for adults aged 85 years and older, with estimates suggesting that one in five adults in the oldest age group was treated for injury in an ED, annually. Contusions and fractures were the two most frequent types of injuries; falls and adverse medical events were the leading mechanisms of injury, comprising nearly 60% of all episodes. Injuries related to adverse events increased the risk of hospitalization by more than 200%, and fall-related injuries increased the risk of hospitalization by 76% in comparison with other injury-related ED visits.

Self-care problems. Self-care problems, including physical and cognitive impairments that limit functionality and independence, have been frequently described as a primary underlying factor in ED use by older adults. Lowenstein, Crescenzi, Kern, and Steel (1986) found that 19% of the diagnoses given to older adults presenting to the ED encompassed such self-care problems as falling, dehydration, poor food or fluid intake, and "disposition problems". Dove and Dave (1986) studied ED patients older than 70 years and found that the frequency of visits for accidents in a person's own home increased with age. They also reported that 77% of older adults who attended the ED lived alone and had no immediate source of help (Dove & Dave, 1986).

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Others have shown that older adults with decreased social and physical functioning are more likely to visit the ED and to use emergency services. One study looked at older ED patients who had experienced a recent decline in either Instrumental Activities of Daily Living (IADLs) or Activities of Daily Living (ADLs) functioning and found that 65% and 75%, respectively, said this decline directly contributed to their ED visit (Wilber, Blanda, & Gerson, 2006). Another study found that immobility or difficulty leaving the house was the number one reason given by older adults for using emergency services (Shah et al., 2003).

While the majority of research suggests that functional impairment coupled with a lack of support is a main driver in ED use by older adults, some studies do not support these findings (Ettinger et al., 1987). In the study by Wolinsky et al. (2008), only cognitive impairment was found to be associated with increased ED visits while none of IADL impairment, psychiatric problems, or depressive symptoms showed any association. Furthermore, only medical comorbidity was found to be strongly associated with increased risk of intense medical care during the visit (Wolinsky et al., 2008).

The Oldest Old. More detailed analyses of ED use by age group revealed that discrepancies between older and younger adults are driven by a spike in visit rates after the age of 75 years and another after the age of 85 years (Baum & Rubenstein, 1987; Carmel, Anson, & Levin, 1990; Carter & Gupta, 2008; Ettinger et al., 1987; George, Jell, & Todd, 2006; Lowenstein et al., 1986; Rosenblatt et al., 2000; Salvi et al., 2007; Strange, Chen, & Sanders, 1992; Wofford, Schwartz, & Byrum, 1993). Patients aged 75 years and older made up a greater percentage of the ED patient population than patients between the ages of 65 and 74 years, and only the 75 plus group disproportionately represented their presence in the community (Baum & Rubenstein, 1987). Others have shown that visit rates are nearly double among patients 85 years and older as compared with patients in their late 60s (Rosenblatt et al., 2000).

A single study from Israel compared the ED use of middle-aged (aged 45-64 years), young-old (aged 65-74 years), and old-old adults (aged 75+ years) and found a two-fold increase in ED use by the old-old as compared with all others. The study also showed that although the proportions of patients aged 45 to 64 and 65 to 74 years among the ED patients were close to their proportions in the general population, the proportion of patients older than 75 years was more than twice as high as their proportion in the general population (3.9% vs. 8.3%; Carmel et al., 1990).

Need for Emergency Department Care

While it is clear that older adults have greater medical care needs than younger adults, it is less clear whether older adults also have greater need for emergency care. In an effort to clarify this, several studies have attempted to quantify the appropriateness of ED visits in both age groups. Appropriateness has been largely conceptualized in one of two ways. In the first, and more commonly used method, appropriateness is meant to capture the need for emergency medical care at the time it is sought and is measured using indicators of illness severity such as use of emergency medical services (EMS),

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acuity, ED length of stay, degree of diagnostic work-up, and hospital admission. In the second method, appropriateness is defined as seeking health care in the most appropriate setting and is measured as attempts to contact a primary care provider prior to visiting the ED. In both cases, the research overwhelmingly suggests appropriate ED use by older adults, particularly when compared with younger patients (Ettinger et al., 1987; George et al., 2006; Hayes, 2000; Roberts, McKay, & Shaffer, 2007; Singal et al., 1992; Strange et al., 1992).

The following subsections describe the various indicators of appropriateness that have been used to measure older adults' need for ED care.

Emergency Medical Services. A small number of studies looked at EMS and found that older adults were two to four times more likely to arrive at the ED by ambulance than younger adults (Baum & Rubenstein, 1987; Ettinger et al., 1987; Singal et al., 1992; Strange et al., 1992; Wofford et al., 1993). In one study, investigators found that 22.1% of all EMS responses in a catchment area were for people older than 65 years and that the rate of use in this age group was nearly double that in younger adults (Gerson & Shvarch, 1982). A recent study from the United States estimated an EMS use rate of 167 transports per 1,000 persons older than 65 years (Shah et al., 2007). Despite higher rates of EMS use, older adults were found to be less likely to use EMS when not needed and more likely to use EMS when the condition was potentially life-threatening than younger adults (Gerson & Shvarch, 1982).

Consistent with other age-related trends, EMS use was highest among those older than 85 years. One study found that the rate of transports increased from 51 per 1,000 persons for those 60 to 64 years to 291 per 1,000 persons for those older than 85 years, with a steady increase across the intervening 5-year age groups (Wofford et al., 1995). Another showed the proportion of ED visits made by older adults who used EMS also increased from 27% among those aged 65 to 84 years to 48% among those older than 85 years (Shah et al., 2003).

Acuity on Arrival. The majority of studies included some measure of acuity on arrival in the ED. The research generally found that older adults have a higher frequency of acute illness than younger adults, suggesting that the visit increase in older age groups is not explained by more trivial or nonurgent visits (Baum & Rubenstein, 1987; Ettinger et al., 1987; Lowenstein et al., 1986; Nawar et al., 2007; Roberts et al., 2007; Singal et al., 1992; Strange et al., 1992).

Several studies found that the frequency of urgent or emergent classification on arrival in the ED increases with age (Ettinger et al., 1987; Nawar et al., 2007; Singal et al., 1992; Strange et al., 1992). One study showed that the frequency of urgent/emergent triage increased from 31% among younger adults to 37% among those aged 65 to 74 years to 45% among those older than 75 years (Lowenstein et al., 1986). Wolinsky et al. (2008) used Medicare fee codes to classify visits according to the intensity of services provided. They found that 28.9% of visits studied were labeled "high intensity" meaning that the services were provided for a life-threatening reason and only 5.7% of visits were labeled "low intensity" meaning that care could have been provided elsewhere.

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Length of Stay in the ED and Diagnostic Work-Up. Older adults stay in the ED for 19% to 58% longer than patients in other age groups (Baum & Rubenstein, 1987; George et al., 2006; Lowenstein et al., 1986; Moons et al., 2003; Singal et al., 1992). The longer length of stay can be attributed, at least in part, to a more extensive work-up. Age has been found to be associated with a greater number of diagnostic tests, such as X-rays, electrocardiograms, and blood tests (Aminzadeh & Dalziel, 2002; Baum & Rubenstein, 1987; Ettinger et al., 1987; George et al., 2006; Lowenstein et al., 1986; Singal et al., 1992; Strange et al., 1992). Ettinger et al. (1987) found that far more laboratory tests were ordered for older patients regardless of their diagnostic category or urgency of visit: older patients had more electrocardiograms (40.8% vs. 8.9%), blood tests (54.6% vs. 19.5%), and X-rays (52.2% vs. 37.2%) than younger patients. Others have shown that older adults are more likely to receive multiple tests than their younger counterparts (Lowenstein et al., 1986).

Hospital Admissions. Between one third and one half of all ED visits by older patients were found to result in hospital admission. This is 2.5 to 5.6 times more than the number of admissions among younger adult ED patients (Baum & Rubenstein, 1987; Downing & Wilson, 2005; Ettinger et al., 1987; George et al., 2006; Gillick & Steel, 1983; Lowenstein et al., 1986; Roberts et al., 2007; Singal et al., 1992; Strange et al., 1992). Hospital admission rates were found to increase from 33% among the 65 to 74 years age group to 47% among the older than 75 years age group, compared with 19% among younger patients (Lowenstein et al., 1986). Roberts et al. (2007) showed that this is a relatively stable trend and that for each year between 1993 and 2003, at least 30% of ED visits by older adults in the United States ended in hospital admission.

Attempts to Access a Primary Care Provider Prior to the ED Visit. Compared with younger ED patients, older patients were more likely to report having a primary care physician (PCP) and more likely to have attempted to contact the PCP prior to visiting the ED (Aminzadeh & Dalziel, 2002; Denman, Ettinger, Zarkin, Coon, & Casani, 1989; Ettinger et al., 1987; Lowenstein et al., 1986; Oates, Heslop, & Boord, 1997; Parboosingh & Larsen, 1987). Baum and Rubenstein (1987) found that the proportion of patients able to identify a personal physician or other regular source of medical care increased progressively with age from 55% of people younger than 45 years to 95% of those older than 75 years. Parboosingh and Larsen (1987) found that more than one half (53.3%) of their older than 65 years study sample who reported that they had attempted to contact a PCP before presenting to the ED. Wolinsky et al. (2008) found that older adults in rural communities were more likely to make low-intensity ED visits but similarly as likely to make high-intensity visits as those in urban communities suggesting a lack of alternative care sites in less service-rich areas.

Summary: Need for ED Care. Multiple markers show that older adults do have a greater need for care in the ED than other age groups. In addition to having more serious illness on arrival in the ED, as measured by triage acuity, work-up, and hospital admission, older adults were also more likely to attempt to contact their PCP or other regular source of medical care prior to arriving at the ED. Despite the consistency of

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these findings, there were little data to show which older adults may be at greatest risk for requiring care in the ED.

Proactive Care to Prevent the Need for Emergency Department Care

In the following subsections, we describe the research findings on use of primary and supportive care and associations with ED visits among older adults. We first look at the effects of having a regular care provider, which should result in management of chronic conditions as well as provide a "safety net" before a health crisis requiring ED care occurs. We also chose to look at the effects of supportive care because functional decline is considered to be a major contributor to ED use by this population. In both cases, we found limited research that fully explored the association between access to or use of care services and subsequent ED visits.

Primary Care. A small number of studies examined the link between primary care and ED use among older adults and found that access to care was associated with a lower rate of ED use. Rosenblatt et al. (2000) found that Medicare enrollees without a PCP made a disproportionate share of ED visits as compared with enrollees with a PCP and that this discrepancy persisted at all levels of illness severity and was not explained by other sociodemographic factors. Another study found that not having a PCP or having a low degree of care continuity were independently associated with higher rates of ED use even after controlling for age and comorbidity. Notably, older adults with no or low use of a primary care provider were approximately 45% more likely to visit the ED than those with high degree of care continuity (Ionescu-Ittu et al., 2007).

A single study reported the frequency of ED visits for ambulatory care sensitive conditions, which are exacerbations of conditions known to be responsive to regular primary care. They found that 20% of ED visits by older adults in the community could be considered ambulatory care sensitive (Carter, Datti, & Winters, 2006) and therefore potentially prevented with better primary care.

Supportive Care. We found a single study that evaluated formal supportive care services and ED use. Wilson and Truman (2005) compared ED visits between community-based older adults who did and did not receive home care services and nursing home residents. They found that the frequency of visits was highest for older adults with home care, even when compared with older adults in nursing homes (70.1% vs. 34.8% and 36.7% for older adults in the community without formal care and those in nursing homes, respectively). The authors concluded that the high rate among home care recipients suggests that available programs are not able to adequately meet their needs, while the lower than expected rate among nursing home residents can be explained by their regular access to physicians and other health services.

Summary: Proactive Care. Overall, few studies examined the effect of primary care on ED use by older adults. The available evidence suggests that having a PCP does

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decrease the risk of an ED visit; however, the frequency of visits for ambulatory care sensitive conditions suggests that simply having a PCP is not enough. The single study on supportive care was restricted to formal home care services without further elaboration on the types of services provided.

Adverse Events After Emergency Department Use

For older adults, an ED visit represents a period of extreme vulnerability that extends beyond the visit itself. The frequent occurrence of repeat ED use, subsequent hospital admission (separate from the ED visit), nursing home admission, and death following an ED discharge is well-studied. The literature in this area underscores broader problems in the health system's ability to meet the needs of older adults as well as the importance of the ED in identifying those needs and referring them to the appropriate services.

One study found that 43.9% of older adults who visited an ED made at least one repeat visit in the following 6 months and that the rates of return were highest in the first 30 days (19.3%; McCusker, Cardin, Bellavance, & Belzile, 2000). In two separate studies, Hastings and colleagues found that 17.2% of the general older population returned to the ED within 90 days (Hastings, Oddone, Fillenbaum, Sloane, & Schmader, 2008) while 26% of a veteran population returned in the same time period (Hastings et al., 2007). Another 13% to 18% of older adults were found to be admitted to hospital within the 90 days of an index visit (Caplan, Brown, Croker, & Doolan, 1998; Hastings, Oddone, et al., 2008; Hastings et al., 2007). In the same time period, a smaller, yet still substantial, proportion were found to have been admitted to a nursing home (2.6%) or died (4.1%; Hastings, Oddone, et al., 2008).

Efforts to identify which older adults are most at risk for an adverse outcome following an ED visit have consistently shown that those who report difficulties with the ADLs and require help at home are at the greatest risk (Caplan et al., 1998; Chin et al., 1999; Denman et al., 1989; Friedmann et al., 2001; Hastings, Purser, Johnson, Sloane, & Whitson, 2008). Instruments such as the Triage Risk Screening Tool (TRST) and the Identification of Seniors at Risk (ISAR) were designed to aid identification of ED patients most at risk for subsequent decline and repeat ED use or nursing home admission (Hustey et al., 2007; McCusker et al., 2001; Meldon et al., 2003). The TRST was shown to be highly sensitive to ADL decline (Meldon et al., 2003) while the ISAR's strongest predictive item was lack of support at home (McCusker et al., 2000).

Meanwhile, others have shown that features of an ED visit itself may contribute to the risk of a return ED visit for older adults. Measures of the hospital's resources, including having fewer than 12 ED beds, not having a geriatric unit, not having a social worker, and having fewer available hospital beds, increased the likelihood of a patient returning for a repeat ED visit. Furthermore, visits that occurred on weekends were less likely to resolve the initial problem and visits that occurred during times of overcrowding were more likely to result in a repeat ED visit that resulted in hospital admission (McCusker et al., 2007).

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Nursing Home Residents

Fewer studies evaluated ED use by nursing home residents with less exploration of issues around need for care in the ED and the effect of proactive health care services. We found two studies which estimated ED use by nursing home residents relative to use by older adults in the community. Using data from a single Canadian province, Wilson and Truman (2005) found that a similar proportion of older adults in the community made at least one ED visit as did older adults in nursing homes (36.7% and 34.8%, respectively; Wilson & Truman, 2005). In contrast, Carter et al. (2006) found that nursing home residents, who account for approximately 5% of the U.S. older population, accounted for 12.2% of visits in their age group. They estimated a visit rate of 131.4 visits per 100 person-years for older adults in nursing homes as compared to a visit rate of 48.4 visits per 100 person-years for all other older adults (Carter et al., 2006).

Six studies reported either the chief complaint or primary diagnosis during the ED visit (Ackermann, Kemle, Vogel, & Griffin, 1998; Carter et al., 2006; Chou et al., 2009; Finucane, Wundke, Whitehead, Williamson, & Baggoley, 1999; Jones, Dwyer, White, & Firman, 1997; Kerr & Byrd, 1991). Overall, infections, such as respiratory and urinary tract infections, accounted for 23.6% of all ED visits (Chou et al., 2009). Other common conditions included fall-related injuries (7%-12%), gastrointestinal problems (9.9%-15.4%), and altered mental status (9.3%-10.1%).

Several studies examined residents' need for care in the ED but in a less detailed manner than for community-based older adults. Four studies quantified need by using a list of clinical criteria on ED presentation to assess illness severity (Bergman & Clarfield, 1991; Finn et al., 2006; Jones et al., 1997; Kerr & Byrd, 1991). More than 55% to 77% of visits were deemed appropriate based on these criteria and only 13.1% were deemed "inappropriate." Two studies looked at access to a physician at the time of the emergent incident. One study found that nurses were unable to contact the physician prior to ED transfer in 12% of cases (Jones et al., 1997), while another found that physicians took an average of 5 hours to respond to calls from the nursing home and up to 3 days for half of the residents to be seen (Brooks, Warshaw, Hasse, & Kues, 1994). A single small qualitative study refuted these findings and reported that physicians were perceived as highly involved in transfer decisions (Jablonski, Utz, Steeves, & Gray, 2007). Regardless of perceptions of involvement, Finn et al. (2006) found that ED transfers were more often judged as appropriate (27%) than inappropriate (14%) when the resident was first seen by a physician in the nursing home.

Use of regular primary care is less studied in the nursing home setting. Two studies supported the importance of regular care in this population but suggested that it was limited. One study found that residents with urinary tract and respiratory infections were less likely to visit the ED if they had regular physician access (Brooks et al., 1994). Another study found that 22% of visits from nursing homes were ambulatory care sensitive (Carter et al., 2006). Nursing home residents were also more than twice as likely as community residents to have an ambulatory care sensitive hospitalization from the ED visit.

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Discussion

Our review of the literature on ED use by older adults reveals several key findings. First, the disproportionate ED use by older adults is not the result of "inappropriate overuse." Older adults are often acutely ill and in need of high-intensity care at the time they present to the ED illustrating that older adults have greater needs for ED care, and not medical care in general, than other age groups. Second, the burden of fall-related injuries, other self-care problems, and the high occurrence of repeat ED visits suggests a complexity of need that goes beyond immediate medical care. These findings further support the notion that ED visits among this age group may signal an ongoing process of decline rather than a single isolated event. While access to a primary care provider appears to prevent the need for ED care, it is less clear how supportive care services affect this risk. Finally, despite the large volume of research literature on this issue, critical gaps limit appropriate evidence-based policy and practice development.

The literature clearly shows that the specific needs of older adults are reflected in their different patterns of ED use as compared with younger adults; however, limited exploration of the full scope of those needs precludes the development of evidence-based interventions to reduce the need for ED care among older adults. For example, self-care problems were frequently described as a primary contributor to the need for ED care among older adults. For the most part, the concept of self-care problems was largely undefined but tended to encompass functional difficulties that interfered with an older person's ability to fully engage in care activities. In 1992, the Geriatric Emergency Task Force recommended that attention to the social, psychological, and functional problems of older adults be added to the principles of ED care and implemented into routine practice (Sanders, 1992). Despite these recommendations and the frequent discussions of self-care limitations, we identified only a few studies which empirically examined this issue but these studies mostly examined risk factors for repeat ED visits. Falls were often recognized as an outcome of self-care problems and fall-related injuries were among the most common reasons for ED visits by this age group. However, we did not find any studies that focused on linking self-care measures, such as needing help at home, with the incidence of ED visits for fall-related injury. We found only a single study which included cognitive functioning as a risk factor for ED use (Wolinsky et al., 2008) but none that focused on the burden of cognitive impairment among older ED patients. This lack of research was somewhat surprising given the impact of cognitive decline on self-care abilities and the fact that the prevalence of cognitive impairment and the frequency of ED use both increase with age.

One of the most significant gaps in the research literature was the limited use of population-based data to study ED visit patterns by older adults. Of the 19 original research studies that we found, only 6 used population-based data that were linked to information about the source population. All others used patient chart reviews either collected directly from a small number of hospitals or publicly available data sources

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such as the NHAMCS. While these studies illustrate the need for ED care among older adults who present to the ED, the absence of data on the source population precludes identification of risk factors for ED use. The result is a limited ability to identify high-risk groups who may benefit from proactive care that prevents the need for ED care from developing in the first place. This gap also results in limited research on differing patterns of ED use according to geography or other sociostructural constructs. We identified only two studies which compared ED use between rural and urban areas but little else that examined other contextual issues that might affect the likelihood of older adults seeking care in the ED.

The results indicate that many of the older adults who seek care in the ED do require immediate hospital access but that a substantial proportion could likely be served in a less resource-intensive setting. Despite this, we found very little research that examined opportunities to obtain the appropriate care outside of the ED setting at the time of the emergent problem. While several studies showed that a high percentage of older patients attempted to contact their PCP prior to their ED visit, none reported on the quality of contact or whether immediate access to the regular PCP did prevent ED visits. We also found no research on access to or use of ED alternatives, such as urgent care clinics. Without such evidence it is difficult to evaluate the extent to which visits for nonurgent problems is driven by a lack of appropriate alternatives and the opportunity for such alternatives to further reduce older adults' needs for care in the ED at the time of the visit.

The most obvious gap in the research literature was the paucity of studies examining the effect of proactive health services (such as primary and supportive care) on preventing the need for ED care among older adults. The reasons for older adults' visits to EDs are often described as slowly evolving problems that ultimately culminate in the need for emergency care. Ambulatory care sensitive conditions, which are often used as a measure of access to primary care, were found to account for as many as 20% of all ED visits by older adults (Carter et al., 2006). Several studies found that the majority of older adults reported having a PCP and two studies found that older adults with a strong relationship with a PCP were less likely to use the ED than older adults with a weak or no relationship with a PCP (Ionescu-Ittu et al., 2007; Rosenblatt et al., 2000). While the research literature to date has documented the importance of primary care in preventing worsening or exacerbation of chronic conditions, we were unable to identify any studies which examined which components of primary care, beyond having a PCP, were most strongly associated with lower rates of ED use. Furthermore, we found little research on other forms of health services, such as home care or other chronic disease management strategies. This limitation has resulted in a major gap in our understanding of how access to early care services may prevent the need for high-resource care provided in the ED or hospital.

Several studies documented the frequency of repeat ED visits and other related adverse events. While none of these studies identified specific causes of these events or evaluated the quality of care during the initial ED visit, they did find that functional impairment, which is not commonly addressed in the ED setting, was a primary predictor

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of subsequent problems. This issue has been noted by others who argue that there is a clear discrepancy between the structure and process of modern EDs and the needs of the people who most frequently use them (Adams & Gerson, 2003; Schumacher, 2005). The most striking examples of these are reports by ED staff who say they received inadequate training in geriatrics and that structural prioritization of medical procedures in the ED precludes their ability to meet the needs of older adults (Peterson, Fairbanks, Hettimger, & Shah, 2009; McNamara, Rousseau, & Sanders, 1992; Schumacher, Deimling, Meldon & Woolard, 2006; Kihlgren, Nilsson, & Sorlie, 2005; Robinson & Mercer, 2007). Efforts to introduce geriatric interventions into EDs have shown mixed results, and comparisons of overall intervention effects have proven to be difficult (McCusker & Verdon, 2006). These findings emphasize the importance of incorporating the ED into the geriatric care system so that visits can trigger the appropriate responses to prevent further adverse outcomes.

We conducted a separate search for studies on ED use by nursing home residents because we found that many studies in the general literature either purposefully excluded patients transferred from nursing homes or did not identify them in their analyses. Nursing home residents account for only a small fraction of all older adults but they represent a particularly vulnerable group who are at high risk for emergent health problems. We found 12 relevant studies that focused on nursing home residents. Overall, the findings from this research and the limitations in this literature were similar to those for older adults in the community. We were unable to find any research which used population-based data to evaluate risk factors for transfer to the ED or the effects of contextual factors such as staffing. We also found that much of this literature was at least 10 years old and may no longer be relevant to today's long-term care population that has a greater level of need. This highly vulnerable population has 24-hour access to health professionals, yet continues to have high rates of ED transfer. The lack of data on why this occurs is a major gap in the research literature that has significant implications for the quality of nursing home care and health system resource use.

Summary

Despite the volume of literature describing ED use by older adults, critical gaps limit our ability to fully understand, or address, their disproportionate use of ED services. Because of the limited research on individual-level risk factors, it is not yet clear how sociodemographic, clinical, and contextual factors lead older adults to seek care in the ED. There is also a paucity of research on the effect of proactive health services in preventing the need for ED care in the population. The lack of research on the effects of proactive care, especially supportive services, is problematic given the extent to which self-care problems contribute to ED use by this age group. Future research should better contextualize ED visits as a signal for the health system's inability to meet older adults' needs and focus on identifying practice and policy strategies to bridge such gaps.

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