Home Health Research Review

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Disclosure

No conflicts of interest or financial relationships exist for all presenters
The need to provide demonstrable evidence-based care for patients in the home health setting continues to grow as lower cost alternatives and superior outcomes are being sought by payers, patients, and family members.

This session will provide a review of selected home health relevant research published during the past year to afford an opportunity to disseminate and integrate into clinical practice.

The course will include key elements of interest for clinicians, administrators, and managers practicing in the home health setting.
Session Description

Tracey Collins, PT, PhD, MBA, GCS – Clinical Practice
Mary Marchetti, PT, PhD, GCS – Outcomes
Dawn Widmer-Greaves, PT, DPT – Reimbursement/Payment
Matt Janes, PT, DPT, MHS, OCS, CSCS – Administrative/Management
Session Learning Objectives

Upon conclusion of this session the participate will be able to:

• Differentiate types and quality of research studies.
• Define challenges posed to the home care therapist.
• Provide an opportunity to refine and improve clinical practice management.
• Understand recent published research findings that can be immediately integrated into clinical practice.
• Describe the opportunities and responsibilities for physical therapy-related research in the home health practice setting.
Clinical Practice

Tracey Collins, PT, PhD, MBA, GCS
Balance and Falls
The Relationship Between Pedometer-Determined Ambulatory Activity and Balance Variables Within an Older Adult Population

Purpose: to determine the differences between gender, physical activity level, and balance in an older adult population. A secondary purpose was to examine the relationship between pedometer-determined ambulatory activity and balance.

Subjects: 46 older adults aged 73.7 ± 6.2 years

Methods: Participants completed the Fullerton Advanced Balance (FAB) Scale and completed a 2-week daily step recording to determine average steps taken per day.
The Relationship Between Pedometer-Determined Ambulatory Activity and Balance Variables Within an Older Adult Population

**Results:** Low-level activity participants (<5,000 steps/day) were significantly different from the high-level activity participants (>7,500 steps/day) in weight, age, and the number of medications reported. Males performed better than females on the two-footed jump test and reactive postural test FAB assessments. High-level activity participants performed significantly better than low-level activity participants on all FAB assessments except stand with feet together and eyes closed, reach forward to object, and walk with head turns.

**Conclusion:** Greater amounts of physical activity by means of steps per day were associated with improved performance on seven of the 10 balance assessments, most of which required dynamic balance.

**Clinical Significance:** As the number of older adults in the United States increases, finding cost-effective, evidence-based methods for maintaining dynamic balance, functional independence, and quality of life in this population is crucial.
The Association Between Knee Extensor Force Steadiness, Force Accuracy, and Mobility in Older Adults Who Have Fallen

**Purpose:** To determine whether an association exists between muscle force steadiness (MFS) or muscle force accuracy (MFA) of the knee extensors and mobility in older adults who have fallen.

**Methods:** Twenty older adults (= 77.5 ± 7 years, 5 males and 15 females) with 2 or more comorbid conditions and who experienced a fall in the past year underwent assessment of maximal voluntary isometric contraction of the knee extensors. A submaximal target force of 50% of their maximal voluntary isometric contraction was used to determine concentric and eccentric (ECC) steadiness (the fluctuations in force production) and accuracy (the average distance of the mean force from the target force) measures. Mobility was indicated by the 6-minute walk test, the TUG, stair ascent, and stair descent tests. Correlation analysis was used to assess the relationship between measures of muscle force control and mobility.
Results: Correlations between muscle force steadiness and mobility were not significant (P > .05) for either contraction type. However, MFA during ECC contractions only was correlated significantly with all measures of mobility—6 minute walk test (r = −0.48; P = .03), Timed Up and Go (r = 0.68; P = .01), stair ascent (r = 0.60; P = .01), and stair descent (r = 0.75; P < .01).

Conclusion: The identification of the relationship between ECC MFA and mobility in older adults who have fallen is novel. Although the correlations are not causal, these relationships suggest that inaccurate force output during ECC contractions of the knee extensors is linked to impaired mobility.
**Relationship Between Mobility and Arousal Level After Waking Up**

**Purpose:** to clarify the possible relationship of arousal level and mobility with falls in the early morning hours.

**Methods:** Investigated both arousal levels and mobility of 14 community-dwelling older adults after waking up, from 4:00 AM until 2:00 PM. Mobility and arousal levels were evaluated through the following tests: Timed Up and Go, Functional Reach, postural sway, and critical frequency of fusion. Baseline of mobility and arousal levels were measured before sleep and after 5 hours of sleep. Immediately after waking up, each participant's mobility and arousal levels were remeasured and then also remeasured 2 hours later, 6 hours later, and 10 hours later, respectively. Stanford Sleepiness Scale was also chosen to measure the internal state of subjective sleepiness and it was measured 7 times at 2-hour intervals after the participants woke up from sleep.
Relationship Between Mobility and Arousal Level After Waking Up³

**Results:** Significant differences were found between before sleep and after awakening in the score of Timed Up and Go test and Stanford Sleepiness Scale. The speed of Timed Up and Go test after awaking was slower than that before sleep. The Stanford Sleepiness Scale showed high states of sleepiness.

**Conclusion:** We found that the decrease in arousal level in the early morning may affect mobility. The awareness of the degree of arousal levels may increase fall prevention in older adults in the early morning hours.
Purpose: to evaluate the clinical utility of a multifaceted balance protocol used for fall risk screening, with the hypothesis that this protocol would successfully identify individuals who had a recent fall (within the previous 12 months).

Methods: Retrospective review of 30 individuals who self-referred for a free fall risk screening. Measures included case history, Activities-Specific Balance Confidence Scale, modified Clinical Test of Sensory Interaction on Balance, Timed Up and Go test, and Dynamic Visual Acuity. Statistical analyses were focused on the ability of the test protocol to identify a fall within the past 12 months and included descriptive statistics, clinical utility indices, logistic regression, receiver operating characteristic curve, area under the curve analysis, effect size (Cohen d), and Spearman correlation coefficients.
Identifying Balance Measures Most Likely to Identify Recent Falls

Results: All individuals who self-referred for this free screening had current imbalance complaints, and were typically women (70%), had a mean age of 77.2 years, and had a fear of falling (70%). Almost half (46.7%) reported at least 1 lifetime fall and 40.0% within the past 12 months. Regression analysis suggested that the Timed Up and Go test was the most important indicator of a recent fall. A cutoff score of 12 or more seconds was optimal (sensitivity: 83.3%; specificity: 61.1%).

Conclusions: Older adults with current complaints of imbalance have a higher rate of falls, fall-related injury, and fear of falling than the general community-dwelling public. The Timed Up and Go test is useful for determining recent fall history in individuals with imbalance.
The Mini-Balance Evaluation Systems Test (Mini-BESTest) Demonstrates Higher Accuracy in Identifying Older Adult Participants With History of Falls Than Do the BESTest, Berg Balance Scale, or Timed Up and Go Test\(^5\)

**Purpose:** Examining the capabilities of the BESTest and Mini-BESTest for identifying older adult with history of falls and comparing the participants with history of falls identification accuracy of the BESTest, Mini-BESTest, Berg Balance Scale (BBS), and the Timed Up and Go Test (TUG) for identifying participants with a history of falls.

**Methods:** Two hundred healthy older adults with a mean age of 70 years were classified into participants with and without history of fall groups on the basis of their 12-month fall history. Their balance abilities were assessed using the BESTest, Mini-BESTest, BBS, and TUG. An analysis of the resulting receiver operating characteristic curves was performed to calculate the area under the curve (AUC), sensitivity, specificity, cutoff score, and posttest accuracy of each.
The Mini-Balance Evaluation Systems Test (Mini-BESTest) Demonstrates Higher Accuracy in Identifying Older Adult Participants With History of Falls Than Do the BESTest, Berg Balance Scale, or Timed Up and Go Test\textsuperscript{5}

**Results:** The Mini-BESTest showed the highest AUC (0.84) compared with the BESTest (0.74), BBS (0.69), and TUG (0.35), suggesting that the Mini-BESTest had the highest accuracy in identifying older adult with history of falls. At the cutoff score of 16 (out of 28), the Mini-BESTest demonstrated a posttest accuracy of 85% with a sensitivity of 85% and specificity of 75%. The Mini-BESTest had the highest posttest accuracy, with the others having results of 76% (BESTest), 60% (BBS), and 65% (TUG).

**Conclusion:** The Mini-BESTest is the most accurate tool for identifying older adult with history of falls compared with the BESTest, BBS, and TUG.
Purpose: to examine the relationship between a clinical measure of EF, the Trail Making Test Part B (TMT-B), and 3 physical performance measures of fall risk: the Timed Up and Go (TUG) test, gait speed, and the Five Times Sit to Stand (FTSTS) test, in a group of community-dwelling older adults.

Methods: 47 community-dwelling older adults met the inclusion/exclusion criteria. Demographic information was obtained and measures of fall risk and cognition were performed. Correlations and linear regression analyses to assess relationships between measures were completed. To account for the high prevalence of mild cognitive impairment (MCI) in this population, the sample was screened and stratified for MCI in post hoc analyses.
Results: The EF performance was not significantly correlated with performance on the FTSTS test ($\rho = 0.26, P > .05$) but was significantly correlated with the TUG test ($\rho = 0.31, P < .05$) and gait speed ($r = -0.36, P < .05$). These relationships remained after adjusting for age and education in multivariate models. Results from post hoc analyses demonstrated that only those with MCI had significant relationships between EF and physical performance measures. TMT-B scores in the MCI group were significantly correlated with gait speed ($\rho = -0.51, P < .05$) and TUG test ($\rho = 0.58, P < .05$).

Discussion: A significant relationship exists between performance on clinical assessments of EF and fall risk assessments that integrate a mobility task for those individuals who screen positive for MCI. For those who screened negative, no significant relationship exists. Given the large prevalence of undiagnosed MCI in community-dwelling older adults, this finding could be used as an indication to screen older adults for MCI.

Conclusions: Screening tools that require cognitive resources such as gait speed appear to have significant relationships with performance of EF for those who screen positive for MCI. This information could be used clinically to identify older adults with cognitive limitations, which could put them at higher risk for falling.
Purpose: Assessed whether community-dwelling older persons were able to repeatedly self-assess maximum step length (MSL) and gait speed (GS) in their own home for a 6-month period, how these tests changed during this period and if these changes were related to falling.

Design: Prospective study conducted at home.

Participants: A total of 56 community-dwelling older adults (24 women (43%), mean age 76.2 (SD 3.9) years) entered the study; of which, 45 completed the study.

Methods: Participants performed MSL and GS once a week in their own home during a 6-month period.
Feasibility of repeated self-measurements of maximum step length and gait speed by community-dwelling older persons

**Primary and secondary outcomes**: Repeated MSL and GS measurements were the primary outcomes. Falls, self-management and mobility were the secondary outcomes.

**Results**: Self-assessment of MSL and GS by older persons is feasible. Compliance of repeatedly self-measuring MSL and GS was good; the median number of weekly measurements was 23.0 (88%) and 21.0 (81%) for MSL and GS, respectively. Drop-outs showed less self-management abilities compared to the participants who completed the study (p=0.049). Linear mixed models showed a small significant improvement in MSL and GS over time (p<0.001), without an influence on falling.

**Conclusions**: Most community-dwelling older persons are able and willing to repeatedly assess their MSL and GS. Self-managing mobility and fall risk did not increase fall occurrence. The fact that older persons can be actively involved in their own healthcare is clinically relevant. Further studies are needed to examine the (cost-)effectiveness of self-management in fall prevention interventions.
Clinical Research

HEP Adherence
Home exercise programmes supported by video and automated reminders compared with standard paper-based home exercise programmes in patients with stroke: A randomized controlled trial

**Purpose:** To determine whether patients with stroke receiving rehab for UE deficits using smart technology (video and reminder functions) demonstrate greater adherence to prescribed HEP and better functional outcomes when compared with traditional paper-based exercise prescription.

**Subjects:** Patients with stroke with upper limb deficits, referred for outpatient rehabilitation.

**Methods:** Participants were randomly assigned to the control (paper-based HEP) or intervention group (HEP filmed on an electronic tablet, with an automated reminder). Both groups completed their prescribed HEP for 4 weeks.

**Measurement:** primary outcome was adherence using a self-reported log book. Secondary outcomes were change in upper limb function and patient satisfaction.
Home exercise programmes supported by video and automated reminders compared with standard paper-based home exercise programmes in patients with stroke: A randomized controlled trial

**Results:** 62 participants were allocated to the intervention (n = 30) and control groups (n = 32). No differences between the groups for measures of adherence (mean difference 2%, 95% CI –12 to 17) or change in the Wolf Motor Function Test log transformed time (mean difference 0.02 seconds, 95% CI –0.1 to 0.1). There were no between-group differences in how participants found instructions (p = 0.452), whether they remembered to do their exercises (p = 0.485), or whether they enjoyed doing their exercises (p = 0.864).

**Conclusions:** The use of smart technology was not superior to standard paper-based HEP for patients recovering from stroke.
Helping Older Adults Sustain Their Physical Therapy Gains: A Theory-Based Intervention to Promote Adherence to Home Exercise Following Rehabilitation

**Purpose:** To test a theoretically grounded approach to promoting adherence to home exercise programs in older adults.

**Method:** 60 older adults (M age = 69.3 (6.87) years) in a program of physical therapy received 1 of 2 print messages and magnets promoting adherence to home exercise. The content of the messages was informed by the goal-specific tenets of socioemotional selectivity theory—one message described the emotional and meaningful benefits of home exercise, such as time with loved ones and independence, and one message described facts and information about physiological benefits, such as balance and strength. Adherence to home exercise was measured 2 weeks after participants were discharged from physical therapy by calculating the percentage of the prescribed exercises participants reported completing at home.
Results: An analysis of covariance indicated that there was no statistically significant difference in adherence rates between participants receiving either message. However, a 2×2 analysis of covariance did reveal a significant interaction between the type of message participants received and the time at which they received that message. Post hoc analyses separately examined the rates of adherence in participants who received the intervention message with time remaining in their therapy program and participants who received the intervention message on the day of discharge. In the subset of participants who received their intervention message with time remaining in their therapy program, those who received the emotion and meaning message were somewhat more adherent to their home exercise program than those who received the facts and information message (63.6% vs 50.8%; P = .07). Those who received the emotion and meaning message also performed on average more exercises outside of their home exercise program (2.4 vs 1.3; P = .06).

Conclusion: Despite lacking a statistically significant difference between message groups, the results of this study suggest that highlighting the emotional and meaningful benefits of home exercise versus providing facts and information about the physiological benefits may encourage older adults to be adherent to their home exercise programs. This may especially be the case if they receive the information while still in therapy.
Effect of Home Exercise Program in Patients With Knee Osteoarthritis: A Systematic Review and Meta-analysis

**Purpose:** to examine the evidence regarding the effect of home exercise programs with and without supervised clinic-based exercises in the management of knee OA.

**Method:** Searched PubMed, CINAHL, Embase, Scopus, and PEDro for research articles published prior to September 2014 using key words such as pain, exercise, home exercise program, rehabilitation, supervised exercise program, and physiotherapy in combination with Medical Subject Headings “Osteoarthritis knee.” Selected randomized and case-controlled trials published in English language. To verify the quality of the selected studies, we applied the PEDro Scale. Two evaluators individually selected the studies based on titles, excluding those articles that were not related to the objectives of this review. One evaluator extracted data from the included studies. A second evaluator independently verified extracted data for accuracy.
Effect of Home Exercise Program in Patients With Knee Osteoarthritis: A Systematic Review and Meta-analysis

Results: 31 studies were found in the search. 19 studies met the inclusion criteria and were further analyzed. Seventeen of these 19 studies reached high methodological quality on the PEDro scale. Although the methods and home exercise program interventions varied widely in these studies, most found significant improvements in pain and function in individuals with knee OA.

Discussions: Both HEPs with and without supervised clinic-based exercises were beneficial in the management of knee OA.

Conclusions: The large evidence of high-quality trials supports the effectiveness of home exercise programs with and without supervised clinic-based exercises in the rehabilitation of knee OA. In addition, small but growing evidence supports the effectiveness of other types of exercise such as tai chi, balance, and proprioceptive training for individuals with knee OA.
Telephone Calls Make a Difference in Home Balance Training Outcomes: A Randomized Trial

**Purpose:** To determine the benefit of a weekly telephone contact on balance control for community-dwelling frail older adults participating in home-exercise programs.

**Methods:** 75 community-dwelling, frail older adult participants, at risk for falling (mean age: 76 years, range: 64-88 years; 3 women), were randomized in alternating pairs to a Telephone Call or No Telephone Call group. All participants received physical therapy home-exercise programs focused on balance control and were assessed and progressed 4 times over 12 weeks. All participants used an exercise log in which they were asked to record the amount of time and the number of repetitions performed of all daily exercises. The Telephone Call group received an additional 15-minute weekly telephone call with standard questions and encouragement to discuss their program. The primary outcome measure was the Berg Balance Scale.
Results: A total of 11 subjects dropped out of the study with 8 from the No Telephone Call group and 3 from the Telephone Call group. For both groups, a significant effect for time was noted, demonstrating that both groups improved significantly in balance control with the home exercise intervention. For the Berg Balance Scale, an interaction occurred whereby the Telephone Call group improved significantly more in balance control than the No Telephone Call group (Telephone Call group = 6.3 points; No Telephone Call group = 3.9 points).

Conclusions: A home exercise program was beneficial to improve the balance of community-dwelling frail older adults. More importantly for health policy consideration, a simple, weekly, telephone call made a significant difference in how much balance improvement was made. Telephone calls are a cost-effective way to provide effective follow-up support for older adults participating in home exercise programs.
Leveraging Health Information Technology for Fall-Risk Management in Home Care

**Purpose:** investigated home care clinicians’ perspectives on (1) how the currently adopted health IT solutions supported the fall-risk management activities, (2) various shortcomings of these solutions, and (3) ways to improve upon these solutions. This study also identified the opportunities for introducing other existing and emerging IT solutions to the HHA studied. Home care and IT professionals should find the study results useful in their current and future health IT adoption projects targeting fall-risk management.

**Methods:** The study was conducted from October 2014 to November 2015 at a suburban, not-for-profit, Medicare-certified HHA with three branches in the State of Maryland. The clinicians were recruited by the HHA; Twenty semi-structured interviews enabled the researchers to gain in-depth information about the research topics; Four focus groups were conducted with fifteen clinicians. The focus groups were helpful to understand different points of view and validate the findings obtained from the interviews. Qualitative data were analyzed using the Framework Method.
Leveraging Health Information Technology for Fall-Risk Management in Home Care¹²

**Results:** EHR was useful for fall-risk management by helping clinicians better understand the patient’s history and context. To help assess their patient’s mobility and determine the patient’s fall risks, the clinicians used the EHR to enter and review the results of the Timed Up and Go. Clinicians were able to use the Missouri Alliance for Home Care (MAHC-10)³⁸ fall-risk assessment tool to determine their patients’ fall risks by considering a number of key factors such as diagnosis, environmental hazards at home, or medications.

**Conclusions:** The clinicians mainly used the electronic health record but experienced substantial difficulties with documenting and accessing fall-related information. Improvement opportunities include providing better workflow support and usability, implementing medication alerts, facilitating fall-related information exchange, and leveraging the IT capabilities at patients’ homes. Additional IT solutions can improve the awareness, assessment, and intervention dimensions of fall-risk management.
Clinical Research

Technology
Current Telerehabilitation Research With Older Adults at Home: An Integrative Review

**Purpose:** to report the results of an integrative literature review summarizing current in-home telerehabilitation research with older adults.

**Method/Search Strategy:** PubMed, CINHAHL, and Embase databases were searched using the following keyword combinations: ["telerehabilitation" OR "tele-rehabilitation" OR ["informatics" and "rehabilitation"]] AND ["senior" OR "seniors" OR "older adult" OR "older adults" OR "elderly" OR "aging" OR "ageing"] AND ["home"] for January 2005 to May 2015. Reference lists of systematic reviews were also reviewed. Inclusion criteria were English language articles that described telerehabilitation studies with older adult participants in their homes (average age >=60 years), reported patient outcomes, and met quality of reporting criteria from the STARE-HI (Statement on Reporting of Evaluation Studies in Health Informatics) guidelines.
Current Telerehabilitation Research With Older Adults at Home: An Integrative Review

**Results:** Nine studies (5 from the US) from 2006-2015 were included. Six studies employed a remote therapist using real-time video. Three studies used text- or web-based messaging and electronic surveys. Six studies relied on dial-up Internet service and the remaining three studies used broad-band Internet connections.

**Conclusion:** Future research should address (a) in-home and wearable sensing technologies to monitor health and (b) mobile devices, such as tablet computers, to collect patient self-reports. Interoperable platforms are needed to integrate disparate devices and support continuity of care across post-acute care settings.
Clinical Research

Vital Signs
Post aerobic Exercise Blood Pressure Reduction in Very Old Persons With Hypertension\textsuperscript{14}

**Purpose:** To assess the effect of a single session of aerobic exercise on postexercise blood pressure in very old adults with hypertension.

**Methods:** Eighteen older adults with essential hypertension were randomized into exercise (N = 9, age: 83.4 ± 3.2 years old) or control (N = 9, age: 82.7 ± 2.5 years old) groups. The exercise group performed a session of aerobic exercise constituting 2 periods of 10 minutes of walking at an intensity of 40% to 60% of the heart rate reserve. The control group rested for the same period of time. Anthropometric variables and medication status were evaluated at baseline. Heart rate and systolic and diastolic blood pressures were measured at baseline, after exercise, and at 20 and 40 minutes postexercise.
Post aerobic Exercise Blood Pressure Reduction in Very Old Persons With Hypertension

**Results:** Systolic BP showed a significant interaction for group × time (F3,24 = 6.698; P = .002; ηp² = 0.153). In the exercise group, the systolic BP at 20 (127.3 ± 20.9 mm Hg) and 40 minutes (123.7 ± 21.0 mm Hg) postexercise was significantly lower in comparison with baseline (135.6 ± 20.6 mm Hg). Diastolic BP did not change. HR was significantly higher after the exercise session. In the control group, no significant differences were observed.

**Conclusions:** A single session of aerobic exercise acutely reduces BP in very old adults with HTN and may be considered an important nonpharmacological strategy to control HTN in this age group.
Clinical

Quality of Life
Effects of interventions on trajectories of health-related quality of life among older patients with hip fracture: a prospective randomized controlled trial

**Purposes:** to identify distinct HRQoL trajectories and to evaluate the effects of two care models on these trajectories over 12 months following hip-fracture surgery.

**Methods:** secondary analysis, data came from RCT of subjects with hip fracture receiving 3 treatment care models: interdisciplinary care (n = 97), comprehensive care (n = 91), and usual care (n = 93). Interdisciplinary care: geriatric consultation, d/c planning, and 4 months of in-home rehabilitation. Comprehensive care: interdisciplinary care plus management of malnutrition and depressive symptoms, fall prevention, and 12 months of in-home rehabilitation. Usual care included only in-hospital rehabilitation and occasional d/c planning, without geriatric consultation and in-home rehabilitation. Mental and physical HRQoL were measured at 1, 3, 6, and 12 months after discharge by the physical component summary scale (PCS) and mental component summary scale (MCS), respectively, of the Medical Outcomes Study Short Form 36, Taiwan version.
Results: Three quadratic physical component summary scale (PCS) trajectories were identified: poor PCS (n = 103, 36.6%), moderate PCS (n = 96, 34.2%), and good PCS (n = 82, 29.2%). In contrast, we found three linear mental component summary scale (MCS) trajectories: poor MCS (n = 39, 13.9%), moderate MCS (n = 84, 29.9%), and good MCS (n = 158, 56.2%). Subjects in the comprehensive care and interdisciplinary care groups were more likely to experience a good PCS trajectory (b = 0.99, odds ratio [OR] = 2.69, confidence interval [CI] = 7.24-1.00, p = 0.049, and b = 1.32, OR = 3.75, CI = 10.53-1.33, p = 0.012, respectively) than those who received usual care. However, neither care model improved MCS.

Conclusion: The interdisciplinary and comprehensive care models improved recovery from hip fracture by increasing subjects' odds for following a trajectory of good physical functioning after hospitalization.
Outcomes

Mary Marchetti, PT, PhD, GCS
Boland et al\textsuperscript{16}

- Research completed 2016, published Jan, 2017
- Type of article
  - Overview of systematic reviews
• Methods
  – Search engines
    • MEDLINE, the Cochrane Library, EMBASE, CINAHL
    • Included
      – Adults 65+, elder home care, alternative care locations, elder health outcomes
  • Citations reviewed by 2 independent reviewers
  • Authors AMSTAR checklist to evaluate data
Boland et al (cont’d.)\textsuperscript{16}

• **Results**
  
  – 2575 results $\Rightarrow$ 19 systematic reviews
    
    • 340 studies w 271,660 participants
      
      – Home w support vs indep living (11 reviews)
      – Home care vs institutional care (3 reviews)
      – Home rehab vs conventional rehab (7 reviews)
      – Review quality moderate: AMSTAR 6 (4-10/11)
Boland et al (cont’d.)\textsuperscript{16}

• Results (cont’d.)
  – Home care vs institutional care (3 reviews)
    • Two inconclusive
    • One review on palliative care found home care resulted in:
      – Less symptom burden
      – Increased likelihood to die at home
Boland et al (cont’d.)\textsuperscript{16}

• Results (cont’d.)
  – Home rehab vs conventional rehab (7 reviews)
    • 5 reported no difference
    • 1 reported insufficient evidence to make a recommendation
    • 1 reported home rehab superior
  – Home w support vs independent living (11 reviews)
    • Home w support superior to independent living
Boland et al (cont’d.)\textsuperscript{16}

• Discussion
  – Groups/systematic reviews heterogeneous
  – No reviews reported other settings to be superior to home care
  – Several reviews reported home care superior to other settings
  – Remaining reviews no difference or inconclusive
Okoro et al (2016)\textsuperscript{17}

- **Type**
  - Prospective, single-blind RCT

- **Methods**
  - Program developed by 5 PTs w 5+ yrs treating pts s/p THA
  - Pilot study with 1 pt
Okoro et al (2016)\textsuperscript{17}

• Methods (cont’d.)
  – 49 pts. randomly assigned to home-based (n=25) or std PRT (n=24)
  – HH PT taught home-based program; ret’d. 1x/wk to review
Okoro et al (2016)$^{17}$

- **Outcomes**
  - **Primary** – max voluntary quadriceps contrx surg LE
  - **Secondary**
    - STS x 30 sec
    - Stair climb performance (SCP)
    - 6MWT
    - Lean mass of surgical LE via DEXA
Okoro et al (2016)\textsuperscript{17}

- **Results**
  - 26 completed study (n=13 each rehab)
  - Slight to no difference b/t groups in outcomes

- **Discussion**
  - HH mediated program as effective as std rehab
  - More convenient, less wait time
Warren et al (2016)\textsuperscript{18}

• Type of study
  – Retrospective cohort

• Methods
  – Medical records reviewed \textit{s/p TKA}
    • 109 men and women
      – n=87 direct to OP
      – N=22 HH first, then OP
Warren et al (2016)\textsuperscript{18}

• Methods (cont’d.)
  – 6MWT
  – KOOS (Knee Osteoarthritis and Outcome Score)
  – Knee ROM
Warren et al (2016)\textsuperscript{18}

- Results
  - No significant differences b/t groups’ outcomes on completion of OP
  - Those going to HH first completed PT ~20 days later than those going direct to OP
Warren et al (2016)\textsuperscript{18}

- Conclusion of authors
  - Goals achieved by pts. s/p TKA are similar regardless of initial PT setting
  - Those going direct to OP achieve goals sooner
Warren et al (2016)\textsuperscript{18}

• CONCERNS
  – Low n, especially for HH group
  – No pre-op/pre-D/C functional information provided
    • If “homebound,” likely less functional than OP group
  – No information re: HH services provided
    • Assumptions re: services provided
Warren et al (2016)\textsuperscript{18}

• CONCERNS
  – Outcome measures not validated s/p TKA
    • KOOS (modified by authors)
    • 6MWT (used 18’ distance)
  – No consideration for pts. D/C’d directly from HH; i.e., did not need/want OP

**HHS composing letter to editor**
Other...

• OASIS data do not predict hospital admissions for dehydration/malnutrition in pts. with dementia (Marshall et al, 2016)\textsuperscript{19}

• Tele-health can help HHA improve mgt. of pts. with chronic Dx (Radhakrishnan et al, 2016)\textsuperscript{20}
Reimbursement/Payment

Dawn Widmer-Greaves, PT, DPT
Bundled Payment Care Improvement (BPCI)
BPCI – Review$^{21}$

• Model 2
  – Most comprehensive bundle
  – Includes triggering hospital stay, all concurrent professional services, post discharge services, including readmissions
  – Episode length 30, 60, 90 days selected
  – Individual providers paid fee for service
  – Total episode payments reconciled retrospectively against established target
BPCI – Review

- **Model 3**
  - Episode length (30, 60, 90) days and type of clinical episode are chosen
  - Episode starts with admission to a participating SNF, HHA, IRF, LTAC
  - Or, admission to PAC by a participating physician provider
  - Includes services after the hospital stay, including professional services and readmissions
  - Individual providers paid fee for service
  - Total episode payments reconciled retrospectively against established target
• **Model 4**
  – Includes anchoring hospital stay, all concurrent professional services, and associated professional services including readmissions, unless excluded from the bundle
  – Episode length is 30 days
  – Awardees are the convener and receive a prospectively determined payment
  – They in turn pay the other providers involved during the episode
CMS BPCI Models 2-4 Year

CMS BPCI Model 2-4: Year 2 Evaluation and Monitoring Annual Report\textsuperscript{21}

– Report produced by Lewin Group on behalf of CMS

Purpose - Evaluate and monitor the impact of Bundled Payment Care Improvement Initiatives (BPCI)
CMS BPCI Model 2-4: Year 2 Evaluation and Monitoring Annual Report\textsuperscript{21} (cont’d)

• **Method**
  – Quantitative Analysis
    • Stratified by model, EI provider type and clinical episode
    • Medicare Claims and Enrollment Database from the Chronic Conditions Data Warehouse
    • Patient assessment instruments from the PAC settings
    • Surveys of participating and non-participating beneficiaries
• **Method (cont’d) - Qualitative Analysis**
  – 23 site visits with BPCI participants
  – Two focus groups of participants
  – Quarterly interviews with sampled awardee representatives
  – Awardee implementation protocols
  – Technical expert panel on major joint replacement
CMS BPCI Model 2-4: Year 2 Evaluation and Monitoring Annual Report\textsuperscript{21} (cont’d)

- Sample – All phase 2 participants (financial risk begins)
- Phase 2 initiated between October of 2013 and September of 2014
- Includes participants experiences through June of 2015

<table>
<thead>
<tr>
<th>Model Description</th>
<th>Participation</th>
</tr>
</thead>
</table>
| Model 2: Anchor hospitalization plus 30, 60, or 90 days of care post-discharge, maintain FFS payments | 61 Awardees  
110 Hospital Els  
3 PGP Els  
42,572 episodes |
• **Results across all models**
  – Participating providers tended to be larger than non-participating providers and located in more affluent areas
  – Had higher episode costs
  – Many indicated investment in consultants or other resources were key
  – Dominant episode type are the Orthopedic surgery episodes
  – “statistically significant differences in episode costs or quality between treatment and comparison providers have been few”
CMS BPCI Model 2-4: Year 2 Evaluation and Monitoring Annual Report (cont’d)

- **HH relevant Results Model 2**
  - 3 clinical groups with statistically significant change in payment
    - Orthopedic Surgery
    - Cardiovascular Surgery
    - Spinal Surgery
CMS BPCI Model 2-4: Year 2 Evaluation and Monitoring Annual Report²¹ (cont’d)

<table>
<thead>
<tr>
<th>Payment Outcome</th>
<th>Length</th>
<th>PAC Use?</th>
<th>Orthopedic Surgery</th>
<th>Nonsurgical Other Medical</th>
<th>Nonsurgical Neurovascular</th>
<th>Nonsurgical Respiratory</th>
<th>Nonsurgical Cardiovascular</th>
<th>Nonsurgical &amp; Surgical GI</th>
<th>Cardiovascular Surgery</th>
<th>Spinal Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of episodes initiated Q4 2013 – Q3 2014</td>
<td>18,936</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BPCI Cumulative Data (Q4 2013 – Q3 2014)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standardized allowed amount (Part A &amp; B), IP through 90-day post-discharge period</td>
<td>30</td>
<td>No</td>
<td>-$864</td>
<td>-$96</td>
<td>-$194</td>
<td>-$32</td>
<td>$160</td>
<td>-$684</td>
<td>-$880</td>
<td>$3,477</td>
</tr>
<tr>
<td>Standardized allowed amount in bundle definition</td>
<td>30</td>
<td>Yes</td>
<td>-$1,340</td>
<td></td>
<td>-$261</td>
<td></td>
<td>-$1,625</td>
<td></td>
<td></td>
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<tr>
<td>Standardized allowed amount in bundle definition</td>
<td>60</td>
<td>No</td>
<td>$116</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standardized allowed amount in bundle definition</td>
<td>60</td>
<td>Yes</td>
<td>-$2,696</td>
<td></td>
<td></td>
<td>$10</td>
<td>$533</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standardized allowed amount in bundle definition</td>
<td>90</td>
<td>No</td>
<td>-$396</td>
<td>-$611</td>
<td>-$333</td>
<td>$98</td>
<td>-$389</td>
<td>-$48</td>
<td>$514</td>
<td>$2,025</td>
</tr>
<tr>
<td>Standardized allowed amount in bundle definition</td>
<td>90</td>
<td>Yes</td>
<td>-$948</td>
<td>-$445</td>
<td>$883</td>
<td>$194</td>
<td>$653</td>
<td>-$1,385</td>
<td>-$482</td>
<td>$2,933</td>
</tr>
<tr>
<td>Standardized allowed not included in bundle definition</td>
<td>90</td>
<td>No</td>
<td>-$59</td>
<td>$145</td>
<td>-$33</td>
<td>$38</td>
<td>-$96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standardized allowed not included in bundle definition</td>
<td>90</td>
<td>Yes</td>
<td>$58</td>
<td>$47</td>
<td>-$252</td>
<td>$125</td>
<td>-$143</td>
<td>-$227</td>
<td>-$140</td>
<td></td>
</tr>
</tbody>
</table>

Note: Statistical significance at the 0.05 level is indicated by orange and green shaded cells. Orange indicates the DiD estimate was negative and statistically significant; green indicates the DiD estimate was positive and statistically significant.
CMS BPCI Model 2-4: Year 2 Evaluation and Monitoring Annual Report\(^{21}\) (cont’d)

- **HH relevant Results Model 2 (Cont’d)**
  - Orthopedic Surgery
    - Average cost declined $864 mostly due to lower PAC payment
    - Average LOS in SNF 1.3 days less
    - Institutional PAC use decreased from 64% to 57%
    - If first PAC was HHA improvement in upper body bathing declined while improving in comparison group (net difference 1.6%)
    - Higher % of the MJRLE group reported improved:
      - Ability to walk without resting (65.7% vs 57.5%)
      - Ability to go up and down 12 stairs (65.4% vs 57.9%)
CMS BPCI Model 2-4: Year 2 Evaluation and Monitoring Annual Report (cont’d)

• HH relevant Results Model 2 (Cont’d)
  – Cardiovascular Surgery
    • For the 30 day group, cost declined $4,149 more for BCPI vs non
    • Institutional PAC use decreased by 10.9% vs 1% BCPI vs non
    • HHA visits increased by 1.5 visits for those utilizing HH BCPI
    • ED department use was greater for BCPI in 30 day group but no different at 90 days
    • No change in hospitalization or quality in the 30 day or 90 day group
    • Mortality in 30 day group appeared 0.3% higher for BCPI group
CMS BPCI Model 2-4: Year 2 Evaluation and Monitoring Annual Report\(^{21}\) (cont’d)

- HH relevant Results Model 3

### Exhibit 104: Diff-in-Diff Estimate for Utilization Outcomes, by Clinical Episode Group, Model 3 HHAs, Baseline to Intervention

<table>
<thead>
<tr>
<th>Measure</th>
<th>Surgical</th>
<th>Nonsurgical</th>
<th>Nonsurgical Respiratory</th>
<th>Nonsurgical Cardiovascular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of episodes initiated Q4 2013 – Q3 2014</td>
<td>471</td>
<td>2,761</td>
<td>845</td>
<td>1,485</td>
</tr>
<tr>
<td>Acute Inpatient Care LOS</td>
<td>-0.1</td>
<td>-0.2</td>
<td>-0.2</td>
<td>-0.1</td>
</tr>
<tr>
<td>Number of HH Visits, 90-day PDP(^{1})</td>
<td>-0.1</td>
<td>-1.9</td>
<td>-0.3</td>
<td>-2.3</td>
</tr>
<tr>
<td>Number of Institutional Days, 90-day PDP(^{2})</td>
<td>1.6</td>
<td>-1.0</td>
<td>-0.2</td>
<td>-0.3</td>
</tr>
<tr>
<td>Number of IRF Days, 90-day PDP(^{4})</td>
<td>-1.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Readmission Days, 90-day PDP(^{5})</td>
<td>2.1</td>
<td>0.2</td>
<td>1.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Number of SNF Days, 90-day PDP(^{4})</td>
<td>0.4</td>
<td>-2.0</td>
<td>-1.7</td>
<td>-3.0</td>
</tr>
</tbody>
</table>

\(^{1}\) The number of days/visits is conditional on having at least 1 day in the respective setting.

Note: Statistical significance at the 0.05 level is indicated by orange and green shaded cells. Orange indicates the DiD estimate was negative and statistically significant; green indicates the DiD estimate was positive and statistically significant.

Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q3 2014 for BPCI providers and a comparison group.
CMS BPCI Model 2-4: Year 2 Evaluation and Monitoring Annual Report\textsuperscript{21} (cont’d)

- HH relevant Results Model 3

### Exhibit 105: Diff-in-Diff Estimate for Claim-based Quality Outcomes, by Clinical Episode Group, Model 3 SNFs, Baseline to Intervention

<table>
<thead>
<tr>
<th>Measure</th>
<th>Surgical</th>
<th>Nonsurgical</th>
<th>Orthopedic Surgery</th>
<th>Nonsurgical Respiratory</th>
<th>Nonsurgical Cardiovascular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of episodes initiated Q4 2013 – Q3 2014</td>
<td>1,879</td>
<td>5,467</td>
<td>1,303</td>
<td>988</td>
<td>1,087</td>
</tr>
<tr>
<td><strong>BPCI Cumulative to Date (Q4 2013 – Q3 2014)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All-cause mortality rate, first 30 days of episode</td>
<td>0.6 pp</td>
<td>0.1 pp</td>
<td>-3.8 pp</td>
<td>1.8 pp</td>
<td></td>
</tr>
<tr>
<td>Emergency Department Use, first 30 days of episode</td>
<td>-1.6 pp</td>
<td>0.2 pp</td>
<td>-1.0 pp</td>
<td>-0.5 pp</td>
<td>0.3 pp</td>
</tr>
<tr>
<td>Unplanned Readmission Rate, first 30 days of episode</td>
<td>-0.5 pp</td>
<td>2.0 pp</td>
<td>1.0 pp</td>
<td>0.3 pp</td>
<td>7.0 pp</td>
</tr>
<tr>
<td><strong>First Three Quarters of BPCI (Q4 2013 – Q2 2014)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADL NSF, improved mobility function</td>
<td>-9.1 pp</td>
<td>-0.6 pp</td>
<td>-8.0 pp</td>
<td>-3.7 pp</td>
<td>-4.2 pp</td>
</tr>
<tr>
<td>ADL NSF, improved overall function</td>
<td>-9.6 pp</td>
<td>-0.8 pp</td>
<td>-11.9 pp</td>
<td>-1.7 pp</td>
<td>3.0 pp</td>
</tr>
<tr>
<td>ADL NSF, improved self-care function</td>
<td>-7.0 pp</td>
<td>-1.3 pp</td>
<td>-13.9 pp</td>
<td>-3.1 pp</td>
<td>4.0 pp</td>
</tr>
</tbody>
</table>

Note: Statistical significance at the 0.05 level is indicated by orange and green shaded cells. Orange indicates the DiD estimate was negative and statistically significant; green indicates the DiD estimate was positive and statistically significant. The results presented in this table represent episodes initiated in the first four quarters of the BPCI Initiative (Q4 2013 through Q3 2014). Please note that assessment-based quality measures are reported with a one-quarter delay. A blank cell indicates that the outcome cannot be presented, either due to insufficient sample size or the type of episodes initiated during the time period. pp = percentage points. It should be noted that the columns are not mutually exclusive. The surgical sample includes all surgical episodes, including the orthopedic surgery clinical episode group. Similarly, the nonsurgical sample includes all nonsurgical episodes, including nonsurgical respiratory and nonsurgical cardiovascular. Therefore, the results of the larger surgical and nonsurgical groups are largely driven by the three clinical episode groups displayed in the table.

Source: Levin analysis of Medicare claims and enrollment data for episodes that began Q1 2011 through Q3 2014 for BPCI providers and a comparison group.
CMS BPCI Model 2-4: Year 2 Evaluation and Monitoring Annual Report\textsuperscript{21} (cont’d)

- HH relevant Results Model 3

### Exhibit 106: Diff-in-Diff Estimate for Claim-based Quality Outcomes, by Clinical Episode Group, Model 3 HHAs, Baseline to Intervention

<table>
<thead>
<tr>
<th>Measure</th>
<th>Surgical</th>
<th>Nonsurgical</th>
<th>Nonsurgical Respiratory</th>
<th>Nonsurgical Cardiovascular</th>
</tr>
</thead>
<tbody>
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<td>845</td>
<td>1,485</td>
</tr>
<tr>
<td>BPCI Cumulative to Date (Q4 2013 – Q3 2014)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All-cause mortality rate, first 30 days of episode</td>
<td></td>
<td>-1.1 pp</td>
<td>-2.2 pp</td>
<td>-0.5 pp</td>
</tr>
<tr>
<td>Emergency Department Use, first 30 days of episode</td>
<td></td>
<td>-4.4 pp</td>
<td>-0.5 pp</td>
<td>0.3 pp</td>
</tr>
<tr>
<td>Unplanned Readmission Rate, first 30 days of episode</td>
<td></td>
<td>-6.0 pp</td>
<td>0.4 pp</td>
<td>4.2 pp</td>
</tr>
</tbody>
</table>

Source: Lewin analysis of Medicare claims and enrollment data for episodes that began Q4 2011 through Q3 2014 for BPCI providers and a comparison group.
81% of all Model 4 episodes were orthopedic surgery and cardiovascular surgery clinical episodes so report review was focused on those two groups.

<table>
<thead>
<tr>
<th>Measure</th>
<th>BPCI (N=132)</th>
<th>Comparison (N=126)</th>
<th>Diff-in-Diff estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Intervention</td>
<td>Baseline</td>
</tr>
<tr>
<td>Percent of HHA beneficiaries with improved bathing</td>
<td>84.3%</td>
<td>81.9%</td>
<td>83.8%</td>
</tr>
<tr>
<td>Percent of HHA beneficiaries with improved ambulation</td>
<td>82.0%</td>
<td>77.0%</td>
<td>80.5%</td>
</tr>
<tr>
<td>Percent of HHA beneficiaries with improved bed transferring</td>
<td>84.5%</td>
<td>73.3%</td>
<td>80.6%</td>
</tr>
</tbody>
</table>

* Denotes statistical significance at the 5% level.

LCI = lower confidence interval at the 5% level; UCI = upper confidence interval at the 5% level.

Note: Baseline is defined as episodes that began Q4 2011 through Q3 2012. Intervention is defined as episodes that began Q4 2013 through Q2 2014. Sample sizes reflect number of episodes initiated during the intervention period that met inclusion criteria for the outcome.

Source: Lewin analysis of patient assessment data for episodes that began Q4 2013 through Q2 2014 for BPCI and comparison providers.
CMS BPCI Model 2-4: Year 2 Evaluation and Monitoring Annual Report\(^{21}\) (cont’d)

• **Conclusion**
  – More study would be required before generalizing results to other providers or clinical episode types

• **Limitations**
  – Voluntary initiative so participants may differ from other providers
  – Stratification limited sample size in each comparison group
  – At most 15 months of data
  – Study does not account for quarterly reconciliation amounts
  – Limited time for providers to implement changes in response to BPCI
CMS BPCI Model 2-4: Year 2 Evaluation and Monitoring Annual Report\textsuperscript{21} (cont’d)

• **Clinical relevance**
  
  – Decreased utilization of SNF and trends in decreasing SNF length of stay may patients going directly home are more acute
  
  – Trend toward decline in ADL scores for Cardiovascular surgery patients going directly to HH
  
  – Each patient must have an individual care plan developed specific to their needs
  
  – As more information is available it is important to be aware of trends as we develop protocols for clinical diagnosis groups
  
  – Even with the limitation in this study, there is potential for it to drive policy
Changes in Discharge Location - BPCI

Changes in Discharge Location and Readmission Rates Under Medicare Bundled Payment (Jubelt, et al)\textsuperscript{22}

- **Purpose** – Examine the change in hospital readmission rates in the context of shifting referrals from facility-based to home-based post acute care
- **Method** – Retrospective data analysis
- **Sample** – Claims data from CMS for New York University Langone Medical Center patients from baseline (3070 patients, July 1\textsuperscript{st}, 2009 – May 30\textsuperscript{th}, 2012) to those after initiation of risk bearing (1594 patients, October 1\textsuperscript{st}, 2013 – August, 31\textsuperscript{st}, 2014)
Changes in Discharge Location and Readmission Rates Under Medicare Bundled Payment (Jubelt, et al)\textsuperscript{22} (cont’d)

• **Results - Cardiac Valve Surgery**
  
  – 644 patients baseline, 342 patients risk bearing group
  
  – Decline in PAC inpatient setting admissions from 70.5% in the baseline period to 21.1% (AOR, 0.11; 95% CI, 0.08 – 0.15) in the risk bearing period
  
  – Readmission rates remained essentially unchanged at 18.2% in the baseline and 15.8% in the risk bearing group. (AOR, 0.93; CI 95% 0.67-1.31, \( P =.69 \))
Changes in Discharge Location and Readmission Rates Under Medicare Bundled Payment (Jubelt, et al)\textsuperscript{22} (cont’d)

• **Results – MJRLE**
  
  – 1908 patients baseline, 1024 patients risk bearing group
  
  – Decline in PAC inpatient setting admissions from 67.6% in the baseline period to 33.5% (AOR, 0.26; 95% CI, 0.22 – 0.31) in the risk bearing period
  
  – Readmission rates significantly decreased from 8.0% in the baseline to 5.0% in the risk bearing group. (AOR, 0.66; CI 95% 0.47-0.92, \( P = .01 \))
• **Results – Spinal Fusion**
  - 518 patients baseline, 228 patients risk bearing group
  - Decline in PAC inpatient setting admissions from 40.3% in the baseline period to 29.8% in the risk bearing period (AOR, 0.69; 95% CI, 0.48–0.97)
  - Readmission rates statistically unchanged, from 9.8% vs 11.4% baseline to risk bearing group. (AOR, 1.19; CI 95% .071-1.99, P = 0.50)
Changes in Discharge Location and Readmission Rates Under Medicare Bundled Payment (Jubelt, et al)\textsuperscript{22} (cont’d)

- **Conclusion** – Suggest that institutions may be able to shift patients from facility-based toward home-based care without negative impact on rehospitalization rates.

- **Limitations** – Outcomes for functional status, quality of life were not studied; disease burden in the population may have changed although they adjusted for presence of MCC; may not translate to other institutions

- **Clinical relevance** – Trend toward direct to home discharge without increase in rehospitalization rates
Medicare Spending per Beneficiary (MSPB)
MSPB – Basics\textsuperscript{23, 24}

- Part of the Hospital Value Based Purchasing (HVBP) incentive for CMS
- Based on all price standardized, risk-adjusted Medicare Part A and B payments for the episode
- An episode is from 3 days prior to the admission through 30 days after discharge
- Metric is not condition specific
- 20% of the overall HVBP score
- HVBP score drives a penalty or bonus up to 1.5% of all Medicare payments
Association of Postdischarge Spending and Performance on New Episode-Based Spending Measure

• **Purpose** – Factors that influence or determine hospital performance in MSPB have not yet been thoroughly investigated. This study evaluated whether performance in the measure were driven by spending before, during or after hospitalization

• **Method**
  – Retrospective analysis, classified hospitals by their MSPB performance using CMS method into low, medium and high cost domain scores
  – Compared spending across those categories, by pre admission, index admission and post discharge care
  – Sample t tests were utilized to evaluate the differences between low cost and high cost hospitals and for hospitals that got better or worse over the 2 years
Association of Postdischarge Spending and Performance on New Episode-Based Spending Measure

• **Sample** – Publicly available data on CMS Hospital Compare from Fiscal years 2014 and 2015 was utilized. (3194 hospitals in 2015, n not provided for 2014)

• **Results**
  – Spending = 3% for pre, 53% for index admission, 38% for post for total episode spending average of $18,247
  – For postadmission costs 38% was SNF and 30% hospital readmission
  – HH, OP, DME, Carrier and Hospice were together in a category “other”
Association of Postdischarge Spending and Performance on New Episode-Based Spending Measure

• **Results (cont’d)**
  – Cost difference for index admission low vs high cost hospitals = $2450
  – Cost difference for post discharge, low vs high cost hospitals = $4691
  – Hospitals who performed worse on the MSPB from 2014 to 2015 spent $1238 more on Postdischarge care (2015 over 2014) vs those that improved spending $297 less on post discharge care

• **Conclusion** – per authors, the findings suggest that hospitals that can reduce their Postdischarge spending will perform well on the MSPB

• **Limitations** – Causative factors not investigated, other HVBP measures/outcomes were not considered
Association of Postdischarge Spending and Performance on New Episode-Based Spending Measure

- **Clinical Relevance** – More patients are likely discharging direct to home potentially increasing the acuity; importance of agencies working directly with hospitals to help develop evidence based method for evaluation of most appropriate discharge status and risk

Of note, an invited commentary titled Accountability of Hospitals for Medicare Beneficiaries’ Postacute Care Discharge Disposition (Mor, et al)\(^6\) followed this article in JAMA, and concluded “opportunities for inpatient savings are also limited” and stated “therefore Hospitals must focus on post acute care as the most viable lever for reducing spending. Some of this focus requires greater attention to preoperative planning for elective admissions”
Beneficiary Engagement Incentive Models (BEI)
New Models – BEI

• Benefit Engagement and Incentive Model (BEI)
  – Direct Decision Support Model (DDS)\textsuperscript{27}
  – Shared Decision Making Model (SDM)\textsuperscript{28}
  – Letter of Intent submission period began December 8\textsuperscript{th}, 2016 and ends March 5 2017

“CMS Quality Strategy envisions health and care that is person-centered, provides incentives for the right outcomes, is sustainable, emphasizes coordinated care and shared decision making, and relies on transparency of quality and cost information”
New Models – BEI (cont’d)

• Common to both models\textsuperscript{27, 28}
  – “core set of preference sensitive conditions”
    • Stable ischemic heart
    • Hip and Knee osteoarthritis
    • Herniated disc or spinal stenosis
    • Localized prostate cancer
    • And benign prostate hyperplasia
  – Models will test different approaches to shared decision making, engaging beneficiaries
New Models – DDS

• Direct Decision Support Model (DDS)\textsuperscript{27}
  – Support provided outside the clinical care setting
  – Provided by Decision Support Organizations (DSO)
  – 7 will be selected, initial period 2 years with up to 3 annual renewals
  – Not less than 100k beneficiaries each, geographically assigned
  – Encourages beneficiaries to take an active role, they may opt out
  – DSO not to interfere, but encourage the clinician-patient relationship
  – Traditional Med A and B
  – DSO will provide a “small in-kind and/or store gift card” to beneficiaries that complete the process
New Models – SDM

• Shared Decision Making Model (SDM)\textsuperscript{28}
  – Intervention group 50 participating Next Generation or Medicare Shared Savings Program ACOs nationwide
  – Equal number of comparison group ACOs
  – Over 150k beneficiaries estimated to participate annually
  – Alternative Payment Model (APM) so no impact to the ACO incentives or payments
  – Pay to participating ACOs $50 for each SDM service furnished, as long as all 4 steps are completed
New Models – SDM

• Shared Decision Making Model (SDM)\(^{28}\) (cont’d)
  – Four Step Shared Decision Making Process includes:
    1. Identifying SDM eligible beneficiaries
    2. Distributing the Patient Decision Aid (PDA) to the same
    3. Furnishing the SDM service
    4. Tracking and reporting on SDM
  – Step 3 is considered the “service”, the other steps are activities
Accountable Care Organizations (ACO)
ACO – Next Generation Model

- Purpose the Next Generation ACO Model:
  - Sets predictable financial targets
  - Enables experienced ACOs greater opportunities to coordinate care
  - Aims to attain the highest quality standards of care
  - Test whether strong financial incentives for ACOs can improve health outcomes and reduce expenditures
  - Provider groups in this model assume higher levels of financial risk and reward
  - 5 year initiative that began on January 1\textsuperscript{st}, 2016
An Analysis of Geriatric Recidivism in the Era of Accountable Care Organizations

- **Purpose** - to determine factors associated with geriatric trauma readmissions within Lancaster General Health
- **Method** – Admissions from 2000 to 2011 of patients 65 years or older were queried and patients classified as recidivist or non recidivist
  - Data analysis with respect to age, sex, race, primary insurance, admission Glasgow Coma Scale (GCS) score, Injury Severity Index Score (ISS), hospital length of stay, mechanism of injury (MOI), pre existing conditions and discharge destination.
An Analysis of Geriatric Recidivism in the Era of Accountable Care Organizations

- **Sample** – 4,963 unique patients, 65 years or older, admitted from 2000 – 2011 to the Level II trauma center

- **Results** – 5.8% recidivist, 94.2% non recidivist
  - Significant predictors of recidivism were Female Sex and admission history of head trauma and preexisting pulmonary disease.
  - MVA and an initial GCS score of less than 15 were predictors of nonrecidivism
  - Potential for injury related to falls increased with each subsequent admission (81.5% of first admissions, 88.2% of second admission and 90.5% of third admissions.)
An Analysis of Geriatric Recidivism in the Era of Accountable Care Organizations

- **Conclusion** – Study identifies factors that may contribute to recidivism and can help identify those in need of social service and prevention strategies
- **Limitations** – May not be able to generalize to other institutions; variables associated with Trauma center recidivism in prior studies (Socioeconomic status, substance abuse and criminal activity) were not considered
- **Clinical relevance** – identification of patients more likely to have repeat admissions can help inform treatment plan development
  - Also, in light of such information, we can advocate for patients who may need services by educating trauma centers to the risk of recidivism
Home Health Reimbursement
Effects of the Ten Percent Cap in Medicare Home Health Care on Treatment Intensity and Patient Discharge Status

- **Purpose** – To estimate the effect of the 10 percent cap introduced to Medicare home health care on treatment intensity and patient discharge status
- **Method** – Retrospective analysis
- **Sample** – data from 2008 – 2010 from CMS 5 percent Limited Data Set-Denominator file, CMS 5 percent Limited Data Set-Home Health Claims and CMS Provider of Services file
Results

– Agencies with a proportion of outliers above the 10% prior to implementation of the cap, were more likely to have decreased treatment intensities following the implementation of the cap.

– The amount of the agencies outlier payments in the base year, impacted the size and significance of the agencies change in intensity.

– There was not a drop in the non outlier group intensity compared year over year.

– Patients with a low level of functional impairment were more likely to be discharged under the 10% cap.
• **Results** – (Cont’d)
  – The likelihood of discontinuation of services was not different for patients with a high level of functional severity
  – For the subset of diabetic patients pre and post cap, these patients were more likely to be discharged and move to a nursing home than prior
  – Hospitalization rates did not increase

• **Conclusion** – “the drastic reduction in the number of service visits and the discontinuation of relatively healthy patients from home health care suggest the 10% cap improved efficiency of home health services as intended. However the 10% cap increased other types of health care expenditures by pushing sicker patient to use more expensive health services”
Effects of the Ten Percent Cap in Medicare Home Health Care on Treatment Intensity and Patient Discharge Status

- **Limitations** – Functional status, visit intensity and discharge status were the only outcome measures assessed. Used the level of functional status as a “proxy of each patient’s health condition”. No outcome related to patient satisfaction. No estimate of additional costs.

- **Relevance** – Policy makers might use studies such as this to determine the cap has had the desired effect without consideration of other variables such as quality of life, and downstream costs. It is up to each of us as professionals to advocate for the policies we feel best support quality care for our patients.
Administrative/Management

Matt Janes, PT, DPT, MHS, OCS, CSCS
A systematic review evaluating the impact of paid home carer training, supervision, and other interventions on the health and well-being of older home care clients.\textsuperscript{32}

**BACKGROUND:**

Interventions to support and skill paid home carers and managers could potentially improve health and well-being of older home care clients. This is the first systematic review of interventions to improve how home carers and home care agencies deliver care to older people, with regard to clients' health and well-being and paid carers' well-being, job satisfaction, and retention.

**METHODS:**

We reviewed 10,731 papers found in the electronic search (to January 2016) fitting predetermined criteria, assessed quality using a checklist, and synthesized data using quantitative and qualitative techniques.
A systematic review evaluating the impact of paid home carer training, supervision, and other interventions on the health and well-being of older home care clients.\textsuperscript{32}

RESULTS:

Ten papers described eight interventions. The six quantitative evaluations used diverse outcomes that precluded meta-analysis. In the only quantitative study (a cluster Randomized Controlled Trial), rated higher quality, setting meaningful goals, carer training, and supervision improved client health-related quality of life. The interventions that improved client outcomes comprised training with additional implementation, such as regular supervision and promoted care focused around clients' needs and goals. In our qualitative synthesis of four studies, intervention elements carers valued were greater flexibility to work to a needs-based rather than a task-based model, learning more about clients, and improved communication with management and other workers.

CONCLUSIONS:

There is a dearth of evidence regarding effective strategies to improve how home care is delivered to older clients, particularly those with dementia. More research in this sector including feasibility testing of the first home care intervention trials to include health and life quality outcomes for clients with more severe dementia is now needed.
Risk of sharps injuries among home care aides: Results of the Safe Home Care survey.33

OBJECTIVES:

Home care (HC) aides constitute an essential, rapidly growing workforce. Technology advances are enabling complex medical care at home, including procedures requiring the percutaneous use of sharp medical devices, also known as sharps. Objectives were to quantify risks of sharps injuries (SI) in a large HC aide population, compare risks between major occupational groups, and evaluate SI risk factors.

METHODS:

A questionnaire survey was administered to aides hired by HC agencies and directly by clients. One thousand one hundred seventy-eight aides completed questions about SI and potential risk factors occurring in the 12 months before the survey. SI rates were calculated and Poisson regression models identified risk factors.
RESULTS:
Aides had a 2% annual risk of experiencing at least 1 SI (95% confidence interval [CI], 1.1-2.6). Client-hired aides, men, and immigrants had a higher risk than their counterparts. Risk factors among all HC aides included helping a client use a sharp device (rate ratio [RR], 5.62; 95% CI, 2.75-11.50), observing used sharps lying around the home (RR, 2.68; 95% CI, 1.27-5.67), and caring for physically aggressive clients (RR, 2.82; 95% CI, 1.36-5.85).

CONCLUSIONS:
HC aides experience serious risks of SI. Preventive interventions are needed, including safety training for clients and their families, as well as aides.
Organizational characteristics associated with the provision of cultural competency training in home and hospice care agencies.  

BACKGROUND:  
Despite the increasing interest in community-based health care, little information exists on cultural competency training (CCT) and its predictors in this setting.  

PURPOSE:  
We examined the associations between six organizational characteristics and the provision of CCT in home health care and hospice agencies.  

METHODOLOGY:  
We used cross-sectional data from the agency component of the 2007 National Home and Hospice Care Survey. The CCT provision composite was composed of three items: whether the agency provides mandatory cultural training to understand cultural differences/beliefs that may affect delivery of services to (a) all administrators, clerical, and management staff; (b) all direct service providers; and (c) all volunteers. Organizational characteristics were volume, ownership status, chain membership, teaching status, Joint Commission accreditation status, and formal contracts.
Organizational characteristics associated with the provision of cultural competency training in home and hospice care agencies.\textsuperscript{34}

**PRINCIPAL FINDINGS:**

The weighted sample (n = 14,469) had a mean CCT provision score of 1.75 (range = 0-3). Our ordinal logistic regression model showed that Joint Commission accreditation increased CCT provision odds in the home health (odds ratio [OR] = 2.07, 95% confidence interval [CI] [1.01, 4.24]) and hospice (OR = 4.40, 95% CI [2.07, 9.38]) settings. Teaching status increased CCT provision odds (OR = 2.71, 95% CI [1.19, 6.17]) in the home health setting. Formal contracts increased CCT provision odds (OR = 4.03, 95% CI [1.80, 9.00]), whereas not-for-profit ownership decreased CCT provision odds (OR = 0.19; 95% CI [0.07, 0.50]) in the hospice setting.

**PRACTICE IMPLICATIONS:**

Home health care and hospice agencies need to increase their CCT practices to overcome health disparities in an increasingly diverse and aging population.
We evaluated whether community-level home health agencies and nursing home performance is associated with community-level hospital 30-day all-cause risk-standardized readmission rates for Medicare patients used data from the Centers for Medicare & Medicaid Service from 2010 to 2012. Our final sample included 2,855 communities that covered 4,140 hospitals with 6,751,713 patients, 13,060 nursing homes with 1,250,648 residents, and 7,613 home health agencies providing services to 35,660 zipcodes. Based on a mixed effect model, we found that increasing nursing home performance by one star for all of its 4 measures and home health performance by 10 points for all of its 6 measures is associated with decreases of 0.25% (95% CI 0.17-0.34) and 0.60% (95% CI 0.33-0.83), respectively, in community-level risk-standardized readmission rates.
Development of the interRAI Home Care Frailty Scale.36

BACKGROUND:

The concept of frailty, a relative state of weakness reflecting multiple functional and health domains, continues to receive attention within the geriatrics field. It offers a summary of key personal characteristics, providing perspective on an individual's life course. There have been multiple attempts to measure frailty, some focusing on physiologic losses, others on specific diseases, disabilities or health deficits. Recently, multidimensional approaches to measuring frailty have included cognition, mood and social components. The purpose of this project was to develop and evaluate a Home Care Frailty Scale and provide a grounded basis for assessing a person's risk for decline that included functional and cognitive health, social deficits and troubling diagnostic and clinical conditions.
METHODS:

A secondary analysis design was used to develop the Home Care Frailty Scale. The data set consisted of client level home care data from service agencies around the world. The baseline sample included 967,865 assessments while the 6-month follow-up sample of persons still being served by the home care agencies consisted of 464,788 assessments. A pool of 70 candidate independent variables were screened for possible inclusion and 16 problem outcomes referencing accumulating declines and clinical complications served as the dependent variables. Multiple regression techniques were used to analyze the data.
RESULTS:
The resulting Home Care Frailty Scale consisted of a final set of 29 items. The items fall across 6 categories of function, movement, cognition and communication, social life, nutrition, and clinical symptoms. The prevalence of the items ranged from a high of 87% for persons requiring help with meal preparation to 3.7% for persons who have experienced a recent decline in the amount of food eaten.

CONCLUSIONS:
The interRAI Home Care Frailty Scale is based on a strong conceptual foundation and in our analysis, performed as expected. Given the use of the interRAI Home Care Assessment System in multiple, diverse countries, the Home Care Frailty Scale will have wide applicability to support program planning and policy decision-making impacting home care clients and their formal and informal caregivers throughout the world.
Home care agencies are initiating "patient health goal elicitation" activities as part of home care admission planning. We categorized elicited goals and identified "clinically informative" goals at a home care agency. We examined patient goals that admitting clinicians documented in the point-of-care electronic health record; conducted content analysis on patient goal data to develop a coding scheme; grouped goal themes into codes; assigned codes to each goal; and identified goals that were in the patient voice. Of the 1,763 patient records, 16% lacked a goal; only 15 goals were in a patient's voice. Nurse and physician experts identified 12 of the 20 codes as clinically important accounting for 82% of goal occurrences. The most frequent goal documented was safety/falls (23%). Training and consistent communication of the intent and operationalization of patient goal elicitation may address the absence of patient voice and the less than universal recording of home care patients' goals.
OBJECTIVES:
To determine whether a depression care management intervention in Medicare home health recipients decreases risk of hospitalization.

DESIGN:
Cluster-randomized trial. Nurse teams were randomized to intervention (12 teams) or enhanced usual care (EUC; 9 teams).

SETTING:
Six home health agencies from distinct geographic regions. Home health recipients were interviewed at home and over the telephone.

PARTICIPANTS:
Individuals aged 65 and older who screened positive for depression on nurse assessments (N = 755) and a subset who consented to interviews (n = 306).
Integrating Depression Care Management into Medicare Home Health Reduces Risk of 30- and 60-Day Hospitalization: The Depression Care for Patients at Home Cluster-Randomized Trial.\textsuperscript{38}

**INTERVENTION:**

The Depression CARE for PATients at Home (CAREPATH) guides nurses in managing depression during routine home visits. Clinical functions include weekly symptom assessment, medication management, care coordination, patient education, and goal setting. Researchers conducted telephone conferences with team supervisors every 2 weeks.

**MEASUREMENTS:**

Hospitalization while receiving home health services was assessed using data from the home health record. Hospitalization within 30 days of starting home health, regardless of how long recipients received home health services, was assessed using data from the home care record and research assessments.
RESULTS:

The relative hazard of being admitted to the hospital directly from home health was 35% lower within 30 days of starting homehealth care (hazard ratio (HR) = 0.65, P = .01) and 28% lower within 60 days (HR = 0.72, P = .03) for CAREPATH participants than for participants receiving EUC. In participants referred to home health directly from the hospital, the relative hazard of being rehospitalized was approximately 55% lower (HR = 0.45, P = .001) for CAREPATH participants.

CONCLUSION:

Integrating CAREPATH depression care management into routine nursing practice reduces hospitalization and rehospitalization risk in older adults receiving Medicare home health nursing services.
Effectiveness of discharge interventions from hospital to home on hospital readmissions: a systematic review.39

BACKGROUND:

Many discharge interventions are developed to reduce unplanned hospital readmissions, but it is unclear which interventions are more effective.

OBJECTIVES:

The objective of this review was to identify discharge interventions from hospital to home that reduce hospital readmissions within three months and to understand their effect on secondary outcome measures.

INCLUSION CRITERIA:

Participants were adults (18 years or older) discharged from a medical or surgical ward. The included interventions had to be designed to ease the care transition from hospital to home or to prevent problems after hospital discharge. This review considered only randomized controlled trials. The primary outcome measure was hospital readmission within three months after discharge. Secondary outcomes included patient satisfaction, return to emergency departments and mortality.
Effectiveness of discharge interventions from hospital to home on hospital readmissions: a systematic review.\textsuperscript{39}

SEARCH STRATEGY:

Studies in English between January 1990 and July 2014 were considered for inclusion. The databases searched were PubMed, Web of Science, Embase and CINAHL.

RESULTS:

Meta-analysis was performed on 47 studies. The overall relative risk for hospital readmission was 0.77 [95% CI, 0.70-0.84] (p<0.00001). The relative risk for return to the emergency department was 0.75 [95% CI, 0.55-1.01] (p=0.06) and for mortality 0.70 [95% CI, 0.48-1.01] (p=0.06). Patient satisfaction improved in favor of the intervention group in five out of the six studies evaluating patient satisfaction. Exploratory subgroup analysis found that interventions starting during hospital stay and continuing after discharge were more effective in reducing readmissions compared to interventions starting after discharge (between subgroup difference p=0.01). Multicomponent interventions were not more effective compared to single component interventions (between subgroup difference p=0.54). Interventions oriented towards patient empowerment were more effective compared to all other interventions (between subgroup difference p=0.02).
CONCLUSIONS:

Interventions designed to improve the care transition from hospital to home are effective in reducing hospital readmission. These interventions preferably start in the hospital and continue after discharge rather than starting after discharge. Enhancing patient empowerment is a key factor in reducing hospital readmissions. Interventions to reduce hospital readmissions should start during hospital stay and continue in the community (grade A recommendation). This requires financial systems to support and facilitate collaboration between hospitals and home care. Interventions that support patient empowerment are more effective in reducing hospital readmissions (grade B recommendation). To promote patient empowerment caregivers must be trained to increase patients' capacity to self-care. Future research should focus on interventions that improve patient empowerment and the effects of discharge interventions after more than three months.
Home health care agencies are increasingly taking care of sicker, older patients with greater comorbidities. However, they are unequipped to appropriately manage these older adults, particular persons living with dementia (PLWD). We therefore developed the Dementia Symptom Management at Home (DSM-H) Program, a bundled interprofessional intervention, to improve the care confidence of providers, and quality of care delivered to PLWD and their caregivers. We implemented the DSM-H with 83 registered nurses, physical therapists, and occupational therapists. Overall, there was significant improvement in pain knowledge (5.9%) and confidence (26.5%), depression knowledge (14.8%) and confidence (36.1%), and neuropsychiatric symptom general knowledge (16.8%), intervention knowledge (20.9%), attitudes (3.4%) and confidence (27.1%) at a statistical significance of (P < .0001). We also found significant differences between disciplines. Overall, this disseminable program proved to be implementable and improve clinician’s knowledge and confidence in caring for PLWD, with the potential to improve quality of care and quality of life, and decrease costs.
A remote monitoring program evaluation: a retrospective study.41

OBJECTIVE:
Using an integrated model, the Donabedian Quality and Logic Model, we examined a remote monitoring heart failure disease management program.

METHOD:
This quantitative research used post-test only case matched design. The sample consisted of 210 participants from 23 homehealth care agencies.

RESULTS:
Logistic regression results indicated statistical significance, there was an inverse relationship between caregiver support and the complexity of decision making; $X^2 (3, n = 210) = 29.984$, $P = 0.012$. The DTreg suggested that participants who were advised to go to the ER had a 1.00 probability of doing so, and those who were instructed otherwise had a 0.37 probability of going to the ER. Among participants who experienced a hospital readmission, there was 0.50 probability that patient education or other clinical intervention was implemented prior to the admission.
CONCLUSION:

As home health care agencies consider disease management programs, it is important to gain a comprehensive understanding of the potential of innovative programs and the resources they require. While the agency invested the resources required by the remote monitoring program, the study demonstrated that caregiver support was a critical structural component of the program and may affect change in nurses' decision making to mitigate hospital utilization. We recommend that home health care agencies take greater consideration of the family and social support in implementing a remote monitoring system.
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