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Evolving Prehospital, Emergency Department, and "Inpatient" Management Models for Geriatric Emergencies

Christopher R. Carpenter, MD, MSc and **Timothy F. Platts-Mills, MD**

Abstract

Alternative management methods are essential to ensure high quality and efficient emergency care for the growing number of geriatric adults worldwide. Protocols for case-finding and rapid diagnosis to support early condition-specific treatment for older adults with acute severe illness and injury are needed. Improved emergency department care for older adults will require providers to look beyond the diagnosis to address the influence of other factors on the patient's health: isolation and depression; finances and transportation; and chronic medical conditions and polypharmacy. This review article describes recent and ongoing efforts to enhance the quality of emergency care for older adults using alternative management approaches spanning the spectrum from prehospital care, through the emergency department, and into evolving inpatient or outpatient processes of care.

Keywords

Geriatrics; Emergency Medical Services; Emergency Service, Hospital; Case Management/ Organization and Administration; Models/Organizational

Introduction

A historically unprecedented expansion of the world's geriatric population over the next four decades will challenge prehospital emergency medical services, healthcare providers, and hospital administrators to adapt the 20th Century infrastructure and management models in order to maintain reliable access to Emergency Medicine (EM) care.[1–5] EM nurses and physicians already identify geriatric patients as a significant source of clinical stress due to the higher burden of severe illness and injury and the greater complexity of medical decision making encountered in caring for this population.[6–10] The traditional emergency care model (Figure 1a) focuses on purely diagnostic and therapeutic medical decision-making, whereas the geriatric emergency care model incorporates essential elements of older adult well-being including social isolation, transportation limitations, fixed incomes, cognitive status, and functional disability (Figure 1b).[11] Although the format and extent of change to existing organizations will depend upon local resource availability and anticipated demand, almost every healthcare system will need to adjust to some degree.[12] In addition, current policies that provide financial disincentives to short-term readmissions for common diagnoses have expanded the domain of EM to include the spectrum from proactive

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preventive care by prehospital providers to a paradigm shifting concept of the “hospital-at-home”. This chapter will explore these evolving management models within the context of contemporary emergency care for geriatric adults.

The objective of EM care for the aging adult is to alleviate suffering while providing prompt diagnosis of life-threatening pathology in order to prolong the quality of life while respecting patient and family autonomy. Chronological age is not always synonymous with physiological age so there is neither a “one size fits all” approach nor an age-based approach to care. Instead, optimal care of the older adult requires attention to the psychosocial dynamic between the patient and the patient's family or care providers, thus distinguishing geriatric care from the traditional EM care model (see Figures 1a and 1b).[11] Emergency department (ED) management that neglects geriatric care principles produces suboptimal outcomes.[13] Therefore, these principles should be incorporated into prehospital provider and EM residency education. Unfortunately, EM graduate medical education has not emphasized geriatric principles in the past.[14]

Whereas the younger patient typically presents to the ED with a symptom-based chief complaint that is generally amenable to a focused diagnostic and therapeutic approach, geriatric adults more commonly report atypical or non-specific symptoms that prompted the patient or their fatigued caregiver to seek medical care.[15] Although these symptoms can be the manifestation of an acute and reversible life-threatening illness, more often the symptoms are a result of a complex mix of chronic disease processes, some of which have not yet been diagnosed. In addition, the presenting complaint, whether life-threatening or not, may represent just one of the threats to the older patient's well-being, a situation which is far less likely in younger populations.[16, 17] These hidden threats are often viewed as outside the domain of traditional EM care and include physical or emotional isolation and neglect,[18, 19] economic disparities, polypharmacy,[20–22] functional and cognitive decline,[23, 24] malnutrition,[25, 26] fall risk,[27, 28] and inadequate access to transportation. In order to provide optimal evidence-based care incorporating geriatric principles, future EM management models will need to incorporate a sufficiently robust and adaptable organization that incorporates appropriately trained personnel, reliable streams of communication between prehospital, ED, inpatient, and outpatient services, valid protocols, and a geriatric-friendly infrastructure.[3, 8]

Prehospital Geriatric Care Opportunities

Because older adults often require assistance with transportation to the ED, prehospital providers have and will likely continue to care for a disproportionate number of older patients. As of 2007, emergency medical services (EMS) transports of adults age 65 and older comprised 38% of all US EMS transports.[29] In some regions, transports of older adults are anticipated to exceed 50% of total EMS transports in the next decade.[29, 30] In 2003, the American Geriatrics Society and the National Council of State EMS Training Coordinators developed the Geriatric Education for Emergency Medicine Services (GEMS) curriculum.[31] Providers who have completed the GEMS course report improvement in communication, abuse assessments, and falls evaluation with elderly patients.[32] Internet-based learning for EMS providers is also possible.[33]

EMS providers are willing to promote geriatric health through proactive screening programs that extend beyond the traditional scoop-and-run approach, but simple screen-and-refer pathways are ineffective.[34, 35] The burden of EMS care for older adults has generated three major areas of inquiry:[36] expressed here as questions:

1) For older adults with acute severe illness and injury, are there ways to improve the capacity of EMS providers to diagnose specific conditions in order to provide early treatment?

2) For older adults with non-severe conditions, are there alternatives methods of providing care which are less costly than the traditional approach of EMS transport, ED evaluation, and EMS return transport?

3) Can prehospital providers serve as public health stewards by conducting rapid screening assessments to identify older adults in the community at high risk for adverse events?

Progress on each of these areas of inquiry is described below.

Specific time-sensitive diseases that might benefit from rapid diagnostics include myocardial infarction, stroke, and trauma. Although EKGs in the prehospital setting are now broadly used, protocols which recognize that the majority of older adults with ST-elevation myocardial infarction do not have chest pain have not been broadly implemented.[37] Prehospital stroke protocols have been developed and validated and have the potential to accelerate access to thrombolytic therapy.[38] However, the public health impact of these protocols is limited by the controversial benefit to risk ratio of thrombolytics for stroke in any age groups and specifically in geriatric stroke patients.[39–47] In prehospital trauma care injury severity tends to be under-recognized in older adults,[48, 49] a problem that also occurs when older patients reach the ED.[50] The incorporation of age into trauma assessments may help to prevent under-triage of older trauma patients.

Alternatives methods of providing prehospital care for older adults who might otherwise seek care in the ED has the potential to reduce costs. Any such approach must also have the capacity to identify patients with time-sensitive illness and injury. One option is telemedicine, in which a patient assessment by a physician verbally and visually is via audio and video transmissions. Telemedicine is currently being studied as a method of reducing ED visits. Telemonitoring of older adults involves daily assessments using the same technology, but a randomized study did not find that this approach reduced ED visits or hospitalizations.[51] Increased access to primary care following an EMS evaluation has been shown to decrease ED use.[52, 53] However, access to primary care for older US adults continues to be a problem, reflecting both reimbursement problems and personnel shortages.[54, 55]

The potential of prehospital providers to screen older adults for risk of falls, depression, or medication mismanagement has been demonstrated.[56] Prehospital screening for fall risk has yielded equivocal outcomes, but prospective referrals during the initial in-home evaluation are superior to retrospective EMS medical record review and refer models.[57–60] Ongoing research will assess the effectiveness of EMS fall screening in the near future.[61, 62] The impact of EMS screening on ED use and other health outcomes has not been evaluated. Given the large number of at risk older adults with limited access to primary care in the United States (US),[63] there is a large potential value in developing the capacity of EMS providers to identify older adults most likely to benefit from increased access to health care. Implementing this type of preventive care broadly will require both additional research demonstrating an impact on important outcomes and mechanisms to reimburse EMS systems.[64, 65]

The Geriatric Emergency Department

One method by which to classify ED clinical services for geriatric adults is to assess the availability of human resources, care processes, and community services linkages.[66] In

general, specialized tertiary care ED's lack effective linkages to outpatient geriatric services, particularly when contrasted with the least-specialized community hospitals.[67] We distinguish two stylistic approaches to caring for geriatric emergencies: the *geriatric-friendly ED* versus the *geriatric-specific ED*. Whereas all general adult ED's should aspire to become geriatric-friendly, the geriatric-specific ED only manages older adults. Currently, very few geriatric-specific ED's exist and most are within hospitals that also have a general adult ED, but they are geographically distinct with separate staffing, protocols, and objectives. Most healthcare systems lack the resources to build a geriatric-specific ED. In contrast, the geriatric-friendly EDs can be achieved in most settings and is the baseline level of geriatric care to which all adult ED's should aspire. A quality assessment tool for the geriatric-friendly ED has been developed and incorporates three subscales: screening/assessment, discharge planning, and community services.[68] Although this instrument awaits validation, quality assessment tools for the geriatric-friendly ED will be essential for clinicians, managers, administrators, and payers to evaluate the merits of this concept.

The attributes of effective ED-based geriatric case management include an evidence-based practice model, nursing clinical involvement and leadership, high-risk screening protocols, focused geriatric assessments, the initiation of care and disposition planning in the ED, interprofessional and capacity-building work practices, post-ED discharge follow-up, and established quality improvement processes.[69] Clinical research in alternative ED management models which fails to demonstrate a clinically significant effect usually lack attention to more than one of these domains.[69, 70] In particular, whether the hospital environment is rural or urban, academic or community, engaging nurses in protocol development and case management is essential as demonstrated by the Regional Geriatric Programs of Ontario.[12]

Modification of the general adult ED towards a more geriatric-friendly ED that simultaneously yields optimal outcomes while minimizing resource consumption will need to incorporate focused staff education, pragmatic and evidence based screening services, simple infrastructural considerations that accommodate the physiological changes of aging, and readily available access to geriatricians. [Table 1] Educational priorities for physicians and nurses to improve the care of older adults have been identified: recognition of atypical disease presentation; trauma assessment principles; recognition of cognitive decline; pain management alternatives; transition of care principles; and the contribution of comorbid illnesses to both disease presentation and effective management strategies.[14] In 2011 the American College of Emergency Physicians' (ACEP) and Society for Academic Emergency Medicine (SAEM) Geriatric Sections produced and disseminated contemporary educational modules for many of these core competencies [Table 2].[71]

Universal screening occurs when asymptomatic individuals are evaluated for a condition. Case finding refers to the screening of a subset of patients based on the presence of risk factors. EM leaders have long advocated for both universal screening and case finding programs for geriatric syndromes like cognitive dysfunction, fall risk and frailty.[24, 72–74] At least two barriers obstruct the implementation of geriatric syndrome screening. First, very few appropriately brief, pragmatic ED screening instruments have been validated for these geriatric syndromes.[36, 75] Research continues to identify screening instruments for dementia,[76–78] fall risk,[79, 80] and functional decline,[81–83] but these instruments have yet to be validated in other settings and important geriatric syndromes like frailty and delirium await instrument validation in the ED.[36, 75] As a result, reviews and guidelines for ED management of geriatric syndromes like dementia are often extrapolated from non-ED settings.[84]

The second barrier is daily ED crowding and ongoing nursing shortages, which limit the time available for providers to conduct screening. One alternative management strategy is the “Geriatric Technician” (GT), an individual who is neither a nurse nor a physician with the sole responsibility of assessing elderly ED patients for geriatric syndromes using simple, reliable, and valid screening instruments. The GT workforce might consist of volunteers, students, or retirees. In one busy tertiary academic medical center EM nurses and physicians recognized the potential for the GT model to promote patient safety and improve overall clinical care without reducing ED operational flow.[85]

Changes in infrastructure appropriate for a geriatric-friendly ED overlap with those described for geriatric-specific EDs, but are simpler to implement without a geographically distinct site of care or expensive reconstruction. Simple alterations to the structure of the ED that promote a geriatric-friendly milieu include an easy chair in addition to or in place of the traditional hospital bed. Wilber et al demonstrated that in appropriate geriatric patients the easy chair was preferred with improved patient comfort and satisfaction scores and without any adverse events noted.[86] Another easy alteration that all ED's can implement is to increase the font of discharge instructions and prescriptions to accommodate the visually impaired.

Despite focused education of providers regarding geriatric care, ample screening mechanisms, and pragmatic infrastructural modifications, some elderly patient's diagnosis and short-term prognosis remain poorly defined at the end of an ED evaluation. Since current inpatient funding models, which rely on diagnoses to request compensation, discourage admission of these individuals, alternative rapid access consult systems provide a means to increase the likelihood that patient outcomes do not suffer from payers' policies. One approach to this problem is the mobile Acute Care for the Elderly (ACE) team. Whereas the traditional ACE unit is solely an inpatient site, the mobile ACE team brings the medical expertise of the unit to the ED to conduct comprehensive geriatric assessment screening,[87–89] caregiver and patient psychosocial needs assessment, and ensure access to outpatient resources based upon the results of their formal assessment.[36] Some settings have used hospitalists in the ED or hospital rather than geriatricians to staff the ACE unit.[90, 91]

The geriatric-specific ED would incorporate all of the principles from the geriatric-friendly ED, but staff a geographically distinct ED for senior adults with nurses, physicians, social workers, and case coordinators specially trained to care for this population. This focus on geriatric adults permits an infrastructure that is completely modified for the older adult. The infrastructure includes appropriate lighting to optimize visual acuity while minimizing nocturnal delirium or other confusional states, handrails in hallways and bathrooms, protocols for pain and agitation management and fall prevention, slip-proof flooring, palliative care, and multidisciplinary care services with geriatric expertise that maintain continuity of care for admitted patients.

Geriatric Emergency Care Beyond the Emergency Department

Acute care for older adults does not end in the ED. For older adults with severe illness and injury, coordination of ED and inpatient care can improve the transfer of patient information, ensure that key interventions are initiated early and are continued after the patient leaves the ED, and ensure that patient care preferences are communicated to all providers. In contrast, failure to coordinate ED and inpatient care has the potential to prolong time in the ED lengths of stay and lead to frustration on the parts of patients, families, and providers. Trauma and delirium are two particular conditions in which coordination with inpatient specialists is likely to be of particular value.

In the case of trauma, care at a trauma center for adults age 80 and older and activation of a trauma team for patients age 70 and older with an Injury Severity Score of 15 or more have each been associated with improved outcomes as compared to usual care.[92, 93] Thus, for older adults with serious injuries, early care by the trauma team is appropriate. Aggressive treatment in elderly trauma patients has been examined in observational studies, with most studies pointing to the value of intensive early treatment for older adults with life-threatening injuries.[94–96] These studies also show that, as with other conditions in older adults, functional status and comorbidities are stronger predictors of outcomes from a given injury than age.

Like trauma, delirium is also a common and potentially life-threatening condition in older adults and likely to benefit from early initiation of specific therapies.[97, 98] Unfortunately, delirium is under-diagnosed in older ED patients.[99–103] As a result, any efforts to improve outcomes for ED patients with delirium must first ensure the early and accurate identification of delirious patients. Once identified, the goals of delirium care are to treat underlying causes while mitigating symptoms with a minimum of physical and chemical restraints. As compared with delayed management, early care of older adults with hyperactive delirium by geriatricians and psychogeriatricians have demonstrated improved outcomes.[104] Specifically, early interventions for hyperactive delirium in patients admitted from the ED reduce the need for physical (44% vs. 63%) or chemical (49% vs. 76%) restraint, reduced hospital length of stay (17 days vs. 25 days), reduced the duration of delirium (11 days versus 22 days), and lowered fall rates.

Once delirium is recognized, emergency providers should initiate delirium treatment in the ED. Key components of a comprehensive approach to treating delirium have been described: orientation; non-pharmacologic sleep aids; early mobilization; visual aids; hearing aids; and the prevention of dehydration.[105] Furthermore, communicating this diagnosis to the inpatient team and developing methods for continuing delirium treatment in the hospital is likely to be beneficial. Inpatient care by a multidisciplinary team led by a geriatrician with an emphasis on avoiding potential harmful interventions (e.g. Foley catheters, bed rest, some medications) has been associated with a greater improvement in physical function over usual care.[106, 107] This inpatient model evolved from the traditional Acute Care for the Elderly (ACE) unit to designate one area of the ACE unit the “delirium room” that is situated to permit continuous nurse monitoring with the intent to minimize delirium-related morbidity. The “delirium room” concept has been replicated in other inpatient settings and is cost-effective, but opponents debate whether an ED-based observation unit for suspected delirium would be ethical, cost-effective, and utilized appropriately.[108, 109] Trials continue exploring the effect of the “delirium room” on patient outcomes.[110, 111]

The Hospital at Home® Model

For admitted patients of all ages, ED boarding times continue to increase, a trend likely to increase as baby-boomers become octogenarians.[112] Thought leaders, patient safety experts, and policy makers urge proactive and creative solutions to the challenge of ED boarding.[113] In addition, hospital care itself can be a health risk for geriatric adults with iatrogenic events such as functional decline, pressure sores, falls, and delirium commonly reported.[114] Alternatives to traditional inpatient management models exist and early trials have been promising. The “admission avoidance” Hospital at Home® model carefully selects a subset of geriatric patients for whom ED personnel deem hospital admission appropriate and who meet explicit criteria (Table 3)[115] for a few diagnoses including chronic obstructive pulmonary disease exacerbations, cellulitis, or pneumonia. The difference is that rather than being transferred to the hospital ward, these patients go home with an inpatient-like management plan.

Hospital at Home® care includes telemetry, and at least 12-hours of nursing care and one physician home visit each day. One meta-analysis of five randomized trials including 844 patients demonstrated improved six month mortality (adjusted hazards ratio 0.62, 95% confidence interval 0.45–0.87) for the Hospital at Home® model.[116] Additionally, family members report less stress with Hospital at Home® management and healthcare providers view it as both viable and acceptable.[117, 118] In Australia this model has been sustainable over 7-years and less than 5% fail the home care model by requiring transfer back to the hospital.[119] In the US the Hospital at Home® model was developed by Johns Hopkins and has been slow to disseminate.[120] The barriers to wider-spread implementation of this model in the US include an insufficient understanding of healthcare system adoption and infrastructural alteration costs, as well as the contradictory fee-for-service payment system that provides little incentive for hospital to adopt less expensive alternatives to admission.[121] However, in an era of increasingly constrained healthcare budgets, policy-makers are beginning to note that Hospital at Home® care is consistently less costly than traditional hospital management and is preferred by patients.[122]

Conclusions

Emergency care for an aging population represents a challenge and an opportunity for multidisciplinary management of acute health issues. Ample opportunity exists for the cross-disciplinary exchange of ideas through the American Geriatrics Society Section for Enhancing Geriatric Understanding and Expertise Among Surgical and Medical Specialists,[123] the SAEM Academy of Geriatric Emergency Medicine,[124] and the ACEP Geriatric Section.[125] A paradigm shift in the traditional ED management model and inpatient scenario will likely improve healthcare delivery for all age groups. However, the characteristics that define high-quality alternative management models for geriatric adults have yet to be delineated. In addition, the feasibility and financial sustainability of novel prehospital screening programs, geriatric friendly ED's, inpatient delirium rooms, and the Hospital at Home® model remain largely untested.[36] Nonetheless, these alternative management strategies provide a template for heterogeneous emergency care environments around the world to begin exploring more efficient pathways of care for a rapidly aging society.

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KEY POINTS

1. Ensuring high quality and efficient emergency care for the growing number of older US adults will require the development of alternative management strategies for providing emergency care.
2. Prehospital emergency care for older adults may be improved through the development of new methods for the early detection of acute severe illness and injury in order to guide timely condition-specific treatment.
3. Prehospital providers may make an additional contribution to the health of older adults by conducting in-home assessments and referral of high-risk older adults.
4. Emergency department care may be improved through a team approach and through standardized screening procedures for important commonly over-looked conditions (e.g., delirium, dementia, depression, drug-related adverse effects, neglect/abuse).
5. For conditions with high mortality rates (e.g., trauma, delirium), improved coordination of care during the transition from the emergency department to the inpatient setting may improve outcomes.

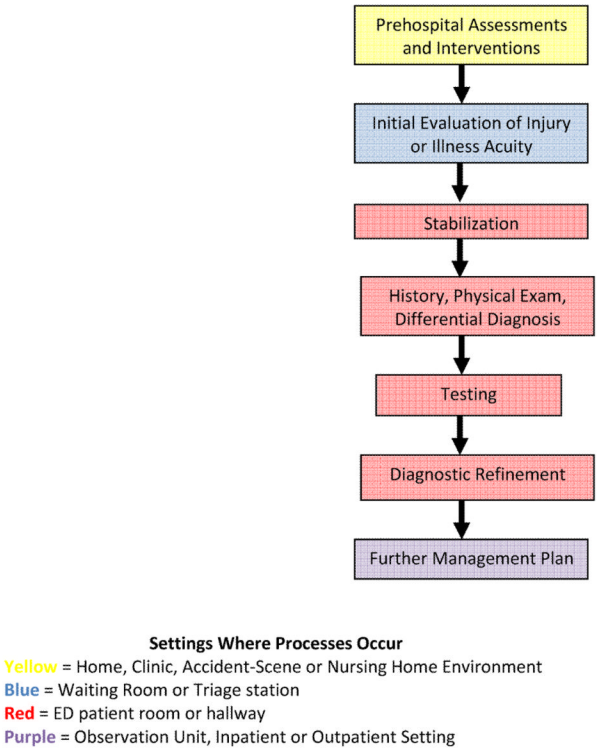

Figure 1a.
Traditional EM Management Pathway*
*Adapted from [11] with permission.

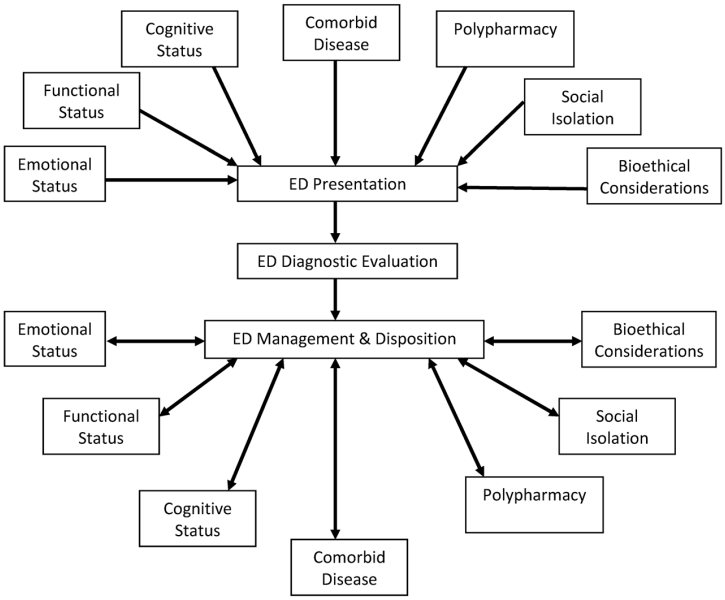

Figure 1b.
Geriatric Emergency Care Model*
*Adapted from [11] with permission.

Table 1

Considerations for the Geriatric-Friendly ED

Domain	**Examples**
Staff Education	Recognition of Atypical Disease Presentation
	Trauma Resuscitation Priorities
	Polypharmacy
	Transitions of Care
Screening	Falls
	Cognitive Dysfunction
	Frailty
	Functional Decline
	Neglect
Infrastructure	Armchair
	Bedside commode
	Large print instructions
Accessible Consults	Mobile ACE Unit
	Stay Healthy Clinics
	Palliative Care
	Pain Management

Table 2

Available Geriatric EM Educational Modules*

Titles
General Assessment of the Elder Patient
Abdominal Pain in the Elderly
Altered Mental Status
Chest Pain & Dyspnea
The Dizzy Elder Patient
End-of-Life Issues
Falls
Infectious Diseases
Pharmacology and Polypharmacy
Physiological Changes in Aging

* Available online at [71].

Table 3

Exclusion Criteria for Hospital at Home® Model*

Diagnosis	Exclusion Criteria
Congestive Heart Failure	Associated arrhythmia
	Known or suspected severe valvular heart disease
	Unstable angina
	Myocardial infarction within previous 3 months
	Rales > ½ lung field at completion ED treatment
COPD	Other significant pulmonary disease such as lung cancer or pulmonary fibrosis
Community Acquired Pneumonia	Suspected supportive infection (empyema, meningitis, endocarditis)
	Alternative explanation for abnormal chest x-ray
	Cavitating lesion on chest x-ray
	Other significant pulmonary disease such as lung cancer or pulmonary fibrosis
	Pneumonia within previous 6 weeks
	Leukopenia with leukemia, HIV, lymphoma/myeloma, or cytotoxic medications

*Summarized from [115].