



Geriatric Emergency Management (GEM):

*An Overview of
Delivery Models, Screening Tools and
Practice Guidelines*

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Geriatric Emergency Management (GEM):

An Overview of Delivery Models, Screening Tools and Practice Guidelines

Purpose

This overview document outlines some of the potential strategies for improving the care of the elderly in the Emergency Room (ER) and/or assisting ER staff in addressing the specific needs of the elderly patient.

A large body of literature exists on the ER utilization patterns of elderly patients, and in combination with the increasing numbers of the elderly as a percentage of the overall Canadian population, specific challenges will be incurred by ER care providers in developing the capacity to manage the care of aged individuals. Geriatric Emergency Management (GEM) programs allow hospitals other means by which to address such challenges, as GEM programs may reduce ER costs associated with care of the elderly, enhance the flow of elderly patients through the ER, and increase coordination of care for the elderly ER patient by enhancing collaboration among emergency, inpatient and community services.

Specifically, this document offers readers an overview of the published literature on service delivery models, screening tools and practice guidelines specific to GEM. It is hoped that the following information will facilitate the adoption and evaluation of such models, screening tools and practice guidelines throughout Ontario ERs and possibly within the emergency environments of other jurisdictions.

The information presented in this document is targeted toward administrators interested in operationalizing specialized geriatric services in emergency environments, as well as clinicians responsible for such implementation, and persons responsible for subsequent evaluative efforts.

The information can be used to:

- Understand the scope of possibilities with respect to GEM programming
- Replicate or design GEM programming for a specific facility or ER site
- Underpin a business case in order to secure operating funds for GEM implementation
- Assist in planning of evaluative methods for demonstration of impact of GEM programs

The service delivery models, screening tools and practice guidelines outlined below will require further evaluation by hospitals considering their adoption and development, in order to assess the relevance and adaptability of such solutions with respect to the local needs and population characteristics of the adopting hospital's ER. For example, questions for consideration could include the following:

- Was the study population similar enough to our own to justify adopting the intervention in question?
- Do we have the resources to customize the intervention to our environment?
- Are the demonstrated impacts of the intervention significant enough to justify its implementation at our hospital?

Also, when considering GEM initiatives that include decreased ER utilization by the elderly as a desired outcome, it is important to keep in mind that the pursuit of decreased ER utilization for any patient population warrants the development of a plan for detecting and analyzing any resulting negative outcomes. Decreasing ER utilization for the elderly patient may negatively affect health outcomes unless alternate supports, interventions or avenues for obtaining health and social care are put into place.

Methodology

Focus

This overview of the literature targets service delivery models, screening tools and practice guidelines specific to care of the elderly in emergency environments and studies were selected for inclusion on this basis, irrespective of the level of evidence offered by such articles. Some articles address demonstrated change in outcome measures based on the results of calculated research, while some simply describe the implementation of a geriatric specialty service. Evidentiary approaches vary from field studies to the systematic evaluation of treatments via randomized controlled trials.

Search Parameters

The initial literature review was based on a search of Medline, CINAHL and HealthSTAR journal databases, utilizing the following search parameters: Year of publication 1990+, English language articles, and local holdings found within the University of Toronto library system or within Ontario hospital libraries. As such, the universe of articles on this topic may not be fully represented here, as articles not easily accessed were not requested via special order through library services.

The content of the search was defined by cross referencing the term "emergency" with the terms "senior(s)", "elderly", "geriatric(s)", "gerontology", "gerontological" and "aged". The search was further defined by cross-referencing the results with the terms "assessment", "screening", "service models", "care maps", "care pathways", "guidelines", "consult", "teams", and "consultation" in order to return the maximum amount of articles for review.

Article Reporting Framework

Journal articles included below are described using the framework recommended by the refereed journal *Annals of Internal Medicine*, with respect to the suggested structure of journal article abstracts. This framework was introduced to provide a measure of consistency for the reporting of articles in this document. The framework is described by Haynes, Mulrow, Huth, Altman and Gardner (1990) and recommends an overview of the following categories, where applicable, when reporting on journal articles: objective, design, setting, patients/participants, interventions, main outcome measures, results and conclusions. This information was included where it was available in the original article.

No systematic assessment of the validity of findings was carried out per se, for journal articles included in this overview. However, comments on the efficacy of methodological approaches utilized in the journal articles are included for each article where necessary and/or appropriate. This document offers readers a brief overview of technical papers in the area of Geriatric Emergency Management based on this author's summary. However, as is commonly acknowledged in systematic overviews or reviews of the literature, disagreement between reviewers is common (Oxman, Cook and Guyatt, 1994). For a fuller understanding of each article and its conclusions, readers are encouraged to seek out the original full text before actually applying such references in the construction of programs, treatments and interventions.

Service Models of Care Originating in ER

A number of cohesive, coordinated and self-contained models of delivering geriatric emergency care are reported in the literature. The following overview describes models of service delivery that were designed to be located and executed within the emergency environment. Such models typically outline a specific constellation of assessments, interventions and/or staffing arrangements thought to improve the experience and health status of seniors using the ER. Outcome and effectiveness data are described where available.

Freeman (1994)

Freeman (1994) describes the development of a Quick Response Program (QRP) by Windsor Ontario's Hotel Dieu of St. Joseph Hospital, four associated county hospitals and the county's Home Care Program. The QRP was conceptualized to prevent unnecessary hospital admissions, decrease ER recidivism and promote functional abilities in the geriatric population through integrated hospital and community geriatric assessment, consultation and care planning. This descriptive article illustrates program development, implementation, and to some degree, evaluation. The QRP service was offered to all patients utilizing the hospitals' emergency room, who were sixty years of age or older, and for whom attending physicians had determined no medical need for hospitalization existed; this was the sole eligibility criteria. Appropriate patients received a one and a half hour multidimensional assessment (targeting physical, psychological, social, spiritual, and home service aspects of care) by a geriatric nurse clinician, with application of assessment instruments such as the Mini Mental State Exam. A physical exam was also administered, and a care plan developed in collaboration with the patient and family, which addressed both present and potential health problems. Patients were educated with respect to the care plan prior to discharge, and linkages to community services were organized. Of all QRP referrals, 13% were deemed inappropriate to return home by the geriatric nurse clinician, due to the potential for unsafe or unreasonably costly discharge.

Measures that reflect pre/post implementation change were sparse; however, QRP was found to have saved 5,000 bed days from 874 referrals during its first year of operation. Hotel Dieu Hospital found the average number of patients waiting in ER decreased from 54 to 3 in an 8 month period, and found a 39% decrease in patients awaiting continuing care placement that same year. Potential alternate/confounding reasons for such changes in outcome measures are not explored. Some cost information comparing average costs per client per hospitalization (\$400/day) vs. per community discharge (\$157/day) are given, and 92% of QRP patients were satisfied with the program.

Instrumentation for obtaining satisfaction measures were not described. Overall, the QRP program was felt to have promoted effective, outcome-oriented linkages between hospital and community services, to the benefit of elderly patients, as well as an increase in knowledge of the elderly by involved hospital staff.

Miller, Lewis, Nork and Morley (1996)

Miller et. al describe the effects of a case-finding and liaison service for elderly ER patients. This non-randomized controlled trial utilized paired intervention and control cohorts matched on day of visit, gender and age within five years; subsequent analysis demonstrated substantial comparability between these two groups. The study setting was the urban emergency room of the St. Louis University Hospital. The population of interest consisted of all patients over sixty-five years of age, excluding those patients staying in ER less than one hour, refusing to participate, or leaving without being seen by a physician. Just over half of eligible patients were seen, but it is not clear how those patients were selected from all total eligible patients.

Intervention patients received a thirty-minute assessment by a geriatric nurse clinician, during which time geriatric medical, dental and social problems were identified using physical assessment techniques and a selection of well-validated instruments such as the Katz ADL Scale and the Confusion Assessment Methodology. Recommendations were issued to emergency staff as well as family members. Outcome measures included frequency of identified problems in intervention subjects, compliance with nurse clinician recommendations, mortality, institutionalization, health status, use of support services, presence of an advanced directive and quality of life.

A full 82% of patients had at least one geriatric problem identified, and 77% reported at least one unmet dental or social support need, with estimated costs of problem identification being about \$5 and \$1 respectively for medical and dental/social problems. Compliance with the recommendations of the geriatric nurse clinician was 61.6% for physicians and 36.6% for families.

Mortality and nursing home placement were not significantly different between groups; however, there were strong trends for fewer subsequent visits to the ER (0.26 intervention vs. 0.39 control, $P=.06$), and more advanced directives in the intervention group. No statistically significant difference between groups was demonstrated in either the remaining health outcomes or number of dental/social services implemented after discharge from ER. Although the intervention program failed to produce substantially improved outcomes, failure to fully implement nurse clinician recommendations should clearly be considered a contributing factor to such results.

Mion, Palmer, Anetzberger and Meldon (2001)

In 2001, Mion et. al described a “Systematic Intervention for a Geriatric Network of Evaluation and Treatment” (SIGNET) program, developed specifically to improve case-finding of at-risk older people in the ER setting, and to improve care planning and referral of these individuals upon discharge. SIGNET was also intended to create coordinated networks of medical, nursing and social services. This study utilized a pre/post implementation evaluation design in order to evaluate SIGNET, which was implemented across four ER sites in qualitatively different types of hospitals (teaching/community/trauma) in collaboration with ten community agencies.

All ED patients over sixty-five years of age were screened with a hospital-developed Triage Risk Screening Tool (TRST); methodological considerations for tool development and implementation are outlined. A geriatric clinical nurse specialist reviewed TRST forms identifying those patients who were determined to be at-risk for return ER visits, or unplanned hospitalization or institutionalization post-ER visit. Patients were then assessed in the ER, or followed up by telephone if already discharged from the ER prior to nurse specialist assessment. The assessment was facilitated by an interview guide on customized software, which included a number of standardized assessment instruments such as the CAGE Questionnaire on alcohol use. The family physicians of the study participants were alerted to SIGNET involvement via a summary letter, which outlined the care plan decided by the geriatric clinical nurse specialist and the patient and family.

A noted strength of the program is the direct referral/linkage of patients to recommended supports to ensure nurse specialist recommendations are in fact implemented. The SIGNET staff was supported by a project coordinator for the duration of the study, and they had access to geriatrician support as needed, which may have augmented the effects of the intervention. Costs analysis revealed that the average cost of program implementation was \$80,000 US in the start up year, and \$50,000 for each year thereafter. Cost savings achieved via inpatient bed days saved due to SIGNET facilitated discharges are not reported.

Preliminary results indicated that repeat ER visits decreased 7% at one site, and 2-3% at two other sites. Community agency referrals increased six fold between participating community agencies during the first 18 months of the program. Patient health outcomes are not reported. Overall, 71% of patients arriving in ER were screened with TRST. Of the at-risk patients discharged prior to nurse assessment, about 58% were followed up by the nurse when they arrived home. This under-coverage potentially contributed to the modest changes in outcome measures.

Limitations included difficulty reporting additional health outcome measures secondary to lack of electronic and easily accessible ER data from participating hospitals.

McCusker, Verdon, Tousignant, Poulin de Courval, Dendukuri and Belzile (2001)

This recent study set out to assess the effectiveness of a two-stage screening and assessment intervention for older patients in the emergency setting who are at risk of functional decline and other adverse outcomes post-ER visit. This controlled trial, randomized by day of ER visit, involved four university-affiliated hospitals in Montreal, Canada. Two hospitals provided secondary care and two provided tertiary care. Intervention and control groups were found to be similar.

Patients were screened using the Identification of Seniors at Risk (ISAR) tool previously developed by the authors, and patients with an ISAR score of greater than two were offered participation in the study. The recruitment for and administration of the ISAR tool was facilitated by a research assistant, and not by the triage/ER staff. One hundred and seventy-eight patients were randomized to the intervention group, and two hundred and ten to the control group, who received usual care.

Intervention patients received a standardized geriatric nursing assessment in ER, notification of the primary care physician of details of the ER visit, and other community referrals as needed. The assessment covered physical and mental function, medical status, and relevant social factors, as agreed upon by local expert panel, and took an average of twenty-eight minutes to complete. Limited geriatric nurse follow-up helped to ensure appointments and referrals were provided. Patient outcomes assessed at four months post-ER visit included functional decline as measured by the Older American Resources and Services ADL scale and depressive symptoms as measured by the Geriatric Depression Scale (GDS). Caregiver outcomes were assessed at baseline and at four months using summary scales of the Medical Outcomes Study Short Form-36. Patient and caregiver satisfaction were assessed one month after enrollment.

The intervention increased the rate of referral to the primary care physician and home care services; however, the impact of increased referral rates on morbidity and mortality was not assessed. The intervention significantly reduced the rate of functional decline at four months (as indicated by death or decreased ADL scale score of >3 points). There was no effect on patient depressive symptoms, caregiver outcomes or satisfaction with care. The ISAR negative sample (sample of patients with ISAR scores <2) was also evaluated, and the ISAR tool was demonstrated effective in detecting geriatric patients at risk, with low false positive detection rates.

Limited adherence to geriatric nurse recommendations, as well as 17% of intervention patients having been discharged prior to geriatric nurse assessment, may have diluted the impact of the intervention.

Gold and Bergman (1997)

In this 1997 article, the authors describe a geriatric consultation team model in terms of its structure and functioning, and comment on the teams' potential impact. The geriatric consultation team in the emergency room of the university affiliated Sir Mortimer B. Davis Jewish General Hospital consists of a physician and a nurse clinician from the Division of Geriatric Medicine, with the physician being available and/or on-call to the ER around the clock. The geriatric consultation team has the ability to consult geriatric occupational and physical therapists during the weekdays. A social worker in ER works closely with the consultation team. On weekdays, the geriatric nurse monitors admissions to the ER by attending ER staff morning rounds, and may recommend referral to geriatrics for specific patients at that time. A formal consultation to geriatrics is then initiated by the emergency room physician.

Emergency department staff may initiate referrals to geriatrics at any time however, and the top three reasons for such consultations include: requests for admission to the acute geriatric ward, diagnostic dilemmas that affect decisions to admit, and questions of whether patients are able to be discharged home from ER. The initial assessment, generally done by the geriatric nurse, includes gathering of background information from the patient, family, referring physicians and often the patient's social worker in the community. Medical and nursing assessments are then performed and any additional tests related to determination of patient disposition are ordered. Importantly, the geriatric consultation team completes a geriatric database information sheet on each patient, including demographic, diagnostic and psychosocial information, in order to enhance what is known about this special population.

Recent data are presented for a one-month period. A total of 70 patients were seen, of which 43 patients were admitted. Of the 70 patients, 87% were actually admitted to the acute geriatric ward or were followed up by outpatient Geriatric Medicine services. Authors assert that the geriatric consultation team in ER may prevent inappropriate admissions, facilitate more appropriate admissions to the acute geriatric unit, and potentially decrease patient holding time in the ER.

No information is available on patients not seen by the consultation team, therefore a comparison of patients receiving this intervention cannot be compared with those elderly patients receiving usual care in the ER. Impact of the consultation team on health outcomes is not assessed.

Sinoff, Clarfield, Bergman and Beaudet (1998)

Sinoff et. al provided a two-year follow-up to disposition for patients seen in ER by a geriatric consultation team (GCT) in response to a consult initiated by ER staff. No specific criteria for GCT consult initiation were provided. This retrospective chart review took place at a tertiary care teaching hospital in Montreal, Canada and included a

review of the total number of cases (n=326) seen by the geriatric consultation team over a one-year period.

Of all ER initiated consults, 4.6% were directed to the geriatric consultation team. A descriptive analysis of GCT patient demographics and major clinical problems was presented along with the results of a two-year follow-up of cases seen by GCT. Follow-up was facilitated by chart review and/or patient and caregiver interview, and focused on mortality, rate of revisit of the ER, readmission to hospital and final disposition. The study revealed a particularly high hospital admission rate of 63.5% for patients seen by the GCT, as well as a 33.7% mortality rate, 45.2% ER re-visitation rate and 52% long-term care institutionalization rate at the two-year follow-up point.

The study successfully characterizes the GCT population as high-risk and alludes to the need for early multi-disciplinary intervention in the course of a patient's ER visit as well as close follow-up after discharge. The study also examined actual final disposition vs. GCT recommended disposition and found that GCT recommendations for discharge home, to long-term care or to acute geriatric inpatient units were met 100% of the time; recommendations for discharge to other settings (rehabilitation, alternative housing, another inpatient service or in-hospital long-term care) were not met between 0.9% and 4.3% of the time. Overall, ER staff did not implement GCT recommendations 22.5% of the time.

Health outcomes for this population seen by the GCT were not compared with those of a control group; therefore, the efficacy of the GCT intervention vs. usual care could not be assessed.

Lee, Ross and Tracy (2001)

Authors present the results of an evaluative study of patients receiving comprehensive functional assessments in the emergency department. The setting was The Wellesley Central site of St. Michael's Hospital, a medium-sized acute care facility in a major urban center (Toronto, Canada). A convenience sample of eighty patients received functional assessments, on the recommendation of ER staff, based on the results of a functional safety checklist. Patients with language barriers or those receiving atypical treatments (e.g. orthotics) were excluded.

The checklist was based on screening questions regarding transfer, ambulation, activities of daily living tasks and cognition. Patients detected during screening were then seen and assessed by an occupational or physical therapist, using a customized functional assessment tool. The tool consisted of general information about the patients' living situation, environmental barriers, availability of caregivers, community supports, use of mobility aids, history of falls and self-perceived balance confidence. As well, standardized and validated physical performance tests (Timed Up and Go, Tinetti Fall Risk Screen) and a pre-morbid ADL measure (Function Autonomy Measurement System – SMAF) were administered.

Results of assessments were discussed with the emergency physician and team, and arrangements for equipment, community supports and follow-up therapy were then made. Patients discharged were asked to complete a checklist diary of events for a six-week period post-ER visit, including type and amount of support received, falls and repeat ER visits. Unfortunately, follow-up procedures only yielded six of eighty patients who were available and who had complied with checklist diary procedures. Hence, longer-term outcomes data is not reported.

Descriptive data on patients seen revealed that 53.8% came to ER because of a fall, and over 40% of patients used no mobility aids indoors. A full 49% of patients could not do either of the physical performance tests, and of those, 54% were admitted. Logistical regression analysis demonstrated that living alone (odds ratio=6.48, $p<0.006$) and the SMAF disability score (odds ratio=0.93, $p<0.002$) were predictive of hospital admission.

Despite the loss of outcomes data, the protocols for screening and assessing the functional ability of seniors in emergency environments was felt to be time-efficient and beneficial to otherwise functionally unstable patients.

Poncia, Ryan and Carver (2000)

This descriptive article describes a next-day telephone follow-up service for seniors discharged from an accident and emergency department. The dual objective of the study was to assess the efficacy of a telephone service in assessing the needs of discharged patients and to evaluate the ability of telephone service staff in targeting early multidisciplinary interventions to those who might benefit the most, based on the results of assessment.

The setting was the A&E department of the Royal Sussex County Hospital in the UK, and a sample of five hundred and fifty-one patients was selected for intervention from a possible five hundred and sixty-five patients. Selection procedures were not disclosed. Prior to initiating the follow-up call, a community liaison nurse reviewed subjects charts for basic information such as existing home support and advice given by A&E staff at discharge.

A semi-structured questionnaire was administered to assess current level of disability, deterioration, type of home support, and compliance with medication as well as patient comprehension of discharge advice, as a subjective measure. The patients were then scored on a six-point risk scale, according to a combination of perceived risk as assessed by the nurse and a number of key risk criteria. No details on instrumentation were provided. Descriptive statistics are provided on study patients, with 58% of patients being supported at home by friends or family and 26% receiving support from other agencies.

Upon discharge from A&E, written advice was given to 33% of patients and verbal advice to 64% of patients. Despite such advice, 15% of patients were taking medication incorrectly or were under-medicated upon follow-up. A further 8% of cases had insufficient home support and an additional 8% were in crisis requiring immediate intervention. A total of five hundred and fifty-nine referrals were made by the completion of the telephone follow-up program, at the request of the liaison nurse. Authors assert that the next-day telephone follow-up service is a low cost, high quality service for seniors that may prevent problems from developing into crises through early and targeted interventions.

In addition, the pre-telephone follow-up chart review revealed a host of problems related to the ER environment, such as poor documentation, failure to ask seniors about stairs and/or current level of home support, poor and uncoordinated discharge advice and instructions and inadequate pain control at discharge. Such information was used by the hospital in quality improvement audits, to develop post-release protocols, and to improve patient satisfaction with A&E services.

Brymer, Cavanagh, Denomy, Wells and Cook (2001)

Brymer et. al discuss the effects of a geriatric education program on emergency nurses. The objective of the study was to measure the impact of a one-day workshop for ER nurses that addressed the topics of geriatric depression, physical assessment of the elderly and mental status testing. The intervention described was part of a larger initiative, the Thames Valley Quick Response Program, designed to improve discharge planning for seniors from eight different ERs in a three-county area. A convenience sample of one hundred and twenty ER nurses from urban, rural, community and academic settings were surveyed on their learning needs with respect to geriatrics, and reported on in a prior study, but the results of the survey were used to build a workshop for subjects in the current study. A total of one hundred and one ER nurses, similar to those who undertook the survey on learning needs, attended the one-day workshop along with a number of other types of health care professionals.

The workshop was delivered in eight sessions to thirty-six nurses per session. It is not clear how workshop attendance was decided, or whether attendance was voluntary. The workshop consisted of case-based didactic modules on physical assessment of the elderly, delirium, depression and dementia, and practical mental status testing of elderly patients using the Mini Mental Status Examination. Self-reported change in practice patterns of the nurse subjects was measured (examining change from pre-workshop to one month post-workshop) via survey, and the reliability of the pre and post-education tool was found to be 90% in a sample of six ER nurses who assisted in developing the tool.

The self-report survey response rate was 50.5%, and the most significant changes in practice were found to be improved screening for depression and acute change in mental status in the elderly patient. Screening for dementia was found not to have

improved. Self-reported changes in practice were not validated. A steady increase in the number of Home Care and Regional Geriatric Program referrals was noted over an eleven-month period, for a total combined referral rate increase from six to twenty-five referrals per month. It was felt that reinforcement of the learning accomplished would be critical to the long-term success of this initiative.

Wexberg-Poh (1996)

This article describes the efforts of a large medical center in Southwestern New Jersey, Our Lady of Lourdes Medical Center, to reexamine its health care services through an age-specific lens. The author describes the Camden Senior Community Support Program's (CSCSP) use of aggressive case management in the ER and hospital inpatient units, although very limited detail and methodological information is provided.

Seniors are seen by bicultural and bilingual case managers for psychosocial assessment, which yields an opinion as to whether the patient in question can be supported in the community or should in fact be admitted to the hospital. Case managers make referrals to appropriate community agencies and follow up on the care plans for discharged patients. Volunteers are recruited to accompany the patient home from the ER or to visit within twenty-four hours of discharge to check home safety and supports.

Assessment of outcomes was facilitated by Rutgers University School of Social Work, and was based on data collected from one thousand, two hundred and sixty-five patients over a three-year interval. The most common reason for providing CSCSP care was the need for home care (54% of patients). Between 1993-1994, patients served by the CSCSP spent an average of 1.84 fewer days in hospital than the total over-sixty population of inpatients, thereby effecting a cost saving of \$1,150 US per patient.

During this same period, only eleven patients were sent home from the ER under the programs supervision. However, estimations done as part of the program evaluation found that hospitalization for these discharged patients would have cost approximately \$625 a day. A 1995 data collection period reveal the reverse, with CSCSP patients staying an average of 11.2 days, compared to 10.9 days for the overall over-sixty population; this increase was attributed to suspected higher acuity in the CSCSP patients, although this was not formally evaluated.

Section Summary: Service Models of Care Originating in ER

The studies described above represent a small but well-circumscribed body of literature outlining specialized geriatric care and/or programs delivered within the emergency environment. Surprisingly, there was a proportionally large representation of Canadian material. Most of the studies are descriptive in nature, and were helpful in establishing the frailty and vulnerability of the population, whether citing subsequent hospital admission and mortality rates at longer-term follow-up, or citing presence of unmet needs one to two days after discharge from the ER.

The marked lack of randomized controlled trials on geriatric emergency service models, however, makes it difficult to estimate the true impact of such services on health and functional outcome measures. One of the two controlled trials cited here did demonstrate positive changes for intervention patients, including trends towards reduced ER admissions and increased presence of advanced directives; the other found significantly reduced rates of functional decline for intervention patients, at four months (death or decreased ADL scale score of >3 points), but was unable to demonstrate an effect on the primary outcome measures of patient depressive symptoms, caregiver stress or satisfaction with care. These small but positive findings should be interpreted as flags to the importance of developing better evaluative methods for geriatric models of care, as several methodological problems may have contributed to such marginal findings.

First, only two of the studies utilized sample sizes of over one thousand cases, and no power estimations were put forward. The probability that intervention-related change would be statistically detectable was not discussed. Further, of the seven studies that required the initiation of service referrals and/or environmental changes as part of the intervention, slightly more than half left the follow-up to ER staff, family physicians and/or the patient and family. The two studies examining compliance rates found that between 22.5% and 63.4% of geriatric team recommendations were not implemented, with family members being the poorest performers.

A third factor that may have contributed to the lack of ability to detect statistically significant changes in intervention patients relates to the inability of most studies to target interventions to the most needy patients. Over half of the models relied on ER staff referral to specialized geriatric intervention, or targeted all patients over a specific age benchmark. Few research teams utilized a validated screening tool in identifying clients most at risk, and none of the articles attempted to determine the impact on outcomes by age range. This inability to target patients likely to benefit most from specialized intervention may moderate treatment effect, and in practical terms, may overwhelm under-resourced geriatric specialty programs.

Choice of outcomes measures in this body of literature is varied, but almost a third of studies did not include patient health outcomes per se, with one study having lost all outcomes data due to difficulties in following patients by telephone once discharged from ER. Although measures of patient care costs, changes in practice patterns and changes in service referral rates are helpful, it is apparent that the central question of “how has this model improved patient health outcomes?” as reflected in measures of morbidity, functionality and mortality, has only been addressed obliquely. The poor availability of reliable and valid health outcomes measures for this population may be contributing to lack of health outcomes data.

Lastly, only one article attempted to elucidate problems inherent in the ER environment and ER care delivery systems which were felt to be barriers to effective care of the elderly in ER, and only one article discussed the importance of collecting elder-specific data in a systematic, electronic format which would allow later analysis of the geriatric emergency populations for further program development. Such factors must be uncovered and addressed in the continual improvement of emergency services for the elderly patient.

Screening Tools for Use in the ER

A number of geriatric emergency screening tools have been developed and reported on in the literature. A proportion of such tools are general purpose and aim to detect high-risk elderly patients who may suffer a number of adverse health outcomes post-ER visit. Alternately, some screening tools are geared specifically to the detection of certain health conditions, diagnoses, or clinical symptoms. The selection of tools reviewed here are reflective of those articles describing new instruments or commonly known instruments that have been shortened for expedited application in the ER environment. The focus is on detection of high-risk elderly or elderly with changes in mental functioning specifically, due to the likelihood of such mental status changes impacting on the final disposition of elderly ER patients, as well as the tendency for health professionals to overlook their detection. Information on validity and/or reliability is presented where available.

Gerson, Schelble and Wilson (1992)

In 1992, Gerson et. al, used a prospective, non-randomized open trial in order to evaluate the ability of paramedics to identify elderly at risk and refer them for assessment and service. The study was carried out with staff from the Akron Fire Department Emergency Medical Services, who screened patients en route to local area emergency departments. All EMS users sixty years of age or older were eligible for inclusion, and of the six thousand patients attended to over a nine month period, 3% were identified by EMS personnel as needing further geriatric assessment.

Prior to the start of the screening program, firefighter paramedics were given a program orientation which covered the purpose of the program, the paramedics role in case-finding, community services availability, as well as how to screen/evaluate seniors using a set of pre-designated items. Special emphasis was given to signs of abuse and how to communicate with elderly patients. Project progress was updated at each subsequent EMS team meeting.

Paramedics used a Paramedic Problem Report in order to summarize areas of concern for referral to geriatric assessors. Completed forms were sent through internal fire department mail to the EMS office where the Area Agency on Aging picked them up in order to arrange geriatric assessor follow-up. During the follow-up period, the geriatric assessor would determine whether or not the paramedic had correctly identified an at-risk case.

The geriatric assessments were completed by staff from the Area Agency on Aging, for one hundred and twenty-four subjects, representing 63% of those screened positive by EMS staff. The positive predictive value of the paramedics case-finding was 98%, in that the geriatric assessor confirmed problems in one hundred and twenty-one of one hundred and twenty-four patients assessed. A determination of program usefulness was made based on the number of cases for whom a geriatric problem was found to

have existed, who were assessed by a geriatric assessor, and who had problems that were amenable to intervention; in addition, help had to have been received by the patient for the problem identified. The program was determined to be useful in ninety-four of one hundred and ninety-seven cases.

The most frequently used services upon completion of the geriatric assessment were: social services (33%), homemaker (23%), home environment alterations (17%), Adult Protective Services (15%), and Lifeline (telephone monitoring) (15%). This case-finding project, using firefighter paramedics to screen elderly EMS patients, was found to be effective and cost-efficient, as program costs were absorbed by the Akron Fire Department and the Area Agency for Aging as part of their normal operating costs.

Tsang and Severs (1995)

This study assessed the appropriateness of acute geriatric admissions and estimated the effectiveness of the Appropriateness Evaluation Protocol (AEP) in identifying appropriate geriatric admissions. The AEP is an instrument designed and tested in the US and found to be reliable and valid in assessing the appropriateness of a general hospital admission, but it had not been tested on admissions to acute geriatric units. This study took place in Queen Alexandra Hospital, a district general hospital, in Portsmouth.

Of the one hundred and eighty-six admissions to seven acute geriatric units, one hundred and forty-six admissions were available for analysis. A large proportion of such admissions were referred from ER. The admitting physician scored admissions using the AEP, and also collected the usual demographic data, source of referral, medical diagnoses and dates of admission and subsequent discharge or death. AEP is scored on sixteen criteria reflecting severity of illness (such as sudden onset of unconsciousness or disorientation, and acute loss of ability to move a body part) and intensity of service required (such as intravenous medications and/or fluid replacement, and surgery or procedure scheduled within twenty-four hours).

If one of sixteen AEP criteria are met, the admission is deemed to have been appropriate. At the first ward rounds after admission, a geriatric consultant would evaluate the admission as appropriate/not appropriate based on clinical details of admission regardless of AEP score. The rates of inappropriate admissions according to the consultants and AEP were 13% and 11% respectively. The overall agreement between consultants and AEP was 92% ($\kappa=0.62$). The AEP appears to be suitable to assess the appropriateness of acute geriatric admissions, which can then guide clinicians to prevent some such admissions by offering urgent outpatient or domiciliary visit assessments, as well as day hospital attendance, palliative care admissions or alternate rehabilitation services.

Authors acknowledge that 100% appropriateness of admissions is not possible or desirable, as the use of this screening tool as the sole deciding factor for admission may reduce access to services when they would actually be appropriate; some factors regarding admission are beyond the control of clinicians, and each case should be considered within its specific context.

McCusker, Bellavance, Cardin, Trepanier, Verdon and Ardman (1999)

This 1999 article describes the development of a self-report screening tool to identify older ER patients at risk of adverse health outcomes post-ER visit. McCusker et. al used a prospective (six-month) follow-up design for the cohort being studied, and the work was carried out in the ER of four acute-care general hospitals in Montreal, Quebec.

The study population included those ER patients visiting emergency on weekdays, and who were over sixty-five years of age. Exclusion criteria included the following factors: severity of medical condition preventing participation, significant cognitive impairment without availability of a substitute informant or family member, inability to speak English/French and patient residing at a nursing home or chronic care hospital.

The first 60% of eligible patients were used to develop the screening tool, and the remaining 40% of the sample were used to validate the final proposed tool, with a total of one thousand, eight hundred and fifty-four participants. Information collected at the ER visit included demographic data, medical history, answers to twenty-seven self-reported screening questions on social, physical and mental risk factors, and details on use of hospital services, medications and alcohol.

The twenty-seven screening questions were based on a review of the literature for appropriate risk factors, and the reduction of such items by expert panel. The Older American Resources and Services (OARS) scale, reflecting ability with respect to activities of daily living, was also administered. At follow-up, the OARS was re-administered by telephone and adverse health outcomes, defined as death, nursing home admission or long-term hospitalization, as well as marked increase in functional impairment (>3 point change on OARS ADL scale), were ascertained.

At follow-up, 29.6% of patients in the scale development sample were found to have an adverse health outcome. Logistic regression, ROC curve and expert opinion were used to identify the best combinations of items for the prediction of said outcomes, and subsequent scale development.

The final proposed screening tool, ISAR (Identification of Seniors at Risk), is comprised of six self-report questions and performed well in the total cohort (age sixty-five years and older) as well as in sub-groups defined by disposition (admitted/released from ER), language of ISAR administration, and person completing ISAR (patient vs. caregiver). The tool itself can be used with different cut points/scores for classification of patients

into positive/negative screen groups, depending on the sensitivity required by a particular setting and the resources available for patient follow up in a particular setting. The ISAR tool provides a quick method for identification of older persons in the ER at risk of adverse health outcomes as well as those with current disability.

Mion, Palmer, Anetzberger and Meldon (2001)

In their second publication describing the Triage Risk Screening Tool (TRST), Mion et. al outline the creation of this instrument through a two-step process of literature review and expert consensus panel.

The TRST was originally developed in the triage setting of an ER in 1997. The expert panel consisted of physicians (n=3), master's or doctorally prepared nurses (n=6), and master's or doctorally prepared social workers (n=3), all specializing in gerontology. The panel reviewed multiple risk factors for clinical applicability and feasibility in the ER setting, and assessed potential interaction between/codependence of the factors.

Five items were initially included in the tool: presence of cognitive impairment, living alone or having no caregiver willing or able to provide assistance, difficulty walking or transferring to/from chair, ER visit within the previous thirty days or hospitalization within the previous ninety days, and taking five or more prescription medications. A sixth factor, "professional recommendation", was added in post-pilot, and represents a recommendation for further assessment based on the ER nurses' clinical judgment if the nurse had reason for concern (i.e., patient history of noncompliance, suspected substance abuse).

The ER nurses were trained on TRST by the project director and a geriatric nurse specialist; at regularly scheduled staff meetings, teaching was reinforced, and ongoing one to one training and reminder interventions were employed as necessary. Potentially "at-risk" individuals are defined as having cognitive impairment or two or more of the remaining five risk factors. Estimated time for completion of TRST was stated to be between one and two minutes. Authors assert that TRST is highly sensitive and reasonably specific, however no quantitative estimates were provided in this article. Further, authors state that the validity of the tool is supported by the findings of McCusker et. al (1999, 2000), whose similar six-item tool demonstrates promising results.

Gerson, Counsell, Fontanarosa and Smucker (1994)

Gerson et. al set out to determine the feasibility of a case-finding program for cognitive impairment in elderly emergency department patients, and to describe the prevalence of impairment in screened patients, as well as factors associated with impairment.

This three-month, cross-sectional study targeted all patients sixty-five years of age and older, utilizing the ER in a community teaching hospital with an annual ER census of sixty-nine thousand adult cases. Exclusion criteria included refusal to participate,

medical instability preventing participation, known dementia, or inability to communicate in English. Of nine hundred and fifty-eight potentially eligible patients, five hundred and fifty-four patients actually participated.

Subjects were interviewed by either the ER social worker or a medical student, and were asked to complete a shortened version of the Orientation-Memory-Concentration (OMC) Test, where a weighted score of more than ten is indicative of at least moderate cognitive impairment. Screened patients were not followed to determine the accuracy of the screening tool based on subsequent detailed clinical evaluation. Interviewers then abstracted the chart for a range of factors that may be associated with dementia, including: gender, age, living arrangements, diagnoses and hospital admission.

Logistic regression was used to identify factors associated with possible dementia, which were incorporated into a screening test. A mean time of 1.9 minutes was required to complete the screening test, and 33.5% of patients were found to have at least moderate cognitive impairment with the test. Age was found to have a direct effect on screening test scores, and increased relative risks for impairment were found in nursing home patients and patients with a diagnosis of trauma. Cognitive impairment was not associated with the chance of being admitted to hospital.

This type of screening tool may be valuable based on the assumption that early detection of disease reduces health care costs. However, for the estimated 90% of non-reversible dementias, case finding would still be valuable to prevent related complications and marshal community and family support in order to prevent institutionalization. Moreover, knowing the status of the ER patients mental functioning should influence discharge planning including the type and format of medical and follow-up information provided.

Chiovenda, Vincentelli and Alegiani (2002)

Chiovenda et. al describe the identification and prevalence of cognitive deterioration in seniors using the ER department of an urban general hospital in Italy, which was identified using a commonly administered cognitive screening instrument. This descriptive study was carried out by a team of physicians and psychologists, who identified potential subjects during thirty-five shifts randomly distributed over the three daily shifts of the ER.

All patients sixty-five years of age and older were screened using the Mini-Mental State Examination (MMSE), and patients were excluded if they were too medically ill to undergo testing, impaired by substance abuse, unable to speak Italian, suffering from hearing impairment or unable to read/write sufficiently.

Patients with an MMSE score below twenty-three were included in a second step of the study, namely reassessment with the Mental Deterioration Battery (MDB) to confirm the presence of cognitive impairment detected by the MMSE. Patients also underwent

assessment with the Basic Activities of Daily Living (BADL) and Instrumental Activities of Daily Living (IADL) scales, as standardized and validated on the Italian population.

A semi-structured interview was utilized to obtain data regarding lifestyle, economic situation, type of assistance received and required, and caregiver availability.

A total of two hundred and five patients presented to ER during the study period, one hundred and fifty of which were recruited. Of these, 16% were found to have cognitive impairment on MMSE, with 46% of those having mild impairment. Second step follow up was done on fourteen of the twenty-four patients, with the MDB confirming the existence of cognitive impairment found on MMSE in all fourteen cases. Preliminary results show that in patients with mild impairment, ADL ability was preserved and IADL ability was impaired in only one case. In patients with moderate impairment, all subjects had some degree of ADL impairment. In six out of fourteen cases, the patient was found to live alone and in nine out of fourteen cases the patient had a low socioeconomic level, which was self-reported to be inadequate in half of the cases. A full 57% of the sample reported unmet needs in home-care services, and 14% of the sample reported unmet needs in hospital day-care.

This type of cognitive screening was found to be effective in detecting cognitive impairment in the elderly attending ER. Further, no patient found to have mild cognitive impairment had been previously diagnosed, implying that ER screening had utility in finding and referring potentially impaired patients for further diagnostics and treatment where such resources exist. Screening of this type may also facilitate appraisal of the adequacy of patients' economic and social coping resources.

Meldon, Emerman and Schubert (1997)

This 1997 study evaluated the identification of geriatric depression by emergency physicians and assessed the utility of a self-rated depression scale to improve case finding in geriatric patients presenting to the ER. This observational study examined geriatric ER patients who presented to an urban, university-affiliated public hospital in Cleveland.

A convenience sample of one hundred and one patients, aged sixty-five years or older, completed a modified version of the previously validated Self-Rated Depression Scale (SRDS). Exclusion criteria included obvious cognitive impairment, medical instability, deafness/language barrier, significant communication problems (aphasia) or prior enrollment in the study.

The SRDS is an ordinal scale scored by summation of positive responses. A cutoff score of four was used to identify patients meeting the criteria for depression, although the use of a dichotomous cutoff may not reliably distinguish between depressive symptoms and a major depressive disorder. Patients were also asked to rate their health as good, fair or poor. Emergency room physicians, blinded to SRDS scores, were asked to determine whether or not the patient in question was depressed (yes/no),

were asked to rate the likelihood of depression on a 100mm linear scale and were also asked if the diagnosis of depression would change their management of the patient.

A full 30% of patients screened were found to be depressed via SRDS scores, and age, sex, race and education were not significantly different between depressed and non-depressed patients. The mean score for depressed patients was 5.8, and the mean score for non-depressed patients was 1.2. Patients reporting their health as good were 19% less likely to be depressed than those reporting poor or fair health (95% CI, 10% - 35%).

Recognition of depression by emergency physicians was poor, with a sensitivity of 27% and a positive predictive value of 32%. Only 13% of depressed patients were referred for further mental health evaluation, compared to 8% for non-depressed patients. In addition, only 18% of emergency physicians noted that a diagnosis of depression would change their management of the patient.

Authors point out that the SRDS is a quick, simple tool for identifying depression in geriatric ER patients, and its standardization and self-report format would permit administration by a social worker or nurse.

Meldon, Emerman, Schubert, Moffa and Gaffney Etheart (1997)

This study examined the prevalence of depression in geriatric ER patients, as well as the ability of emergency physicians to detect depression in this population. The study uses an observational survey design for a convenience sample of two hundred and fifty-nine patients, age sixty-five years and older, who presented to an urban, university-affiliated public hospital ER. Patients were excluded if medical instability prevented participation, and if there was a history of or current obvious cognitive impairment, significant communication problems (aphasia, deafness, language barrier) or prior enrollment in the study.

Study authors or trained ER research nurses assessed subjects with a modified version of the Koenig Scale (KS), a self-rated screening instrument for the detection of major depression. The study staff verbally administered the instrument. A cutoff score of four was used to identify depression in this un-weighted ordinal scale, scored by the summation of positive responses.

The KS was found to have 83% sensitivity and 77% specificity when compared with structured psychiatric interview, when a cutoff score of three was used. Demographic data and status of living arrangements was also recorded for each patient, as well as the number of chronic illnesses and medications, as found in the medical record. Subjects were also asked to rate their health as good, fair or poor.

A retrospective chart review was used to assess the emergency physician's recognition of depression, according to the following criteria: primary or secondary diagnosis of depression, mental health referral or notation of any signs and symptoms of depression

in the ER record. ER physicians were not aware of KS scores. A total of 27% of subjects screened were found to be at or above the cutoff point for depression. The median score for depressed patients was six, as compared to one for non-depressed patients. No associations between depression and age, sex, education, ethnicity, number of prescriptions or number of chronic illnesses were found. Patients who felt their health was poor were 32% more likely to be depressed than patients who rated their health as good or fair (95% CI, 18% - 45%). Emergency physicians failed to recognize depression in all seventy patients found to be depressed with the KS instrument.

The KS was felt to be a quick, easy and sensitive measure in the detection of depression in elderly ER patients, at one-third of the length of the Geriatric Depression Scale. The cutoff point of four, however, may not allow the detection of depressive symptoms that could still benefit from treatment, as opposed to detection of a major depressive episode.

Fabacher, Raccio-Robak, McErlean, Milano and Verdile (2002)

This very recent work by Fabacher et. al (2002) assesses the utility of a three-question screening instrument (ED-DSI) to detect depression in elderly ER patients. The setting was an urban, university, tertiary care ER with sixty-five thousand annual visits.

The study utilized a prospective convenience sample of one hundred and three English-speaking ER patients over sixty-five years of age. Subjects were predominately white and female, thereby limiting the generalizability of the work to some degree. Patients were excluded if too ill to participate, hearing impaired, obviously demented, suffering from acute changes in mental functioning, or had a previous psychiatric diagnosis.

A physician administered the ED-DSI after which trained research personnel administered the gold standard comparator, the thirty-question Geriatric Depression Scale, as well as the Mini-Mental State Exam to detect unrecognized cognitive impairment. The diagnosis of depression was not validated by psychiatric evaluation/DSM-IV criteria. The mean MMSE score was twenty-six, and the mean GDS score was 7.7. Two of the three ED-DSI questions were pulled from the GDS, while the third consisted of the commonly used but not validated phrase “do you often feel downhearted and blue?” The ED-DSI was considered positive if the patient answered yes to any of the three questions, whereas the GDS was felt to be indicative of depression for scores greater than or equal to ten.

Results indicated that the GDS identified thirty-three patients as depressed, and of these, twenty-six were detected by the ED-DSI, giving the instrument a sensitivity of 79% (95% CI, 65% - 93%). The specificity was reported as 66% (95% CI, 54% - 78%).

Authors assert that the ED-DSI is a quick and useful tool in the detection of depression in geriatric patients using the emergency room. Interestingly, although exclusion criteria screened out cognitively impaired patients prior to the start of the study, subsequent

application of the MMSE to study patients found that roughly one quarter of study patients were impaired; this lends further support to the need for validated screening tools to assist the clinical judgment of health care practitioners. As is the case with most screening tool literature, authors point out that the detection of health problems does not necessarily ensure appropriate aftercare.

Section Summary: Screening Tools for Use in the ER

The literature presented here on screening tools for use with geriatric emergency patients clearly demonstrates the feasibility, sensitivity and usefulness of such instruments, with the majority of the work showing very acceptable positive predictive results. The general risk screening tools, which identify elders at risk of an adverse health outcome based on assessment of a number of physical, psychological and social phenomenon, appear to be quick, economical and efficient ways of detecting elders in need of specialized assessment, treatment and referral. Further, it has been shown here that a number of different health professionals (doctors, nurses and emergency medical services personnel) can be utilized to deliver such screening tools.

It is important to be able to employ these instruments in the ER environment, as a percentage of elderly ER patients may not routinely access care at other times secondary to isolation, inability to secure transportation and other factors. The brevity of such instruments may be conducive to the assessment of elderly patients, who may fatigue quickly, with most instruments generally having six or less items/questions.

Studies of screening tools targeting problems of mental functioning, such as depression and cognitive impairment, are as equally robust in terms of demonstrating significant ability of such tools to detect positive cases in the ER environment. The majority of such tools are clearly validated against well-known and accepted instruments such as the Geriatric Depression Scale, further supporting their integrity. It should be noted, however, that the cut point, or score at which a case is determined to have screened positive, may cause early cases of disease or dysfunction to be missed depending on the point at which it is set. It has been shown above that some screening tools were successful in detecting mild cognitive impairment not previously known prior to the ER visit.

Although a percentage of the studies outlined here flagged the inability of routine ER work-up to detect at risk geriatric patients, it should be noted that the focus of the ER assessment is primarily related to the presenting problem at the time of ER presentation, which may in some cases be only partially related to the concerns of geriatric medicine. Geriatric screening tools may be used to supplement the ER work-up, allowing case finding for specialized geriatric services in an expedient way.

Lastly, facilities implementing geriatric screening tools in ER must give consideration to the handling of positive cases, in terms of care paths and available resources once such cases are identified.

Practice Guidelines for Use in the ER

Practice guidelines specific to particular health care settings are commonplace today. However, the number of practice guidelines specific to the care of the elderly in emergency settings is sparse. Such guidelines may be specific to the management of particular diagnoses or clinical conditions, and may also be targeted towards conditions a) commonly found in the elderly (constipation, falls) or b) characteristics of clinical presentations that are typical of the elderly, but are markedly different than those normally found in adults of a younger age. Such guidelines are described below, with information on implementation strategies where available.

Baraff, Della Penna, Williams and Sanders (1997)

In their 1997 article, Baraff et. al describe the development, but not the evaluation of, a practice guideline for the ER evaluation, treatment and outpatient referral of community-dwelling persons older than sixty-five years of age who present to the ER after a fall.

The guideline was developed by three emergency departments and their staff, in a large, managed-care organization in Southern California (Kaiser Permanente). The guideline is directed towards the recognition of the factors that increase the risk of falling and includes interventions proven to improve function and reduce the risk of future falls. The practice guideline was created using a modified Delphi technique modeled on the Rand-UCLA method of practice guideline development.

The literature was reviewed for research and review publications outlining appropriate history, physical examination, lab tests and specific treatments and interventions in evaluating the consequences of falls in older patients and in preventing future falls. A draft guideline was then developed and circulated to a panel consisting of emergency physicians, geriatricians and selected consultants. The panel met once and attempted to reach a consensus regarding essential elements of the guideline.

The guideline covers essential history (medications, location and cause of fall, functional status, environmental factors, medical problems and vision testing), essential physical examination (vital signs, nutritional status, mental status, injury, cardiopulmonary examination, and get-up-and-go testing), interventions (medication management, alcohol management, geriatric assessment and a myriad of referrals to social and health services) and selected preventative health measures (immunizations and calcium/vitamin D administration). The guideline also includes a reminder for staff, to be placed on the patient's chart, as well as an information sheet for the elder who has sustained the fall, to be distributed along with other aftercare instructions.

The guidelines' external validity is questioned by the authors, as it was specifically developed for use within a single HMO, with intent to minimize the time commitment and expense for the evaluation of and interventions with the target population. Such guidelines may need to be adapted for other settings. Also, the guideline is not meant

to override clinical judgment of the attending physician who may choose to individualize therapy on the basis of unique clinical circumstances.

Baraff, Lee, Kader, and Della Penna (1999)

Baraff et. al report on a study which aims to determine the effect of a practice guideline on the process of ER care in a health maintenance organization, with respect to elderly who fall. This time, series design compared the care of one thousand, one hundred and forty patients before the implementation of the guideline with the care of seven hundred and fifty-nine patients after the guideline was introduced.

There was a two-week educational blitz between the two measurement periods during which ER physicians and nurses were educated on the details of the guideline. Post implementation, more patients were diagnosed as having had falls due to loss of consciousness, strokes, and seizures (pre-intervention 3.8% vs. post-intervention 8.4%, $p < 0.001$).

There was significant improvement in the documentation of six out of a possible ten falls history items: cause of fall, location of fall, ability to get up unassisted, long lie after fall, prescription medications and Pneumovax immunization status. Documentation on two of the four physical examination items improved as well: visual acuity and the “get up and go” test. In addition, the prescribing of calcium and vitamin D increased from 0% to 6.6%.

Authors conclude that the introduction of a falls practice guideline into the ER environment led to improvements in documentation of fall related details, the prescribing of calcium and vitamin D and the consideration of the causes of falls.

Section Summary: Practice Guidelines for Use in the ER

It is apparent from the results of this overview that there is a dearth of clinical practice guidelines widely available for use with elderly populations within the ER environment.

The literature search preceding this paper targeted not only clinical guidelines, but care pathways, standardized routine orders and standards of care; only two relevant articles were retrieved. Further, the two articles included here share common authorship and most likely reflect the creation, and subsequent implementation, of a single care guideline specifically targeted towards patient falls.

The impact of clinical guidelines is evidenced by the findings of Baraff et. al (1999), even though such guidelines were implemented after only a short two-week educational blitz with no apparent follow-up to ensure continued awareness of the guideline.

Guidelines provide advice on clinical issues that is generally concise, convenient for end users to learn and reference, evidence-based and relatively easy to disseminate to multiple sites.

The creation of clinical guidelines for geriatric emergency management present an untapped opportunity of significant magnitude, especially since guidelines may be appropriate to a host of other clinical situations and conditions relevant to geriatrics, for example the management of elder mistreatment and abuse. The creation and dissemination of such guidelines by specific clinical groups may save other hospitals from investing significant time and resources into management of that same issue.

Transferability of guidelines, however, must be carefully evaluated when introducing guidelines generated in a specific setting to an alternate care setting that may or may not be similar in nature to the setting in which the guideline was first created.

Service Models/Screening Tools for Implementation Post-ED Admission

A limited number of service models and screening tools have been reported in the literature that, although not implemented in the ER itself, target recent admissions from emergency rooms who then occupy either acute care beds or specialized geriatric inpatient beds. The rapidity with which these service models and/or screening tools are implemented increases the likelihood of identifying and/or treating high-risk geriatric admissions early in the course of their admission, in order to prevent sub-optimal management or the development of complications commonly found in hospitalized elderly.

Naughton, Moran, Feinglass, Falconer and Williams (1994)

This study tested the impact of a geriatric evaluation and management model on the costs of acute hospital management of emergently admitted older adults; effect on iatrogenesis and long-term functional outcomes were also examined.

Using a randomized controlled trial approach, a total of one hundred and eleven patients were followed from admission from ER through to discharge. The study took place in a private, non-profit academic medical center in a densely populated urban area. Eligible patients were seventy years of age or older and admitted directly from the emergency room to the medicine service, and were randomized into intervention and control groups using a permuted block design before transfer from ER.

An integrated team of medical house staff, as well as a social worker and geriatrician, cared for the intervention group patients. A nurse specialist and PT joined the team as necessary. The team consistently met two to three times weekly to discuss patients' mental status, psychosocial status, functional condition, and medical condition and worked jointly to identify problems and decide on a care plan.

Patients randomized to the control group were given "usual care". Demographic data was abstracted from medical records by a researcher who was blinded to patient group assignment, and case-mix records (and therefore costing information for each case) and severity of illness information using the APACHE II method were also obtained. Measures of resource use for the two groups included length of stay in days and costs.

Patients in the intervention group had 2.1 fewer days of hospitalization but this reduced length of stay was not statistically significant. There were no differences between groups in terms of mortality or discharge disposition. In risk-adjusted multiple regression analysis the intervention group had a statistically significant lower predicted total cost per patient than the usual care group (-\$2,544, P=0.029), and assignment to the intervention group was also associated with lower lab and pharmacy costs as well.

The use of a geriatric management team in this case was felt to reduce costs, partly due to the teams philosophy of defining the services needed, based on goals related to functional outcomes. No impressive differences in patient outcomes were noted.

Milisen, Foreman, Abraham, De Geest, Godderis, Vandermeulen, Fischler, Delooz, Spiessens and Broos (2001)

Milisen et. al report on the development and testing of a nurse-led interdisciplinary intervention program for delirium and discuss its effect on the incidence and course of delirium, functional rehabilitation, mortality and length of stay in geriatric hip-fracture patients.

Their study utilized a prospective sequential (before/after) design, with a total of one hundred and twenty subjects, half in the pre-intervention group and half in the post-intervention group. The study took place in the ER and two traumatological units of an academic medical central in an urban area of Belgium.

All patients had a traumatic fracture of the proximal femur and were admitted through ED to an inpatient unit within twenty-four hours of a surgical repair. Patients were excluded in cases of concussion, multiple trauma, pathological fractures, surgery occurring more than seventy-two hours after admission, marked communication problems and less than nine years of formal education.

As part of the intervention, all nurses in the ER and inpatient study units were trained to screen for delirium using the NEECHAM Confusion Scale. Patients screening positive were reevaluated by one of eight resource nurses, who validated the staff nurses findings using the CAM criteria.

The resource nurses, having been trained on the identification and management of delirium by a geriatric nurse specialist, were also available to assist staff nurses in developing a patient focused delirium management plan. In turn, the resource nurses could consult the geriatric nurse specialist or geriatrician as needed. In addition, a specially tailored pain medication protocol, consisting of short acting weak opioids and nonopioid analgesic thought to decrease the risk of delirium developing in geriatric patients, was used.

Cognitive status was measured using the Mini-Mental State Exam, functional status was measured using the Katz Index of Activities of Daily Living scale, and mortality and length of stay were measured by the number of deaths postoperatively and the number of days in hospital postoperatively, respectively. Mortality was tracked until three months after discharge. Post-discharge functional status was evaluated at three months via follow-up telephone interview.

The incidence of delirium between the two groups was not statistically different, however, the duration was significantly shorter in the intervention cohort (median of one day vs. median of four days). Fewer severe delirious patients were found in the

intervention cohort for all time points measured. There were no significant differences in functional status between cohorts for delirious patients, though a trend towards shorter length of stay existed for delirious patients in the intervention group. Mortality assessment was inconclusive due to the very small number of deaths in either group.

Clearly, the integrated geriatric model of care resulted in a decrease in the severity and duration of psychiatric symptoms for hip-fracture patients.

Dawson and Critchley (1992)

Authors describe the development of a Quick Response Team (QRT) in the Capital Region of British Columbia, that aimed to provide rapid, community-based health care to patients over sixty years of age, after their ER visit. Little descriptive information was provided about the setting. Patients appropriate to QRT services were identified based on a number of predetermined selection criteria including: medical condition not requiring hospitalization, available caregiver, case not requiring close nursing supervision with a maximum of three hours of nursing care per twenty-four hour period, patient not experiencing confusion and patient within catchments area and willing to accept up to twenty-four hours of home support services. Patients not meeting the criteria were used as a naturally occurring control group. A total of three thousand, six hundred and eighty patients were screened, and one hundred and ninety-nine accepted into the program, over a six-month pilot period.

The QRT team consisted of two part-time social workers, two home care nurses and two liaison nurses, who assessed the patients referred and subsequently arranged twenty-four hour home maker services, home nursing care, respite, adult day care and counseling. Services were arranged prior to patients leaving the ER and were scheduled to begin within thirty minutes of the patients return to the home environment.

All participating project members and service providers were tracked and their feedback incorporated into project improvement during the formative evaluation period. Interview data, survey data, source documents, communication logs, activity schedules, charts and observational records provided raw data for summarization using the Statistical Package for the Social Sciences; additional methodological details were not provided. Program evaluation was based on Donabedian's model of structure-process-outcome using a case-by-case qualitative approach.

Authors cite data limitations resulting from descriptive and context-specific data, which was thought to have been reliant on the vigilance of the recorder. Rich descriptive data were provided about the QRT group and the control group, therefore the groups were not directly compared with respect to statistical significance of differences in specific health outcomes.

QRT clients received on average 2.4 hours of care per day, with homemaking costs equating to \$87.24 per day per client. In contrast, the average costs for an admission of a patient in the control group was \$126,000.

Unfortunately, total costs for intervention patients were not calculated. Mail and telephone follow-up of QRT patients indicated that 87% of patients felt positive about the program.

After a three-year continuance of the program, authors assert that the percentage of long-term care clients occupying medical and surgical beds has dropped from 20% to 6%, however, the possibility of historical confounding factors is not commented on.

Runciman, Currie, Nicol, Green and McKay (1996)

Runciman et. al report on the results of their 1999-2000 study that explored the value of health visitor intervention and occupational therapist follow-up for elderly patients aged seventy-five years and over, discharged from the emergency room of the Royal Infirmary of Edinburgh, Scotland.

This randomized controlled trial allocated two hundred and thirty-two patients to the intervention group and one hundred and ninety-two patients to the control group; method of randomization was not disclosed.

Background information collected about subjects included reason for ER attendance, nature of injury, and immediate and follow-up action required. A research health visitor and a research occupational therapist were recruited to conduct the study, and were trained in the use of a pre-designated, standardized assessment package. Intervention patients were visited at home by the health visitor, most usually within twenty-four hours of discharge from ER, and were assessed in the areas of ADL and IADL performance, using standardized instruments; availability of informal and formal social supports were also assessed.

The visitor, on the basis of assessed dependency and support needs, devised and initiated a customized package of support services for each intervention patient.

Four weeks after the emergency room visit, both groups of patients were assessed in their homes by an occupational therapist. The OT used the same standardized instruments as the health visitor, as well as consumer satisfaction questions.

Upon analysis, intervention and control groups were found to be similar. With respect to consumer satisfaction, 28% of the intervention group experienced increased confidence and self-esteem as a result of the health visitor's visit. In contrast, 36% of control patients felt they might have benefited from some form of follow-up immediately following the ER visit. Readmission rates did not vary markedly between patients. Compared to controls, intervention patients were significantly more independent at four weeks in instrumental activities of daily living such as shopping and cooking ($p=0.027$). However, this effect may be explained in part by the impact of services initiated by the health visitor for intervention patients. In addition, more debilitated control group patients were more likely to participate in follow-up by the OT, skewing the control group

measures. An additional finding was that intervention patients had transient impairment in both ADL's and IADL's, but most had returned to their prior level of functioning only four weeks post-incident.

Close, Ellis, Hooper, Glucksman, Jackson and Swift (1999)

This randomized controlled trial assesses the result of a structured bi-disciplinary falls prevention program on further falls, for elderly patients attending an accident and emergency department. All patients over sixty-five years of age, presenting to the ER with a chief complaint of falling, were eligible for the study, where a fall was defined as inadvertently coming to rest on the ground or other lower level with or without loss of consciousness. Little information was provided about the type of emergency setting.

A total of three hundred and ninety-seven patients were enrolled; one hundred and eighty-four patients were randomized to the intervention group via random-numbers table. Exclusion criteria were cognitive impairment as assessed by the Abbreviated Mental Test (AMT), as well as those with poor English skills or who lived outside the catchments area.

Baseline data collection on study patients covered history of the fall as well as previous falls, concurrent disorders, medications, functional ability pre-fall and cognitive and socio-demographic status.

Intervention group patients were recruited in ER and contacted by telephone two to three days post-ER visit to provide an opportunity to discuss any questions regarding the study. These patients received a detailed day hospital medical assessment and occupational assessment (in home), geared towards falls prevention.

Medical assessment focused on visual acuity, balance, cognition, affect, drugs and cardiovascular function (including postural hypotension). A single OT home visit assessed environmental hazards and psychological consequences of the fall(s) via the Falls Handicap Inventory. Advice and education were provided to patients post-assessment and relevant service referrals were initiated; risk factors for falls were modified if possible.

Information on degree of function, subsequent falling, fall-related injury and doctor/hospital visits were gathered via postal questionnaire every four months for one year. Comparison of outcomes between groups were done after adjustment for differences in baseline functional ability and AMT scores, as well as number of falls in the year prior to study registration.

At twelve-month follow up, the attrition rate was comparable in both groups. The risk of falling was significantly reduced in the intervention group (odds ratio of 0.39, [95% CI 0.23-0.6]). Odds of hospital admission in the intervention group were lower (0.61, [95% CI 0.35-1.05]), and the decline in Barthel (functional status) score with time was greater in the control group ($p < 0.00001$).

Authors assert that although a primary attributable cause of falling was identified in 72% of cases, the rest of the cases had multi-factorial causes and therefore the need for clear interdepartmental (ER and geriatric medicine) falls-prevention strategies was strongly stressed.

Lightbody, Watkins, Leathley, Sharma and Lye (2002)

Lightbody et. al, in their 2002 article, describe a nurse-led, single visit falls prevention program for elderly people discharged from the Accident and Emergency Department. The study took place at University Hospital Aintree in Liverpool, a tertiary teaching centre.

A block-randomized approach was used to allocate three hundred and forty-eight patients to either the treatment or the control group. Eligible patients were those patients sixty-five years of age or older with the ER admitting diagnosis of a fall, where a fall was defined as follows: the patient failed to maintain a stable position and inadvertently came to rest on the ground or lower level, with or without loss of consciousness, but not as a result of acute medical events (stroke, etc.) or extraordinary environmental factors. Patients admitted, living outside of the immediate area, unable to consent or refusing participation were excluded.

Baseline data collected on study patients included measures of mood, cognition, and Life Space Diameter, a measure of the space through which people habitually move. Data were also collected on demographics, pre-fall abilities, falls in the previous year and medication usage of study patients.

Between two and four weeks after discharge, intervention patients received a home visit by the falls nurse who assessed a wide variety of medical and environmental correlates to falls. Patients were given advice and education about modifiable falls risk factors, some of which were flagged to follow-up by the patients' family, general practitioner, or social services. After the visit, participants kept diary records on subsequent falls, related injury and place of treatment.

Postal questionnaires were returned by patients at the six-month interval, and included details of diary events and functional ability, mood and degree of social support.

On analysis, intervention and control groups were found to be similar. In the intervention group, forty-three patients fell one hundred and forty-one times, and in the control group, forty-four patients fell one hundred and seventy-one times, with the difference not reaching statistical significance. At the six-month interval, the intervention group was significantly more independent ($p < 0.04$) and more mobile in the community ($p < 0.02$). There was a trend toward fewer patients attending ED in the intervention group after the index fall, and this group appeared to sustain fewer major injuries as well.

Authors assert that the difference in falls was not statistically significant between groups because in retrospect, the study was underpowered. In addition, a more marked result may have been achieved had the study nurse intervened directly rather than flagged modifiable fall risk factors to secondary parties, such as the patients' family or general practitioner.

Allen (1997)

This case-study research by Allen (1997) delivers an overview of the creation of a telephone follow-up service for older ER patients. The aims of the service were to prevent re-attendance and improve patient outcomes for the frail emergency department patient, as well as understand the status of those patients over seventy-five years of age, post-discharge. No information was provided about the ER setting.

Over the course of this two-month pilot, approximately two hundred and fifty referrals were collected from emergency; twenty-one cases had no working telephone access, nine cases were unable to be contacted and two cases were dropped due to language barrier issues. The details of each patient's ER visit were collected prior to telephone outreach. The liaison nurse contacted the study patients within forty-eight hours of discharge. Little information was given on the nature of the telephone assessment, and the subsequent type of referral linkage made.

The author presents six example case studies of actual cases in order to demonstrate the type of patient issues/problems identified and subsequent interventions implemented by the liaison nurse.

Despite the limitations of case-study design, very detailed descriptions are provided with respect to strategies implemented in order to ensure program success. Of the cases contacted, 40% were referred on to other services.

The author asserts that a percentage of repeat ER admissions were avoided as a result of the telephone follow-up, but this finding was not quantified. More importantly, the results of this research were used to stage a successful bid for additional government money by which to implement a permanent program.

Section Summary: Service Models/Screening Tools for Implementation Post-ER Admission

This section reviewed the research to date on geriatric service models and interventions targeting ER patients, though not delivered in the ER environment. Over 50% of studies reviewed utilized quasi-experimental or experimental (randomized controlled trials) methods that lend credibility to the body of evidence. However, although some statistically significant improvements in outcomes were demonstrated, several outcomes did not reach significance but merely indicated that data trends were supportive of the interventions in question. The articles presented above demonstrate trends in geriatric emergency research whereby smaller sample sizes are utilized, with study populations tending to be less than five hundred cases. This may be reflective of limitations in funding and resources for this new specialty of geriatric emergency management, thereby limiting coverage in service provision, and subsequently, available study populations.

In addition, a proportion of articles reviewed indicated that recommendations and interventions from specialized geriatric assessment were left to be implemented by family physicians or patients and family members, and almost none of the studies included implementation measures by which the percentage of recommendations actually acted upon were measured. These factors may have contributed to the modest findings in this grouping of literature.

An additional marked point of interest was the lack of medically oriented outcome data, in that a majority of outcome measures were functional in nature or relating to patient satisfaction and/or service utilization, such as the effect of intervention on readmission to ER. Mortality and morbidity outcomes were less popular, and short outcome measurement intervals were common. In some cases, a period of weeks may elapse before recommended interventions/home supports are even in place, demanding a longer period of follow-up in order to demonstrate the impact of such interventions. Nevertheless, it is noteworthy that most outcome measures showed at least positive trends in support of geriatric intervention.

It is also apparent that the majority of studies did not provide a sufficient amount of descriptive methodological information with respect to assessment and intervention, focusing more on the structure of teams and organization of services. The essence of how the assessments and interventions typified specialized geriatric knowledge and practice experience was not fully apparent, despite rather fulsome descriptions of any well-known and validated assessment tools utilized. Information on type of ER setting (teaching vs. community, urban vs. rural) was also very limited, thereby making generalizability of findings difficult.

Lastly, only a very small proportion of work estimated cost differentials between intervention and non-intervention groups. Cost comparisons were made even more difficult, as hospital-based researchers may have difficulty in obtaining cost data for non-hospital services implemented as an alternate to hospital-based care. In addition, there was no attempt in any of the work to estimate the ripple effect of intervention impacts, such as the effect of decreased ER utilization by the elderly on local community health support service demands.

Conclusions

A well-circumscribed body of literature has been reviewed, critically analyzed and summarized here. However, it should be noted that there is additional literature on geriatric emergency management outside the scope of this review that is available to interested parties, including material on:

- ER utilization by the elderly (descriptive information on patients and their ER utilization patterns)
- ER recidivism rates of elderly patients post-ER visit, and related causative factors
- Pre and post hospital programs targeting reduction of ER utilization by the elderly
- Screening tools for additional clinical phenomenon such as dehydration and elder abuse

It is clear from this overview of the literature related to geriatric emergency management (GEM) that the balance of evidence is supportive of GEM service delivery models, screening tools and guidelines. The body of knowledge in this area is small, given that the specialty of geriatric emergency management is a more recently acknowledged focus in health care provision. However, despite a small number of studies being available, definite trends and/or impacts have been demonstrated with respect to GEM interventions decreasing ER utilization, increasing patient and family satisfaction, increasing the utilization of community service referral pathways and detecting cases requiring further geriatric intervention. A modest effect on health outcomes was also noted for intervention patients, for example: increased independence, reduced risk of falls and shortened periods of delirium.

Given the relatively small body of GEM research literature, facilities implementing GEM programming are encouraged to monitor both implementation and outcome measures and to document, publish and/or disseminate evaluation findings for the benefit of others wanting to pursue GEM interventions in their own facility. Future research should attempt to rectify some of the methodological limitations uncovered by this review, such as:

- Small sample size
- Limited description of settings, and type and content of patient assessments and interventions
- Incomplete operationalization of treatments, such as lack of implementation of GEM team recommendations
- Single source outcome measures, and lack of emphasis on health status outcome measures
- Lack of longer term follow-up
- Incomplete or missing case-costing data

- Inability to assess the occurrence of unanticipated systemic effects resulting from the implementation of GEM programming; for example, community agencies may be unable to manage increased referral rates resulting from increased numbers of GEM facilitated discharges

It is hoped that GEM programming will continue to be developed and reported on in order to ensure the continued improvement of the care of the elderly within the emergency room environment, and assist emergency room staff in addressing the specific needs of the elderly patient.

The OHA is interested in the continued exploration and development of geriatric emergency management initiatives, and plans to continue working with Ontario-based stakeholders in order to highlight work being done in this area.

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