Appendix X: Parameters of the Review

A. Research design & publication dates

Our synthesis includes two types of research articles:

1. *Systematic reviews* or health technology assessments published between September 2006 and September 2011,[1] inclusive. To be considered "systematic," a given review had to provide three things:
    i. a documented search strategy for identifying relevant primary studies;
    ii. citation info for all included studies; and
    iii. an aggregate description of included study characteristics that included participants, setting, intervention, outcomes.
2. *Primary studies* published between April 2011 and September 2011, inclusive. We elected to draw on relevant primary studies that met our criteria but were published too recently to have been included in a systematic review.

B. Selection Criteria

The team collectively agreed on the following inclusion criteria for selection of review studies:

Patients: We included only those articles that evaluated the effect of acute care programs and services on inpatients aged ≥65 years. Because we were interested in how programs and services affect the broad range of older adult inpatients – no matter what their health status – we did not employ disease or diagnostic category as a selection criterion. That is to say, we did not set out to limit the analysis to programs and services that focussed on a particular type of patient population. As we explain below, however, we did limit our selection to articles that focussed on particular types of settings or units found within the hospital. As a result we very likely have excluded from the analysis certain specialized segments of the older adult inpatient population. The reader will also note that a few of the reviews in our synthesis included some studies that did not specifically state that patients were ≥65 years. We included these reviews so long as (a) patients in these studies were described as adults, and (b) the reviews themselves clearly identified older adults as the population of interest.

Setting: we included only those articles that analyzed program and service delivery in acute care hospital units *not* designed exclusively for older adults. Since Newfoundland and Labrador currently has very little in the way of specialized geriatric units, and since it cannot be assumed that the province will be acquiring such units in the short or medium term, we were particularly interested in finding out what works for seniors in venues designed for *all* adult age groups. As a result, general medicine/surgical wards and emergency departments were the two main settings considered relevant to our synthesis, but units that deliver condition-specific care (e.g., stroke units, orthopaedic units, psychiatric units, cardiovascular units, etc.) were also considered relevant because older adults represent a high proportion of the patient population in these

[1] With respect to our PubMed search, we only included articles that were published between September 2006 & September 2011, and that were indexed to PubMed prior to January 10, 2011.

units, and because they are denoted in the organizational structure of a hospital as medical or surgical. In addition, programs and services delivered in diagnostic areas as part of an acute care episode were considered relevant. By contrast, we excluded articles that were focussed principally on specialized geriatric/elder care units such as Acute Care for the Elderly (ACE) units, and any forms of rehabilitative or long-term inpatient care, except insofar as these provide a control or comparison group for assessing the effects of programs and services delivered in all adult-age units.

Applying this criterion in practice proved quite challenging. This was because the majority of reviews we came across did not draw these kinds of distinctions between hospital settings; consequently, they tended to lump studies on specialized geriatric units together with studies on adult care units. By contrast, we needed to find some way of selecting reviews that accurately represented the available research evidence on hospital settings *not* designed specifically for older adults. With this aim in mind, we employed the following criteria when dealing with reviews on mixed settings:

1. We selected reviews if at least 60% of their included studies were on acute care inpatient settings *not* designed exclusively for older adults.
2. Reviews that included a greater proportion of studies on ineligible settings (i.e., >40% on specialized geriatric units) were selected if they analyzed eligible studies separately from the ineligible ones. In the case of meta-analyses, this meant that data from studies conducted in eligible settings had to be pooled separately from other study findings. In reviews where meta-analysis was not used, eligible studies had to be treated as a distinct subset of the whole and analyzed in a discrete section of the review. In effect, these discrete sections constituted reviews-within-a-review.

Programs and services: As we defined them, programs and services encompass the physical environment in which care is delivered, the infrastructure that supports care, and the skill mix and staffing levels in acute care settings. We included reviews if (a) they evaluated a program or service that was initiated in an acute care unit, and (b) the greater part of said program/service was delivered during the acute phase of the illness – in other words, we included reviews even if a component of the program/service they described was delivered in the post-discharge period. On the other hand, we excluded articles on the following subjects:

1. surgical procedures;
2. drugs;
3. nutritional supplements; and
4. efficiency testing for tools & instruments used in clinical assessment

Outcomes: We only selected articles that assessed at least one of two types of outcome:

1. *Patient outcomes* – includes objective (e.g. activities of daily living, falls, mobility, cognitive status, death) and subjective (e.g. patient satisfaction, quality of life) outcomes. By including self-reported data, we felt that we would be able to capture some of the more diffuse impacts of environmental variables. Such impacts might not necessarily be reflected clearly in the more quantitative, objective outcome data.
2. *Service/ resource utilization outcomes* (e.g. readmission to hospital, length of stay, costs, subsequent GP/ED visits, etc.)

C. Search Strategy

To identify relevant articles on PubMed and CINAHL we used the Boolean operator "AND" to combine three sets of search terms: (1) subject headings and keywords related to aged persons, (2) subject headings and keywords related to acute hospital settings, and (3) a validated search filter for retrieving either systematic reviews or primary studies. Our search was limited to articles published in English. Tables in the appendix illustrate how we constructed our PubMed search, and the actual search strings we used for both PubMed and CINAHL are presented on the following page. In order to limit article retrieval to the desired types of research design, each search employs an evidence-based, research-validated search filter designed by the Health Information Research Unit at McMaster University.[2]

1. "Aged" concept	
MeSH	"Aged" "Health Services for the Aged" "Geriatrics" "Geriatric Nursing"
Keywords	"aged" "elder*" "older" "geriatric" "gerontolog*"
String	(Aged[MeSH Terms] OR Health Services for the Aged[MeSH Terms] OR Geriatrics[MeSH Terms] OR Geriatric Nursing[MeSH Terms]) OR aged[Title] OR elder*[Title] OR older[Title] OR geriatric[Title] OR gerontolog*[Title]

2. "Acute care" concept	
MeSH	"Critical Care" "Emergency Medical Services" "Hospitalization" "Perioperative Care" "Perioperative Period" "Health Facility Environment" "Hospital Administration" "Hospital Units" "Hospitals" "Personnel, Hospital"
Keywords	"acute care" "hospital*" "emergency" "surg*"
String	Critical Care[MeSH Terms] OR Emergency Medical Services[MeSH Terms] OR Hospitalization[MeSH Terms] OR Perioperative Care[MeSH Terms] OR Perioperative Period[MeSH Terms] OR Health Facility Environment[MeSH Terms] OR Hospital Administration[MeSH Terms] OR Hospital Units[MeSH Terms] OR Hospitals[MeSH Terms] OR Personnel, Hospital[MeSH Terms] OR Perioperative Nursing[MeSH Terms] OR "acute care"[Title] OR "acute-care"[Title] OR hospital*[Title] OR emergenc*[Title] OR surg*[Title]

3. Search filters
<u>Systematic reviews – Balance of sensitivity and specificity</u> meta analysis[Publication Type] OR meta analysis[Title/Abstract] OR meta analysis[MeSH Terms] OR review[Publication Type] OR search*[Title/Abstract]
<u>Primary studies (Therapy) – Balance of sensitivity and specificity</u> randomized controlled trial[Publication Type] OR randomized[Title/Abstract] OR placebo[Title/Abstract]
<u>Primary studies (Prognosis) – Maximum specificity</u> prognos*[Title/Abstract] OR (first[Title/Abstract] AND episode[Title/Abstract]) OR cohort[Title/Abstract]

[2] See: Montori, V. et al. 2005. Optimal search strategies for retrieving systematic reviews from Medline: analytical survey. *BMJ*. Jan 8; 330 (7482): 68.

PubMed

Search **(meta analysis[Publication Type] OR meta analysis[Title/Abstract] OR meta analysis[MeSH Terms] OR review[Publication Type] OR search*[Title/Abstract]) AND ((Aged[MeSH Terms] OR Health Services for the Aged[MeSH Terms] OR Geriatrics[MeSH Terms] OR Geriatric Nursing[MeSH Terms]) OR (aged[Title] OR elder*[Title] OR older[Title] OR geriatric[Title] OR gerontolog*[Title])) AND ((Critical Care[MeSH Terms] OR Emergency Medical Services[MeSH Terms] OR Hospitalization[MeSH Terms] OR Perioperative Care[MeSH Terms] OR Perioperative Period[MeSH Terms] OR Health Facility Environment[MeSH Terms] OR Hospital Administration[MeSH Terms] OR Hospital Units[MeSH Terms] OR Hospitals[MeSH Terms] OR Personnel, Hospital[MeSH Terms] OR Hospital Design and Construction[MeSH Terms] OR Perioperative Nursing[MeSH Terms]) OR ("acute care"[Title] OR "acute-care"[Title] OR hospital*[Title] OR emergenc*[Title] OR surg*[Title]))** Limits: **English, Publication Date from 2006/08/30 to 2011/09/30**	1669[3]

CINAHL

☐	S8	S6 or S7	**Search modes** - Boolean/Phrase	Results: 392[4]
☐	S7	S4 and S5	**Search modes** - Boolean/Phrase	
☐	S6	MH aged, hospitalized	**Limiters** - Published Date from: 20060801-20110931; Clinical Queries: Review - High Sensitivity; Language: English **Search modes** - Boolean/Phrase	
☐	S5	MH (aged OR health service for the aged OR geriatrics OR gerontologic nursing OR gerontologic care) OR TI (aged OR elder* OR older OR geriatric OR gerontologic*)	**Limiters** - Published Date from: 20060801-20110931; Clinical Queries: Review - High Sensitivity; Language: English **Search modes** - Boolean/Phrase	
☐	S4	MH (acute care OR critical care OR emergency care OR perioperative care OR emergency medical services OR hospital programs OR academic medical centers OR health facility environment OR emergency service OR hospitals OR hospital units OR medical staff, hospital OR nursing staff, hospital OR hospitalization) OR TI ("acute care" OR "hospital*" OR "emergenc*" OR "surg*")	**Limiters** - Published Date from: 20060801-20110931; Clinical Queries: Review - High Sensitivity; Language: English **Search modes** - Boolean/Phrase	

[3] This result was obtained on January 5, 2012. A similar search using the "Therapy" filter for primary studies (in place of the systematic review filter) netted 489 results, and the "Prognosis" filter netted 980.

[4] This result was obtained on January 5, 2012. A similar search using the "Therapy" filter for primary studies (in place of the systematic review filter) netted 115 results, and the "Prognosis" filter netted 142 results.

We also searched a range of grey literature websites in November of 2011 for relevant systematic reviews:

NHS (*https://www.evidence.nhs.uk/*)
All searches filtered by 'Types of Information' (systematic reviews, HTAs) & published date (last 3 years)

A. Searched "Older people": 606 results, 0 selected for full-text review
B. Searched "Elderly NOT Older people": 57 results, 0 selected for full-text review
C. Searched "Seniors NOT Older people": 19 results, 0 selected for full-text review
D. Searched "Health services for the aged NOT Older people": 130 results, 0 selected for full-text review
E. Searched "Geriatrics NOT Older people": 11 results, 0 selected for full-text review
F. Searched "Geriatric Nursing NOT Older people": 7 results, 0 selected for full-text review
G. Searched "Geriatric Psychiatry NOT Older people": 5 results, 0 selected for full-text review

TRIP (*http://www.tripdatabase.com/index.html*): searched (title: old* OR elder* OR aged OR geriatric* OR gerontolog*) from: 2006 to: 2011, filtered by systematic reviews, 322 results: 0 selected for full-text review

healthevidence.ca (*http://www.health-evidence.ca/articles/search*): general search filtered by 'Articles added to the registry since' (2006), 'Review type' (meta-analysis & systematic), Population Characteristics' (seniors [65+]), & 'Intervention Location' (Hospital): 85 results (the website would only display the first 50, but I have the full results in an e-mail from the healthevidence people), 0 selected for full-text review

Health Systems Evidence (*http://www.mcmasterhealthforum.org/healthsystemsevidence-en*): searched "old* OR elder* OR geriatric* OR gerontolog* OR aged", filtered by 'Health system topics' (Delivery arrangement, Implementation strategy), 'Types of synthesis' (Overview of systematic reviews, Systematic review (Cochrane), Systematic review), and 'Publication date range' (2006-2011): 84 results, 1 selected for full-text review

CADTH (*http://www.cadth.ca/en/products/health-technology-assessment*): searched "acute care geriatric" (279 results) + browsed the full list of Technology Assessments & Rapid Responses: 1 selected for full-text review

AHRQ (*http://www.ahrq.gov/*): searched "acute care geriatric" (general website search engine – 406 results) in 'with all of the words' + browsed the full list of Evidence-based Practice reports + searched "older OR elderly OR geriatric OR aged" (Effective Health Care Program search engine – 37 results), filtered by 'Report Types' (Research Reviews & Technical Briefs): 1 selected for full-text review

NY Academy of Medicine Library Catalog (*http://nyam.waldo.kohalibrary.com/*): searched "older" OR "elderly" OR "geriatric" OR "aged" in the 'Title' field, limited to 2006-2011: 229 results, 1 selected for full-text review

Finally, we searched the reference lists of all flagged reviews and, on that basis, we selected one additional paper for full-text review.

D. Article Selection

Our searches for relevant systematic reviews retrieved 4338 citations, and our searches for primary research studies retrieved 1726 citations. Initially, the titles and abstracts of the retrieved citations were screened by two reviewers (RK and MM), though each handled separate portions of the results list. Subsequently, one reviewer (RK) screened the entire list to ensure consistency. On this basis, 56 papers – 50 literature reviews and 6 primary research studies – were selected for full-text review. Both BP and RK reviewed all 56 papers, and through a process of mutual consent, selected 11 systematic reviews and 3 primary research studies for inclusion in our synthesis. Excluded articles and reasons for their exclusion are listed below, along with a flow chart that illustrates the selection process.

Excluded articles					
Didn't focus primarily on eligible settings/not enough detail about setting of intervention	*Did not evaluate an acute care program or service (e.g., evaluated a measurement tool or a pre/post-acute service)*	*Did not focus exclusively on inpatient population ≥65 years*	*Published prior to September 2006*	*Did not meet our criteria for systematic reviews*	*Did not assess targeted outcomes*
Bakker (2011) Cameron (2010) Chiu (2007) Corsonello (2009) Coussement (2009) Garcia-Caballos (2010) Graf (2010)[5] Handoll (2011) Holroyd-Leduc (2010) O'Connell (2007) Oliver (2007) Popejoy (2009) Shepperd (2010) Sjogren (2008) Stern (2009)	Arendts (2010) Buurman (2011) Courtney (2011) de St-Hubert (2010) Foss (2010) Gates (2008)[6] Hoogerdujin (2007) LaMantia (2010) Oliver (2008) Scott (2007) Sutton (2008) Walsh (2007)	Chudyk (2009) Hempenius (2011) Prowse (2007) Shiga (2008)	Fisher (2006) Glasby (2006) McCusker (2006)	Cozart (2009) Hook (2008) Mistiaen (2007)[7] Moyle (2008) Murray (2010) Terrell (2007)	Gallagher (2011) Stitt (2011)

[5] We could not access a full-text version of this review.

[6] This review evaluated fall prevention programs offered in different environments, including the emergency room; however, the goal of these programs was to prevent falls in the home, not in acute care settings.

[7] This was a systematic meta-review; i.e., a review of reviews, not primary studies.

Citation info for excluded articles

(1) Bakker FC, Robben SH, Olde Rikkert MG. Effects of hospital-wide interventions to improve care for frail older inpatients: a systematic review. BMJ Qual.Saf. 2011 Aug;20(8):680-691.

(2) Cameron ID, Murray GR, Gillespie LD, Robertson MC, Hill KD, Cumming RG, et al. Interventions for preventing falls in older people in nursing care facilities and hospitals. Cochrane Database Syst.Rev. 2010 Jan 20;(1)(1):CD005465.

(3) Chiu WK, Newcomer R. A systematic review of nurse-assisted case management to improve hospital discharge transition outcomes for the elderly. Prof.Case Manag. 2007 Nov-Dec;12(6):330-6; quiz 337-8.

(4) Corsonello A, Pranno L, Garasto S, Fabietti P, Bustacchini S, Lattanzio F. Potentially inappropriate medication in elderly hospitalized patients. Drugs Aging 2009 Dec;26 Suppl 1:31-39.

(5) Coussement J, De Paepe L, Schwendimann R, Denhaerynck K, Dejaeger E, Milisen K. Interventions for preventing falls in acute- and chronic-care hospitals: a systematic review and meta-analysis. J.Am.Geriatr.Soc. 2008 Jan;56(1):29-36.

(6) Garcia-Caballos M, Ramos-Diaz F, Jimenez-Moleon JJ, Bueno-Cavanillas A. Drug-related problems in older people after hospital discharge and interventions to reduce them. Age Ageing 2010 Jul;39(4):430-438.

(7) Graf CE, Zekry D, Giannelli S, Michel JP, Chevalley T. Efficiency and applicability of the comprehensive geriatric assessment in the emergency department: a systematic review. Aging Clin.Exp.Res. 2010 Oct 5.

(8) Handoll HH, Sherrington C, Mak JC. Interventions for improving mobility after hip fracture surgery in adults. Cochrane Database Syst.Rev. 2011 Mar 16;(3)(3):CD001704.

(9) Holroyd-Leduc JM, Khandwala F, Sink KM. How can delirium best be prevented and managed in older patients in hospital? CMAJ 2010 Mar 23;182(5):465-470.

(10) LaMantia MA, Scheunemann LP, Viera AJ, Busby-Whitehead J, Hanson LC. Interventions to improve transitional care between nursing homes and hospitals: a systematic review. J.Am.Geriatr.Soc. 2010 Apr;58(4):777-782.

(11) O'Connell B, Gardner A, Takase M, Hawkins MT, Ostaszkiewicz J, Ski C, et al. Clinical usefulness and feasibility of using Reality Orientation with patients who have dementia in acute care settings. Int.J.Nurs.Pract. 2007 Jun;13(3):182-192.

(12) Oliver D, Connelly JB, Victor CR, Shaw FE, Whitehead A, Genc Y, et al. Strategies to prevent falls and fractures in hospitals and care homes and effect of cognitive impairment: systematic review and meta-analyses. BMJ 2007 Jan 13;334(7584):82.

(13) Popejoy LL, Moylan K, Galambos C. A review of discharge planning research of older adults 1990-2008. West.J.Nurs.Res. 2009 Nov;31(7):923-947.

(14) Shepperd S, McClaran J, Phillips CO, Lannin NA, Clemson LM, McCluskey A, et al. Discharge planning from hospital to home. Cochrane Database Syst.Rev. 2010 03(1).

(15) Sjogren P, Nilsson E, Forsell M, Johansson O, Hoogstraate J. A systematic review of the preventive effect of oral hygiene on pneumonia and respiratory tract infection in elderly people in hospitals and nursing homes: effect estimates and methodological quality of randomized controlled trials. J.Am.Geriatr.Soc. 2008 Nov;56(11):2124-2130.

(16) Stern C, Jayasekara R. Interventions to reduce the incidence of falls in older adult patients in acute-care hospitals: a systematic review. INT J EVID BASED HEALTHC 2009 12;7(4):243-249.

(17) Arendts G, Howard K. The interface between residential aged care and the emergency department: a systematic review. Age Ageing 2010 May;39(3):306-312.

(18) Buurman BM, van Munster BC, Korevaar JC, de Haan RJ, de Rooij SE. Variability in measuring (instrumental) activities of daily living functioning and functional decline in hospitalized older medical patients: a systematic review. J.Clin.Epidemiol. 2011 Jun;64(6):619-627.

(19) Courtney MD, Edwards HE, Chang AM, Parker AW, Finlayson K, Bradbury C, et al. Improved functional ability and independence in activities of daily living for older adults at high risk of hospital readmission: a randomized controlled trial. J.Eval.Clin.Pract. 2011 Apr 1.

(20) De Saint-Hubert M, Schoevaerdts D, Cornette P, D'Hoore W, Boland B, Swine C. Predicting functional adverse outcomes in hospitalized older patients: a systematic review of screening tools. J.Nutr.Health Aging 2010 May;14(5):394-399.

(21) Foss C, Askautrud M. Measuring the participation of elderly patients in the discharge process from hospital: a critical review of existing instruments. Scand.J.Caring Sci. 2010 Dec;24 Suppl 1:46-55.

(22) Gates S, Fisher JD, Cooke MW, Carter YH, Lamb SE. Multifactorial assessment and targeted intervention for preventing falls and injuries among older people in community and emergency care settings: systematic review and meta-analysis BMJ 2008 Jan 19;336(7636):130-133.

(23) Hoogerduijn JG, Schuurmans MJ, Duijnstee MS, de Rooij SE, Grypdonck MF. A systematic review of predictors and screening instruments to identify older hospitalized patients at risk for functional decline. J.Clin.Nurs. 2007 Jan;16(1):46-57.

(24) Oliver D, Papaioannou A, Giangregorio L, Thabane L, Reizgys K, Foster G. A systematic review and meta-analysis of studies using the STRATIFY tool for prediction of falls in hospital patients: how well does it work? Age Ageing 2008 Nov;37(6):621-627.

(25) Scott V, Votova K, Scanlan A, Close J. Multifactorial and functional mobility assessment tools for fall risk among older adults in community, home-support, long-term and acute care settings Age Ageing 2007 Mar;36(2):130-139.

(26) Sutton M, Grimmer-Somers K, Jeffries L. Screening tools to identify hospitalised elderly patients at risk of functional decline: a systematic review. Int.J.Clin.Pract. 2008 Dec;62(12):1900-1909.

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(28) Chudyk AM, Jutai JW, Petrella RJ, Speechley M. Systematic review of hip fracture rehabilitation practices in the elderly. Arch.Phys.Med.Rehabil. 2009 Feb;90(2):246-262.

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(31) Shiga T, Wajima Z, Ohe Y. Is operative delay associated with increased mortality of hip fracture patients? Systematic review, meta-analysis, and meta-regression Can.J.Anaesth. 2008 Mar;55(3):146-154.

(32) Fisher M, Qureshi H, Hardyman W, Homewood J editors. Using qualitative research in systematic reviews: Older people's views of hospital discharge. London: Social Care Institute for Excellence; 2006.

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(34) McCusker J, Verdon J. Do geriatric interventions reduce emergency department visits? A systematic review. J.Gerontol.A Biol.Sci.Med.Sci. 2006 Jan;61(1):53-62.

(35) Cozart HC, Cesario SK. Falls aren't us: state of the science. Crit.Care Nurs.Q. 2009 Apr-Jun;32(2):116-127.

(36) Hook ML, Devine EC, Lang NM. Using a Computerized Fall Risk Assessment Process to Tailor Interventions in Acute Care. In: Henriksen K, Battles JB, Keyes MA, Grady ML, editors. Advances in Patient Safety: New Directions and Alternative Approaches (Vol. 1: Assessment) Rockville (MD); 2008.

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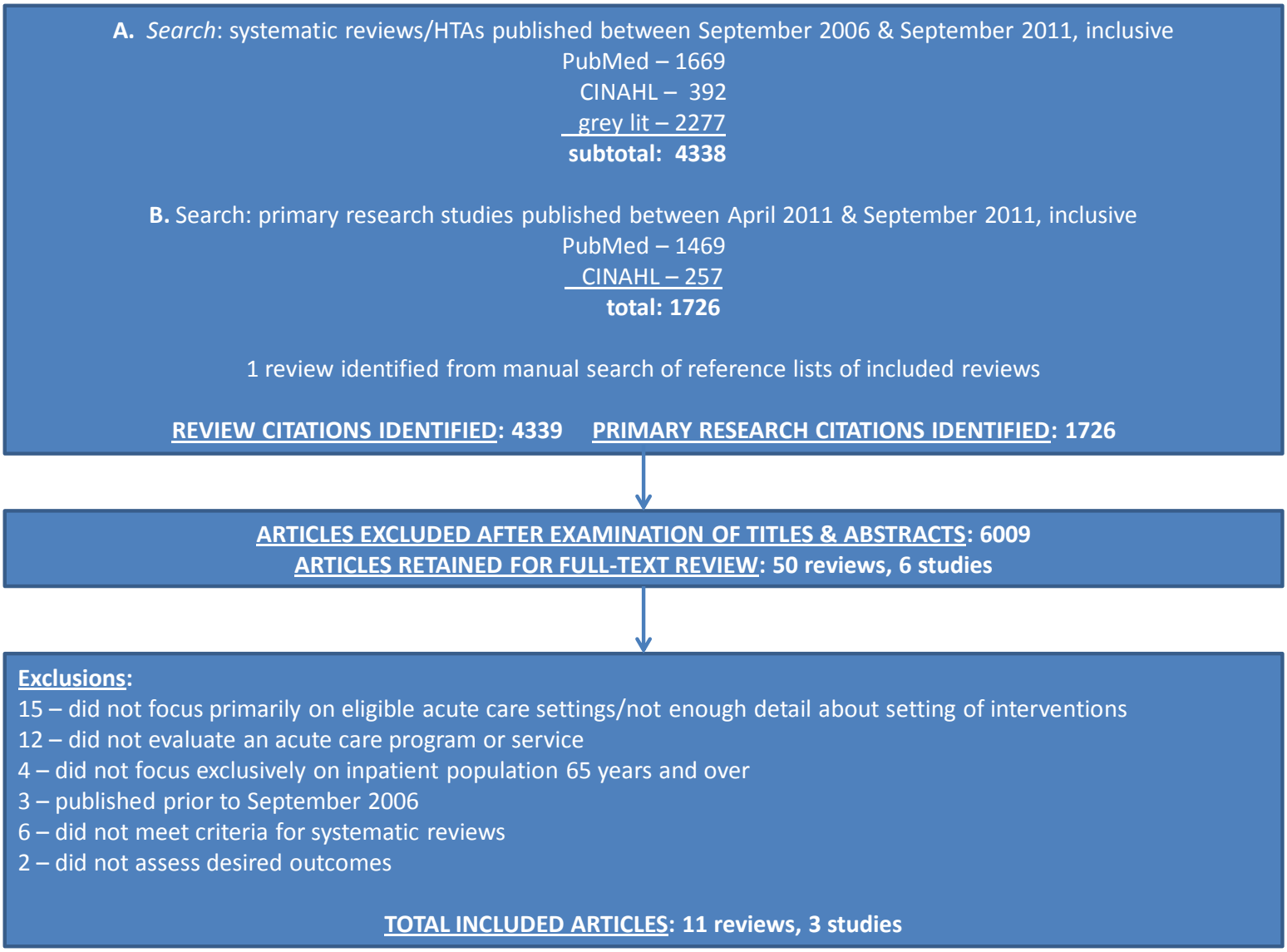
(42) Stitt DM, Elliott DP, Thompson SN. Medication discrepancies identified at time of hospital discharge in a geriatric population. Am.J.Geriatr.Pharmacother. 2011 Aug;9(4):234-240.



E. Critical Appraisal and Data Extraction

As stated in the main report, our critical appraisal methodology for systematic reviews employs AMSTAR[8], a validated measurement tool for evaluating the methodological quality of systematic reviews. AMSTAR scores range from 0 to 10 (0 to 11 for the reviews that pool quantitative data). Higher scores can be taken as an indicator that the various stages of the review – e.g., literature searching, pooling of data, critical appraisal, etc. – were conducted appropriately. Each included systematic review was scored by both Rob Kean (RK) and Meagan Mackenzie (MM) using the AMSTAR tool. RK and MM then met and compared their appraisals,

[8] See: Shea, B.J., Bouter, L.M., Peterson, J., Boers, M., Andersson, N., et al. 2007. External Validation of a Measurement Tool to Assess Systematic Reviews (AMSTAR). *PLoS ONE* 2(12): e1350. doi:10.1371/journal.pone.0001350

review by review, and resolved any discrepancies in score via a consensus procedure. Each then took a separate portion of the reviews and extracted relevant data into a table. Subsequently, each reviewed the other's table entries to ensure consistency. A similar process was used for the 3 primary studies, only in this instance the reviewers were RK and Jinelle Ramlackansingh.

Using the selection criteria outlined above, we selected 11 systematic reviews and three primary studies for inclusion in the synthesis. When we totalled up all the studies included in our selected reviews, eliminated duplicates, and added the three primary research studies from our own searches (the ones published between April 2011 and September 2011), we determined that the primary research base covered by our synthesis encompasses 163 different studies. Certain of these studies appeared in more than one review: three studies appeared in five reviews, two studies appeared in two reviews, seven studies appeared in three reviews, 20 studies appeared in two reviews, and 128 studies appeared in only one review (see table below).[9]

	Appeared in 5 reviews	Appeared in 4 reviews	Appeared in 3 reviews	Appeared in 2 reviews	Appeared in 1 review
No. of primary studies	3 Caplan, 2004 Counsell, 2000 Landefeld, 1995	2 Asplund, 2000 Mion, 2003	7 Basic, 2005 McInnes, 1999 Naylor, 1999 Nikolaus, 1999 Reuben, 1995 Runciman, 1996 Winograd, 1993	20	128

As documented in the data extraction tables below, only 2 of our 11 reviews restricted their selection of articles to just those primary studies that were conducted in acute care units not exclusively designed for older adults patients. The other 9 reviews included studies from various kinds of setting. Of the 163 studies that constitute our primary research base, 106 (approximately 65%) are on acute care units not designed exclusively for older adult patients; the remaining 57 studies are on other kinds of settings, typically either specialized geriatric units or long-term rehabilitation units. This presented special challenges for our data extractors. As discussed earlier, the project team resolved early on that our focus would be service delivery in acute care hospital units *not* designed exclusively for older adults. Because the majority of reviews we came across tended to mix studies on specialized geriatric units together with studies on general adult care units, we needed to find some way of distilling from that mix the available research evidence on hospital settings not designed exclusively for older adults. This challenge presented itself at the level of article selection, but it also had implications for our data extraction procedures. More specifically, when preparing our table of systematic reviews we made careful distinctions between the evidence on specialized geriatrics settings and evidence on general adult care units. The reader will note that the column for 'Inclusion criteria' lists all the studies included in a given review, but the 'Setting' column carefully distinguishes the studies conducted in units *not* designed exclusively for seniors from the studies on other kinds of settings.

[9] Citation info for these studies is provided in the main report.

Interpreting the findings from the 9 reviews on mixed settings provided an additional challenge. Because those findings were not based solely on research into general adult care units, it was not always easy to determine how applicable they were in our own analysis, which *is* solely about general adult care units. As discussed earlier, part of our solution to this problem involved selecting reviews only if (a) at least 60% of their included studies were on acute care inpatient settings *not* exclusively designed for older adults; or (b) they devoted a separate sub-group analysis to such settings. In addition, we arranged our table in a way that made it possible for us to determine whether or not review findings were adequately supported by the evidence on general adult care settings. The data entered into the 'Measured outcomes' column have been taken exclusively from the group of studies on units *not* specifically designed for seniors, but the findings presented in the column for 'Conclusions & implications for practice' are direct quotations. This enabled us – and will enable the reader – to go back and forth between 'Measured outcomes' and 'Conclusions' and see how well the outcome data from the studies on general adult care units support the overall findings in the review.

Below we provide a blank version of the AMSTAR scoring sheet, a table that illustrates how each review was scored, and the data extraction tables. At the very end of the document we have included pdf version of the the Aged Care Assessment Tool, currently in use within the South Eastern Sydney Illawarra Area Health Service in Australia.

REFERENCE:

AMSTAR Item	Answer
1. Was an 'a priori' design provided? The research question and inclusion criteria should be established before the conduct of the review.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
2. Was there duplicate study selection and data extraction? There should be at least two independent data extractors and a consensus procedure for disagreements should be in place.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
3. Was a comprehensive literature search performed? At least two electronic sources should be searched. The report must include years and databases used (e.g. Central, EMBASE, and MEDLINE). Key words and/or MESH terms must be stated and where feasible the search strategy should be provided. All searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and by reviewing the references in the studies found.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
4. Was the status of publication (i.e. grey literature) used as an inclusion criterion? The authors should state that they searched for reports regardless of their publication type. The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language etc.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
5. Was a list of studies (included and excluded) provided? A list of included and excluded studies should be provided.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
6. Were the characteristics of the included studies provided? In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions and outcomes. The ranges of characteristics in all the studies analyzed e.g. age, race, sex, relevant socioeconomic data, disease status, duration, severity, or other diseases should be reported.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
7. Was the scientific quality of the included studies assessed and documented? 'A priori' methods of assessment should be provided (e.g., for effectiveness studies if the author(s) chose to include only randomized, double-blind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
8. Was the scientific quality of the included studies used appropriately in formulating conclusions? The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review, and explicitly stated in formulating recommendations.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
9. Were the methods used to combine the findings of studies appropriate? For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e. Chi-squared test for homogeneity, I2). If heterogeneity exists a random effects model should be used and/or the clinical appropriateness of combining should be taken into consideration (i.e. is it sensible to combine?)	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
10. Was the likelihood of publication bias assessed? An assessment of publication bias should include a combination of graphical aids (e.g., funnel plot, other available tests) and/or statistical tests (e.g., Egger regression test).	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
11. Was the conflict of interest stated? Potential sources of support should be clearly acknowledged in both the systematic review and the included studies.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable

	AMSTAR item											
Review	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	**Total**
Crotty et al (2010)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	9/11 (82%)
de Morton et al (2007)	Yes	Yes	Yes	?	Yes	Yes	Yes	Yes	Yes	Yes	No	9/11 (82%)
Ellis et al (2011)	Yes	Yes	Yes	?	Yes	Yes	Yes	Yes	Yes	No	No	8/11 (73%)
Conroy et al (2011)	Yes	Yes	Yes	?	No	Yes	Yes	Yes	Yes	?	No	7/11 (64%)
Fealy et al (2009)	Yes	Yes	Yes	No	No	Yes	No	Yes	NA	No	No	5/10 (50%)
Linertova et al (2010)	Yes	Yes	Yes	No	No	Yes	Yes	No	NA	No	No	5/10 (50%)
Bridges et al (2010)	Yes	?	Yes	No	No	Yes	No	Yes	NA	No	No	4/10 (40%)
Sinha et al (2011)	Yes	No	Yes	No	No	Yes	No	Yes	NA	No	No	4/10 (40%)
Steele (2010)	Yes	?	No	No	No	Yes	Yes	Yes	NA	No	No	4/10 (40%)
Hickman et al (2007)	Yes	?	Yes	No	No	Yes	No	?	NA	No	No	3/10 (30%)
Preyde et al (2009)	Yes	?	No	No	No	No	Yes	Yes	No	No	No	3/11 (27%)

? = can't answer

NA = not applicable

‘Age-Friendly’ Acute Care Data Extraction Table – Systematic Reviews

Citation	Objective	Inclusion criteria, # of included articles	Setting	Sampled participants	Interventions/programs /services	Measured outcomes	Review authors’ assessment of study quality	Conclusions & implications for practice	Relevant contextual factors
Crotty (2010) AMSTAR: 9/11 (82%)	To evaluate the effects of interventions aimed at improving physical and psychosocial functioning after hip fracture.	Included articles: • were RCTs or quasi-randomized trials; • evaluated interventions designed to improve functioning in older adults who had undergone surgery for hip fracture; • compared an intervention group with a control group (e.g. usual care); and • assessed one or more of the following primary outcomes: 1) independence in physical function 2) quality of life 3) ‘poor outcome’ (composite of death, readmission to hospital, & failure to return to independent living). N = 9 studies	Mixed setting, but 3 of the included studies (Stromberg, 1999; Hagsten, 2004; Burns, 2007) focused on interventions “provided to patients solely in an inpatient setting (before discharge from hospital)” (p7). These trials were analyzed separately from the rest. Stromberg (1999) and Hagsten (2004) were conducted in Sweden, & Burns (2007) was conducted in the U.K.	The mean age of patients in the three studies was ≥80 years.	• Reorientation measures provided by nurses (Stromberg, 1999). • Intensive occupation therapy program, provided by occupational therapists (Hagsten, 2004). • Cognitive behavioural therapy, provided by an assistant psychologist (Burns, 2007).	<u>*I. Functional outcomes*</u> ○ Hagsten (2004) reported that at discharge the group receiving intensive occupational therapy had better performance in dressing, personal hygiene, bathing and toilet visits, but that all trial participants had regained these abilities at two months follow-up. ○ Hagsten (2004) also reported statistically significant differences at two months between the two groups in moving around indoors, light housework, and getting in and out of a car. No other statistically significant differences between treatment & control groups were reported.	“For the most part, the trials are inconsistent in approach to the intervention and measurement of outcome, and hence meaningful pooling of data is challenging. It was difficult to determine the range of attrition rates for the reviewed studies, as one (Hagsten 2004) reported differing numbers of drop-outs. However, the attrition rates for the remaining studies ranged between 4% (Stromberg 1999) and 66%...” (p13).	“There was no evidence that any of the three interventions provided during inpatient stay had any significant advantage over usual care” (p12). “Rehabilitation interventions (eg. occupational therapy) have been demonstrated to be important in improving other outcomes not investigated in this review and hence the findings of this review should not be used to support removal of such rehabilitation services for older adults following hip fracture” (p13).	<u>*Client-related*</u> • Prevalence of hip fractures among persons ≥65 years (current and projected) <u>*Human resources*</u> • Availability of occupational therapists

Citation	Objective	Inclusion criteria, # of included articles	Setting	Sampled participants	Interventions/programs /services	Measured outcomes	Review authors' assessment of study quality	Conclusions & implications for practice	Relevant contextual factors
de Morton 2007 AMSTAR: 9/11 (82%)	To determine the effect of exercise interventions for acutely hospitalized older medical patients on functional status, adverse events and hospital outcomes.	Included articles: • were RCTs or CCTs published prior to 2007; • compared exercise for medical inpatients ≥65 years to usual care or no treatment; • assessed at least one measure of functional (that included activities of daily living, mobility or cognition) or hospital outcome. N = 9 studies	4 of the 9 studies[10] were conducted in specialized geriatric units. Separate effect sizes were reported for a sub-group of 3 trials that were conducted in general medical wards (de Morton, 2006; Jones, 2006; Siebens, 2000). 2 of these trials were conducted in Australia, & Siebens (2000) was conducted in the USA.	Adults ≥65 years admitted to a hospital medical ward or unit with an acute exacerbation of a medical condition.	The interventions evaluated in de Morton (2006), Jones (2006), & Siebens (2000) involved a walking program and exercises that were individually tailored by a physiotherapist and then administered by a physiotherapy assistant. "[P]rograms were commenced within 2 to 3 days of hospital admission and encouraged strengthening and mobility…. Frequency of the exercise intervention was reported to be twice per day during hospitalization and for a duration of up to 30 minutes across trials" (pp 6-7).	Pooled analysis of the results from de Morton (2006), Jones (2006), & Siebens (2000) indicated no conclusive effects of the intervention on functional status, mortality, admission to ICU, falls, musculoskeletal injuries, discharge to nursing home, or length of stay	"Study quality ranged from 4 to 8 with a mean score of 6/10" (p. 7). "The trials that met inclusion in this review were of varying method quality and there were too few trials available to conduct sensitivity analysis or meta-regression" (p. 15).	"[M]ultidisciplinary intervention that includes exercise [as in the trials conducted in specialized geriatric units] may result in a small but significant reduction in acute hospital LOS and cost of hospital stay and a small but significant increase in the proportion of patients discharged directly to home…. Given that exercise only interventions [as in de Morton, 2006; Jones, 2006; Siebens, 2000] did not significantly improve hospital LOS, costs or the proportion of patient discharges to home, it is possible that the multidisciplinary intervention components other than exercise may explain improved hospital outcomes" (p15).	<u>*Human resources*</u> • Availability of multidisciplinary provider teams to conduct exercise interventions • Level of staff training, expertise in exercise interventions

[10] These included Asplund (2000), Counsell (2000), Landefeld (1995), and Collard (1985).

Citation	Objective	Inclusion criteria, # of included articles	Setting	Sampled participants	Interventions/programs /services	Measured outcomes	Review authors' assessment of study quality	Conclusions & implications for practice	Relevant contextual factors
Ellis (2011) AMSTAR: 8/11 (73%)	To determine the effectiveness of inpatient comprehensive geriatric assessment (CGA) for older adults admitted to hospital as an unplanned emergency.	Included articles: • were RCTs or cluster RCTs; • evaluated CGA; • compared an intervention group with a control group (usual care); and • assessed the odds of the patient being alive and in their own home after the intervention (primary outcome). N = 22 studies	7 studies evaluated CGA delivered by mobile teams in the general inpatient setting they were admitted to, and 15 studies evaluated dedicated CGA wards. Teams and wards were treated as distinct sub-groups, & sub-group results were reported where significant sub-group interaction existed. The 7 studies on CGA teams were conducted in Canada (1), Germany (1), & the U.S.A. (5).	Adults ≥65 years admitted to hospital care as an emergency with medical, psychological, functional or social problems (or other similar admissions referred to as non-elective, urgent, acute, unplanned, or unscheduled).	"Comprehensive geriatric assessment (or CGA) is a simultaneous, multi-level assessment of various domains by a multidisciplinary team to ensure that problems are identified, quantified and managed appropriately. This includes assessment of medical, psychiatric, functional and social domains followed by a management plan including rehabilitation. Usually the multidisciplinary team will include as a minimum experienced medical, nursing and therapy staff" (p3).	*I. Living at home* • Patients receiving CGA were more likely to be in their own homes at 6 & 12 months. • However, only CGA wards were associated with significantly improved odds of living at home; mobile CGA teams were *not* associated with a benefit. *II. Institutionalization* • There was significantly greater reduction in institutionalization for patients in receipt of CGA at both 6 & 12 months. • There was no statistically significant subgroup interaction at 6 months, but there *was* at 12, which suggests that the overall benefit results from trials of CGA wards, not teams. *III. Mortality* • There was a significant reduction in death-or-deterioration in the CGA groups, and there was no statistically significant subgroup interaction. *IV. Functional outcomes* • There was an overall benefit in cognitive measures for patients in receipt of CGA, & there was no statistically significant subgroup interaction. No other statistically significant differences between treatment and control groups were reported.	"The studies identified were heterogeneous in quality (Figure 3). All employed some method of individual patient randomisation, however reporting of key issues such as allocation concealment varied. Outcome assessment was seldom blinded…. "We noted attrition in some trials (Collard 1985; Harris 1991) for functional outcomes. In some cases (Collard 1985) this exceeded 25%...." (p8).	"More older patients are likely to survive and return home if they receive comprehensive geriatric assessment (CGA) whilst an inpatient. Fewer will suffer death or deterioration. These effects are consistently demonstrated from trials of geriatric wards, but not replicated from trials of mobile peripatetic geriatric consultation teams on general wards although trial and participant numbers are much lower for this subgroup" (p15). The authors attempt to explain the apparent superiority of wards over teams on p14.	*Human resources* • Availability of appropriate personnel (OT, physiotherapists, social workers) • Level of training, expertise in CGA

Citation	Objective	Inclusion criteria, # of included articles	Setting	Sampled participants	Interventions/programs /services	Measured outcomes	Review authors' assessment of study quality	Conclusions & implications for practice	Relevant contextual factors
Conroy, 2011 AMSTAR: 7/11 (64%)	To examine the evidence for comprehensive geriatric assessment (CGA) for frail older people who developed a crisis and attended hospital, but who were assessed, treated and discharged, either immediately, or within a short-time period.	Included articles: • were RCTs published prior to 2009; • evaluated the care of frail older (≥65 years) patients discharged rapidly (<72h) from an acute hospital setting; • scored more than a mean of 8/19 on the van Tulder critical appraisal score; and • assessed one or more of the following outcomes: ○ ADL ○ cost/cost benefit/cost effectiveness ○ mortality ○ health status ○ length of stay ○ discharge ○ readmission ○ quality of life ○ satisfaction ○ carer strain/burden. N = 5 studies	In 2 trials the intervention was delivered on a semi-elective basis in the outpatient department or geriatric day hospital. In 2 trials CGA was performed in the ED, and in 1 trial CGA was performed either in the ED or in the patient's home after discharge.	Frail older (≥65 years) adults ("frail" not defined)	Defines CGA as a "'multidimensional diagnostic process focused on determining a frail older person's medical, psychological and functional capability in order to develop a coordinated and integrated plan for treatment and follow-up'" (p437). 2 trials evaluated geriatrician-led CGA focusing on falls prevention, for cognitively intact individuals. 3 trials evaluated rapid-access, nurse-led, geriatrician-supported comprehensive assessment and management.	Analysis of the results from the 5 trials indicated no conclusive effects of the intervention on mortality, institutionalization, functional outcomes, quality of life, cognition, or readmissions.	"The overall quality of the trials was low…. The mean van Tulder score for the [included] trials was 11.8/19" (p. 438).	"[W]e found no firm evidence that any form of CGA in this setting and to this group has any effect on mortality, long-term institutionalisation, subsequent use of acute care, physical function, quality-of-life or cognition. Given this uncertainty, we cannot claim to have identified any particular model of care which realizes the benefits of CGA in acute, short-term inpatient care settings" (p.442).	<u>*Human resources*</u> • Availability of appropriate personnel (nurses, geriatricians) • Level of training, expertise in CGA

Citation	Objective	Inclusion criteria, # of included articles	Setting	Sampled participants	Interventions/programs /services	Measured outcomes	Review authors' assessment of study quality	Conclusions & implications for practice	Relevant contextual factors
Fealy, 2009 AMSTAR: 5/10 (50%)	To appraise the evidence concerning the effectiveness of gerontological nursing assessment and referral interventions for older emergency department (ED) attendees.	Included articles: • were published between 1992 and 2008; and • "constituted reports of interventions undertaken by a nurse(s), or involving a nurse(s) in multidisciplinary interventions, in which the *content* of the intervention was activities conducted within the scope of nursing practice" (p936); and • evaluated interventions that took place during the index ED visit. Total N = 11 studies: • 1 before-and-after design • 5 RCTs • 1 pre- and post design • 2 secondary data analysis • 1 quasi-randomized trial • 1 non-randomized clinical trial	ED The studies were conducted in Australia (3), Canada (5), the U.S.A. (2), and Scotland (1).	Adults ≥65 years	A variety of assessment & referral interventions were deployed: • assessment by an aged care nurse specialist, carer and healthcare provider liaison, & post-discharge referrals; • weekly interdisciplinary case presentation & 4-week follow-up; • case-finding assessment & referral conducted by an advanced practice nurse; • a 30 min nursing assessment with tailored education & phone follow-up; • risk screening & referral incorporating limited follow-up of high-risk patients; • post-discharge health visitor assessment & screening for new dependency and support needs; • community nurse-led risk screening; and • use of a nurse discharge plan coordinator.	*I. Hospital visits/admissions* • In 3 of the 10 studies that assessed this outcome, interventions were associated with statistically significant decreases in readmissions or re-presentations to the ED. • On the other hand, 2 studies found that intervention participants were *more* likely to make a return visit to the ED. *II. Functional outcomes* • In 3 studies of the 5 studies that assessed functional outcomes, interventions were associated with statistically significant post-discharge reductions in either short-to-medium term functional decline or dependence in instrumental activities of daily living. *III. Patient satisfaction* • Of the 4 studies that assessed this outcome, 2 reported statistically significant increases in patient satisfaction in the intervention group. No other statistically significant differences between treatment and control groups were reported.	"Blinding of participants was not undertaken in any of the trials reviewed…. Intention-to-treat analysis was undertaken in four trials, and these same studies had acceptably high rates of follow-up…. In the non-experimental designs the main design limitation was absence of a control arm" (p937). "While the studies under review here were precise on intervention content, their context dependency result in a potential or real threat of bias" (p943-4).	"The evidence concerning the effectiveness of gerontologically informed nursing assessment and referral interventions for older ED attendees indicates benefits in terms of reduced service use and reduced functional decline. However, there is also evidence of ineffectiveness in predicted patient and/or health systems outcomes…. While nursing assessment and referral interventions can lead to reduced service use, perhaps unsurprisingly, they can also increase service use" (p944). The review authors attempt to explain why this might be so on p942.	*Client-related* • Availability of family/social supports post-discharge *Human resources* • Availability of appropriate personnel (nurse specialists, advanced practice nurses) • Level of training, expertise in gerontologically-informed assessment and referral procedures *Economic* • Availability of primary care, community-based services

Citation	Objective	Inclusion criteria, # of included articles	Setting	Sampled participants	Interventions/programs /services	Measured outcomes	Review authors' assessment of study quality	Conclusions & implications for practice	Relevant contextual factors
Linertova 2010 AMSTAR: 5/10 (50%)	To identify interventions that effectively reduce the risk of hospital readmission for elderly people (at least 75 years old) and to assess the role of home follow-up.	Included articles: • were controlled trials published prior to 2009; • evaluated interventions carried out during admission and/or the follow-up in order to reduce readmissions of elderly patients admitted to hospital for any medical problem; and • assessed unplanned hospital readmissions. Total N = 32 studies (25 randomized and 7 non-randomized)	17 studies evaluated interventions delivered exclusively within the hospital setting, & 15 other studies involved some kind of home care. Each group of studies was analyzed separately. Of the 17 in-hospital studies, 3 were conducted in specialized geriatric units.[11] Studies were conducted in the U.K. (10), the U.S.A. (7), Australia/New Zealand (8), Belgium (2), Germany (2), & Scandinavia (3).	Adults ≥75 years	All the interventions in the 17 in-hospital studies used a geriatric assessment during the hospital stay and comprehensive discharge planning: • 10 also included a care plan elaborated by a geriatric team following discharge. • 3 included a pharmaceutical care review. • In 11 interventions some kind of follow-up was carried out, through collaboration with the patient's GP, collaboration with intermediate care services, follow-up phone calls, or outpatient geriatric consultations.	*I. Hospital visits/admissions* • Only 3[12] of the 17 in-hospital studies reported a statistically significant difference between intervention and control groups in terms of reduced readmissions. In one of them this difference was only partial and depended on the time period measured. • A negative effect was observed in 1 of the 17, and the remainder did not show any effect on the risk of hospital readmission.	The authors used SIGN criteria, finding that only 2 of the 17 studies fulfilled few or no criteria.	"10 clinical trials showed that the intervention assessed had a positive effect… although some were only partial and they depended on the length of the follow-up… It is noteworthy that seven of these 10 studies included some type of home care during the follow-up period [these 7 were from the group of 15 studies that involved some kind of home care]. "This evidence suggests that interventions that incorporate geriatric management supported with home care post discharge are more likely to reduce or prevent hospital readmission in elderly patients" (pp5-6).	*Client-related* • Availability of family/social supports post-discharge *Human resources* • Availability of appropriate personnel (members of the geriatric team) • Level of training, expertise in geriatric assessment and discharge planning *Economic* • Availability of primary care, community-based services

[11] These were Asplund (2000), Landefeld (1995), and McInnes (1999).
[12] These did not include any of the aforementioned studies of specialized geriatric units.

Citation	Objective	Inclusion criteria, # of included articles	Setting	Sampled participants	Interventions/programs /services	Measured outcomes	Review authors' assessment of study quality	Conclusions & implications for practice	Relevant contextual factors
Bridges 2010 AMSTAR: 4/10 (40%)	To explore older people's and their relatives' views on and experiences of acute health care.	Included articles: • explored older patients' or relatives' self-reported experiences of care in an acute hospital setting; • used qualitative methods through face-to-face contact and a semi-structured or open-ended questioning approach; and • were published between 1999 and 2008 N = 42 studies. Review authors listed the following methodological approaches: • Qualitative/ exploratory/ descriptive (9) • Phenomenology (8) • Grounded theory (5) • Ethnography (4) • Survey (4) • Other (7) • Not specified (5)	17 studies took place exclusively within (a) the ED, (b) general medical/ surgical wards, or (c) condition-specific units like orthopedics. 2 took place in specialized units for older people, and 10 were conducted in a mix of specialized geriatric settings and the more 'general' settings listed above. Setting was not specified in 13 studies. Studies took place in Europe (21), Australia/New Zealand (4), or the U.S.A (5 – not specified in 12 studies).	14 studies did not specify patient age. In those that did, only 1 study included patients <65 years.	The review authors did focus on particular interventions or services, but rather on "aspects of experiences and care mediated through interpersonal relationships between staff, patients and relatives, referred to hereafter as relational aspects" (p93).	<u>*I. Patient satisfaction*</u> • "For patients, a 'connected' and reciprocal relationship with staff provided reassurance that staff recognised and would meet all their needs…" (p93). • "Maintaining connections with family and social networks also helped patients feel supported and connected…" (p93). • "Findings showed that older patients need to be able to remember and relate to important people, events and things…. Helpful interventions identified include staff getting to know individuals and what is important to them, as well as protecting patients' privacy, personal space and belongings" (pp 93 & 97). • "[F]indings reflect that participation in decision-making needs to be individually and carefully negotiated with patients and relatives. This will include understanding each patient's expectations and wishes about their health and what will happen to them, and valuing what expertise they and their family have. Helpful interventions also include providing information in a way that responds to individual needs such as cognitive impairment or communication difficulties" (pp97 & 104).	"Sensitivity analyses showed that findings are robust in the absence of low quality studies (n=9), suggesting that they contribute little to the findings. Sensitivity analyses also reflect a robustness of findings regardless of country of clinical setting. This lends weight to the generalisibility claimed for the findings…" (p92).	"This review's findings indicate that relational approaches to care may underpin more positive experience of acute health care…. A relationship-centred approach to care rejects the 'individual, disease oriented, subspecialty-focused model….' [P]atients and relatives want relationships that engender reciprocity, recognition, and involvement and this reflects recognition that they too have an active role in shaping their own and others' experience. However, how best to facilitate the involvement of patients and relatives in creating and maintaining this culture an context has yet to be established'" (pp 104-5).	<u>*Human resources*</u> • Level of training, expertise in therapeutic communication

Citation	Objective	Inclusion criteria, # of included articles	Setting	Sampled participants	Interventions/programs /services	Measured outcomes	Review authors' assessment of study quality	Conclusions & implications for practice	Relevant contextual factors
Sinha 2011 AMSTAR 4/10 (40%)	To review the existing evidence for ED based case management models designed to improve the health, social, and health service utilization outcomes for non-institutionalized older patients within the context of an index ED visit.	Included articles: • constituted descriptions of clinical interventions undertaken to improve outcomes for older adults within the context of an index ED visit; • reported sufficient quantitative information to judge outcomes; and • were published prior to February 2010. N = 18 studies: • 7 RCTs • 8 non-randomized clinical trials • 3 observational studies or program descriptions	ED The studies were conducted in Australia (6), Canada (7), the U.S.A. (4), & the U.K. (1).	Adults ≥65 years. 8 studies focused on "high risk" older adult patients.	The review authors evaluated ED-based geriatric case management models. They identified eight distinct model characteristic components, though only 6 of the 18 studies featured all eight components: 1) evidence-based practice model 2) nursing clinical delivery involvement or leadership 3) high-risk screening 4) focused geriatric assessment 5) initiation of care and disposition planning in the ED 6) interprofessional and capacity-building work practices 7) post-ED discharge follow-up with patients 8) establishment of evaluation and monitoring processes	*I. Patient satisfaction* • Of the 12 studies that assessed patient satisfaction, 9 reported differences between intervention and control groups (i.e., usual care). *II. Quality of life (self-reported)* • Only 2 of the 6 studies that examined intervention's effect on improving a patient's perceived well-being or quality of life reported improvement. *III. Functional outcomes* • Only 2 of the 6 studies examining functional outcomes noted an ability to achieve significantly favorable results. *IV. Hospital visits/admissions* • Of the 13 studies examining revisitation rates to EDs: ○ 7 demonstrated reductions in the early post-ED discharge period; ○ 1 demonstrated reductions up to 18 months after an index ED visit; and ○ 2 demonstrated small *increases* in revisitations. • 5 of the 6 studies that examined the ability of the intervention to immediately obviate inpatient admissions reported success. • 6 of the 7 studies that examined the ability of the intervention to reduce subsequent nonelective admission reported success.	Study quality not documented	"Effective geriatric emergency management initiatives use validated risk stratification tools as a routine prelude to initiating an assessment and developing a care plan or referral process in the ED with specialized clinicians. Team composition and leadership strongly influenced model effectiveness, and nurses in particular appeared to be a critical component…. Although some found a social work-led intervention to be effective, other have found that without appropriate nursing support, social workers in general did not have the broader skill set required to work as case managers within the ED.	*Human resources* • Availability of appropriate personnel – primarily nurses – to serve as case managers • Level of training, expertise in screening, assessment, & case management procedures • Presence of interprofessional and capacity-building work practices

Citation	Objective	Inclusion criteria, # of included articles	Setting	Sampled participants	Interventions/programs /services	Measured outcomes	Review authors' assessment of study quality	Conclusions & implications for practice	Relevant contextual factors
						V. Length of stay • Decreases in lengths of inpatient stay were reported in 3 of the 5 studies that assessed this outcome. *VI. Institutionalization* • The ability to reduce subsequent nursing home admissions was demonstrated in only 1 of the 4 studies examining this outcome. No other statistically significant differences between treatment and control groups were reported.		""[C]ollaborative working practices and capacity-building efforts can influence and enhance geriatric emergency management initiatives and may also be their most integral component…. Using former ED nurses in geriatric emergency management roles and embedding geriatric emergency management nurses as ED staff members are 2 ways to possibly facilitate interpersonal, interprofessional, and capacity-building measures to help formalize this new role in a setting in which geriatric care principles are uncommon" (p680).	

Citation	Objective	Inclusion criteria, # of included articles	Setting	Sampled participants	Interventions/programs /services	Measured outcomes	Review authors' assessment of study quality	Conclusions & implications for practice	Relevant contextual factors
Steele 2010 AMSTAR: 4/10 (40%)	To review available evidence on 3 models of acute care for hospitalized older people: Acute Care for Elders (ACE), Hospitalized Elder Life Program (HELP), and Nurses Improving Care for Health-system Elders (NICHE).	Included articles: • were primary research reports that evaluated the ACE, HELP, and/or NICHE models N = 13: • 4 RCTs • 1 controlled clinical trial • 4 surveys • 2 pretest-posttest design • 1 longitudinal qualitative study • 1 descriptive study	The ACE model requires specialized units designed to meet the unique needs of the geriatric patient. HELP & NICHE, by contrast, can be implemented in any preexisting hospital environment.	Adults ≥70 years	*HELP* (5 studies)[13] "HELP is… designed 'to maintain physical and cognitive function throughout the hospitalization; to maximize independence at discharge; to assist with the transition from hospital to home; and to prevent unplanned remissions.' The program is composed of multiple interventions that are applied based on individual need…. "[M]embers of the HELP team include an elder life nurse specialist, elder life specialist, geriatrician, program director, and interdisciplinary support staff" (pp334-5). *NICHE* (2 studies) "The NICHE program is a nursing resource program.... NICHE provides a wide variety of resource that hospitals may use to educate nursing staff on the care of geriatric patients" (p336).	*I. Delirium* • 2 of the 5 HELP studies assessed this outcome. Both found that HELP was associated with significant reductions in incidence of delirium. • According to 2 other studies, participating care providers reported that HELP decreased incidence of delirium. *II. Functional outcomes* • 1 of the 5 HELP studies assessed functional outcomes, & found that HELP was associated with significant reductions in cognitive impairment, sleep deprivation, and use of sedative drugs after 5 days of hospitalization or at discharge. *III. Patient satisfaction* • 3 studies assessed this outcome via survey, and all 3 reported patient satisfaction with HELP at greater than 90%. *IV. Costs* • 2 studies examined cost-effectiveness via survey. According to these studies, participating hospitals reported that HELP was cost-effective. No other statistically significant differences between treatment and control groups were reported.	"The available evidence on the HELP program is generally high quality. There are multiple rigorous studies with large sample sizes, which reflect an ability to detect differences in outcomes" (p337). "Current evidence for the NICHE program is limited to 2 studies…. There is no research available that examines objective patient clinical outcomes, cost of implementation, or satisfaction with the NICHE program" (p338).	"Available evidence on the HELP program suggests that the program improves some clinical outcomes for older patients. Data show that patients in the HELP program have decreased incidence of delirium, cognitive impairment, sleep deprivation and use of sedatives… Beyond clinical effectiveness, there is apparent satisfaction with the model reported by patients… However, this does not include the satisfaction of those who refused to complete surveys. Overall, these findings suggest that HELP may be an effective program that is well received by laypersons as well as clinical staff" (p337).	*Human resources* • Availability of appropriate personnel (nurse specialists, geriatricians, pharmacists, dieticians, rehabilitation therapists, social workers, volunteers) • Level of training, expertise in HELP *Economic* • Availability of primary care, community-based services

[13] HELP was developed by Sharon Inouye, who is a co-author of all 5 of these research articles.

Citation	Objective	Inclusion criteria, # of included articles	Setting	Sampled participants	Interventions/programs /services	Measured outcomes	Review authors' assessment of study quality	Conclusions & implications for practice	Relevant contextual factors
Hickman 2007 AMSTAR: 3/10 (30%)	To examine the experimental literature describing interventions to manage the older adult in the acute care hospital setting in order to inform the development of a care model.	Included articles: • were RCTs or controlled clinical trials published between 1985 and 2006; and • evaluated interventions designed to improve the care of persons ≥65 years in the acute hospital setting; N = 26 (21 RCTs, 3 CCTs, 1 retrospective case-control design, & 1 prospective controlled trial)	Of the 26 included studies: • 11 were in general medical or surgical wards; • 1 was conducted in a general medical ward & a neurology ward; • 2 were in the ED; • 1 was in the ICU; • 1 was in a nursing-led inpatient unit; • 1 was in a stroke unit; and • 9 were in geriatric units[14]	Acute care hospital patients ≥65 years	The reviewers considered any and all interventions designed to improve the care of persons ≥65 years in the acute hospital setting. In particular, they noted 4 elements of interventions that were "critical in providing optimal health outcomes for older people admitted to acute care" (from the abstract): (1) a team approach to care delivery; (2) targeted assessment techniques; (3) discharge planning; and (4) enhanced communication between care providers.	*I. Delirium* • Inouye (1999) evaluated the use of standardized protocols for the management of delirium risk factors & found that delirium occurred in 9.9% of the intervention group compared with 15.0% in the usual care group (*P*=0.02). • Pitkala (2006) found that individually tailored geriatric treatment following detailed assessment of needs resulted in faster alleviation of delirium and improved cognition (*P* = 0.002). *II. Length of stay* • Harris (2005) found that a nursing-led inpatient unit produced statistically significant reductions in LOS by improving care before discharge. *III. Hospital visits/admissions* • Naylor (1999) found that advance practice nurse-centred discharge planning and home care intervention reduced readmissions (20.3 vs. 36.1; *P* < 0.001), and lengthened the time between discharge and readmission (*P* < 0.001). *IV. Costs* • Harris (2005) found that a nursing-led inpatient unit produced statistically significant	No documentation of quality assessment.	"We recommend that nursing care needs to be planned and enacted within a multidisciplinary team approach, with gerontological expertise, considering both the independent and collaborative elements of nursing practice. Data reveal that care delivery appears to be even more effective if the management of an older person is undertaken within a specially designed unit, promoting communication strategies across the care continuum and emphasizing discharge planning" (p123).	*Client-related* • Availability of family/social supports post-discharge *Human resources* • Availability of multidisciplinary provider teams • Level of training, expertise in gerontologically-informed assessment and discharge planning *Economic* • Availability of primary care, community-based services

[14] These were: Schmader (2004), Jayadevappa (2006), Landefeld (1995), Cohen (2002), McInnes (1999), Rao (2005), Asplund (2000), Counsell (2000), and Vidan (2005).

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						reductions in post discharge community care costs by improving care before discharge, but the overall cost per hospital stay was increased. • Naylor (1999) found that advance practice nurse-centred discharge planning and home care intervention decreased health care costs ($0.6 million vs. about $1.2 million; *P* < 0.001). <u>*V. Patient satisfaction*</u> • Kleinpell (2004) found that early comprehensive discharge planning resulted in patients being able to report that they had adequate information, less concern about managing their care at home, knew their medicines, and knew danger signals indicating potential complications. No other statistically significant differences between treatment and control groups were reported			

Citation	Objective	Inclusion criteria, # of included articles	Setting	Sampled participants	Interventions/programs /services	Measured outcomes	Review authors' assessment of study quality	Conclusions & implications for practice	Relevant contextual factors
Preyde 2009 AMSTAR: 3/11 (27%)	To review recent (within the last 10 years) research Into discharge planning (DP) from hospital to home of patients ≥65 years.	Included articles: • were RCTs or quasi-experimental trials published between 1995 and 2005; • evaluated DP for patients ≥65 years with no restriction on specific characteristics (e.g., could span hospital and home); and • assessed one or more of hospital length of stay (LOS), readmission rate, costs, quality of life (QOL), patient well-being, and patient satisfaction. N = 25 21 RCTS, 2 concurrent cohort, 1 matched pair, 1 quasi-experimental design	• 2 studies were conducted in the ED; • 6 were multi-center trials in urban settings; • 5 were conducted in or geriatric hospitals or wards;[15] • one was in an orthopedic teaching hospital; and • the rest were conducted in a university or urban hospital. In 13 studies, the intervention spanned the hospital and home.	Hospital patients ≥65 years. 10 studies focused on elderly patients with specific high risks: • in 3 studies, the focus was on congestive heart failure (CHF); • single studies examined elderly patients with chronic disease, delirium, critical illness, orthopedic problems; and • in three studies high risk, frail, elderly patients was the focus	In all studies, the test intervention included some degree of multidisciplinary involvement, often coordinated by a single discharge planner. In several studies, a comprehensive, early, or geriatric assessment was the focus of the intervention. In all but four studies, the test intervention was technically patient centered, comprehensive DP.	*I. Length of stay* • Pooled analysis of study results indicated that augmented DP has only a small effect on LOS (mean ES = 0.26). • Of the 19 studies that assessed LOS, 8 studies reported significantly shortened overall LOS in the intervention groups. • 2 studies reported longer LOS for intervention groups. *II. Hospital visits/admissions* • Pooled analysis of study results indicated that augmented DP has a moderate effect on readmissions (mean ES = 0.45). • Most of the included studies assessed hospital readmissions, but only 5 reported statistically significant effects. *III. Costs* • 5 of the 8 studies that assessed hospital-based costs reported intervention group savings • Both studies that measured readmission costs cited significant savings in intervention groups *IV. Mortality* • The majority of studies that measured this outcome failed to demonstrate any significant difference between control and experimental groups.	"The quality assessment scores ranged from 2 to 5. Only two studies scored the highest possible, while the mean score was 3.12 (SD 0.92)" (p207). "In terms of study quality, inadequate reporting of methods and outcome data was evident in a considerable number of trials" (p212).	"In conclusion, augmented discharge planning appears to have a robust effect on patient satisfaction and moderate effects on quality of life and hospital resources. No strong effects were noted for any one type of DP, patient characteristic, or quality assessment rating" (p212).	*Client-related* • Availability of family/social supports post-discharge *Human resources* • Availability of multidisciplinary provider teams • Level of training, expertise in gerontologically-informed assessment and discharge planning *Economic* • Availability of primary care, community-based services

[15] These included Counsell (2000), McInnes (1999), Nikolaus (1999), Saltvedt (2004), & Styrborn (1995)

Citation	Objective	Inclusion criteria, # of included articles	Setting	Sampled participants	Interventions/programs /services	Measured outcomes	Review authors' assessment of study quality	Conclusions & implications for practice	Relevant contextual factors
						V. Quality of life (self-report) • Pooled analysis of study results indicated that augmented DP has a moderate effect on QoL (mean ES = 0.45). • Of the 11 trials that assessed this outcome, 6 reported statistically significant differences on QoL measures between 2 weeks and 3 months post-enrollment. • In only 1 of 4 studies did the intervention reportedly have a positive effect on depression. *VI. Functional outcomes* • Pooled analysis of study results indicated that augmented DP has only a small effect on function (mean ES = 0.31). • In the majority of studies, the intervention was not found to affect function, though significant improvements were noted in 4 trials. *VII. Patient satisfaction* • Pooled analysis of study results indicated that augmented DP has a large effect on patient satisfaction (mean ES = 0.83). • Overall, intervention group subjects were significantly more satisfied with the care received No other statistically significant differences between treatment and control groups were reported.			

'Age-Friendly' Acute Care Data Extraction Table (primary studies)

Reference	Objective	Design	Setting	Participants	Programs/services /interventions	Measured outcomes	Study limitations	Conclusions & implications for practice	Relevant contextual factors
Farber (2011)	To compare operational and quality outcomes for patients cared for on a mobile ACE (MACE) service to those cared for on a unit-based ACE service and matched controls on other general medical services	Retrospective cohort study with propensity-score matching	An urban academic medical center in New York City.	8094 hospitalized adults >64 years old	An interdisciplinary MACE service composed of a geriatrician-hospitalist, geriatric medicine fellow, nurse coordinator, and social worker.	*I. Mortality* • In-hospital mortality was similar in all groups. *II. Readmissions* • 7- and 30-day readmission rates were similar in all groups. *III. Length of stay* • Mean LOS was significantly lower for patients in the MACE service compared with the ACE unit service (5.8 vs. 7.9 days, $P < 0.001$). • As well, mean LOS was significantly lower for patients in the MACE service compared with general medical services (5.6 vs. 7.2 days, $P < 0.001$). *IV. Cost* • Total costs were significantly lower for patients in the MACE service compared with the ACE unit service ($10,315 vs. $13,187, $P = 0.002$). • As well, total costs were significantly lower for patients in the MACE service compared with general medical services ($10,693 vs. $15,636, $P < 0.001$).	• The study lacked data on readmissions to other hospitals. • There may have been differences between the patients cared for on the MACE and in the control group that were not accounted for. • The study took place in a single large academic medical center in New York City, and so it may have limited external validity: "While the MACE model may very well be readily adaptable elsewhere, numerous studies have demonstrated wide variation in medical practice patterns and healthcare use which may influence the exportability of the model" (p362).	"A mobile ACE service may result in reduced LOS and lower costs with no change in in-hospital mortality or 7- or 30-day readmission rates when compared with standard medical service and a traditional unit-based ACE service" (from the abstract). "Benefits in cost and LOS reductions may be, in part, due to the hospitalist nature of the model…. Our findings support this hypothesis as the LOS reduction was not present during the first year of our MACE service during which the hospitalist model was not fully implemented" (p362). "LOS reductions may also have been related to the interdisciplinary team-based approach in which a need for family meetings to address goals of care or assess and attempt to resolve complex family/living situations was identified early in the course of hospitalization" (p363).	*Human resources* • Availability of required MACE team members (hospitalists, social workers, etc) • Availability of training in MACE service model

Reference	Objective	Design	Setting	Participants	Programs/services /interventions	Measured outcomes	Study limitations	Conclusions & implications for practice	Relevant contextual factors
Schilling (2011)	To investigate the relationship between nurses staffing levels and in-hospital mortality among elderly patients with hip fractures.	Retrospective analysis of patient data	39 general medical-surgical hospitals in Michigan (specialty hospitals, such as psychiatric facilities or those dealing primarily with elective operations, were excluded from the analysis)	13,343 hospitalized adults >65 years old with a primary diagnosis of hip fracture, admitted through emergency departments.	The study looked at the hospitals' overall number of full-time equivalent registered nursing staff (FTE-RN) per patient per day.	*I. Mortality* • The odds of in-hospital mortality decreased by 0.16 for every additional FTE-RN added per patient day. • This association suggests that the absolute risk of mortality increase by 0.35 percentage points for every one unit decrease of FTE-RN per patient day, a 16% increase in the risk of death.	• Staffing levels were measured at the hospital level, not the patient level. This measure didn't capture the actual number of nurses taking care of a given number of patients with hip fractures. • Staffing levels were measured on an annual basis, which made it impossible to capture differences in staffing at different times throughout the day or year. • The nurse staffing measure may be acting as a proxy for overall hospital quality, rather than a true measure of nurse staffing practices. • Unobserved differences in burden of illness and/or socioeconomic status among patients may have confounded the results	"Decreased hospital-wide nurse staffing levels are associated with increased in-hospital mortality among patients admitted with hip fractures. These observations indicate the need for further studies to characterize this relationship for staffing of units caring for patients with hip fractures" (from the abstract). (There is an extended discussion on p2937 about the possible mechanism by which increased nurse staffing levels reduce in-hospital morality)	*Human resources* • Nurse staffing levels

Reference	Objective	Design	Setting	Participants	Programs/services /interventions	Measured outcomes	Study limitations	Conclusions & implications for practice	Relevant contextual factors
Wald (2011)	To evaluate a hospitalist-run Acute Care for the Elderly service (Hospitalist-ACE) service.	Quasi-randomized, controlled trial.	Inpatient general medical services of an urban academic medical centre.	122 treatment-group inpatients aged ≥ 70 years, compared to 95 control group patients aged ≥ 70 years	Hospitalist ACE service components: 1) selected hospitalist attendings 2) daily interdisciplinary rounds 3) standardized geriatric assessment 4) clinical focus on mitigating harm and discharge planning 5) novel inpatient geriatrics curriculum for residents The Hospitalist-ACE unit team consisted of one attending hospitalist, one resident, one intern, and medical students.	*I. Functional outcomes* • There were no differences between the treatment and control groups in falls or discharge location. *II. Length of stay* • Hospitalist-ACE patients and usual care patients had similar mean lengths of stay in days (3.4 ± 2.7 vs 3.1 ± 2.7, *P* = 0.52). *III. Costs* • Hospitalist-ACE patients and usual care patients had similar mean charges ($24,617 ± $15,828 vs $21,488 ± $13,407, *P* =0.50). *IV. Hospital visits/admissions* • Hospitalist-ACE patients and usual care patients had similar 30 day readmission rates (12% vs. 10%, *P*=0.12).	• The results of this small study at a single academic medical center may be of limited generalizability. • The evaluation took place only 3 months after its inception, thus improvements made later in the service were not captured. • There could have been contamination of the control group due to Hospitalist ACE residents and attending physicians rotating on general medical services.	"During the study period, we improved performance of important processes of care for hospitalized elders, including recognition of abnormal cognitive and functional status; maintained comparable resource use; and implemented a novel, inpatient-focused geriatric medicine educational experience. We were unable to demonstrate an impact on key clinical outcomes such as falls, physical restraint use, and readmissions…. "We believe that there was no difference in key clinical outcomes between Hospitalist-ACE and control patients because the population in this study was relatively low acuity and, therefore, the occurrence of falls and the use of physical restraints were quite low in the study population" (p319).	. *Human resources* • Availability of required Hospitalist-ACE unit team members (primarily hospitalists) • Availability of training in Hospitalist-ACE service model