Accidental falls during post-acute care: Do patients achieve successful community discharge after this adverse event?

Natalie E. Leland, PhD, OTR/L, BCG, FAOTA
Assistant Professor
THE MINIMUM DATA SET (MDS)
Policy & Practice

• 1987 Federal Nursing Home Reform Act
• Passage of the Balanced Budget Act of 1997
  – Implemented prospective payment system (PPS) in post acute care
  – Each setting has a different payment model
  – Nursing home Minimum Data Set (MDS)
    • Residential assessment tool
• Skilled nursing facility (SNF) care is based on a per diem PPS
  • Resource Utilization Groups (RUGS)
  • Therapy utilization is a key contributor in payment for SNF patients
Minimum Data Set (MDS)

• MDS is a standardized, primary screening and assessment tool of health status aimed at providing a multidimensional perspective on the patient
  • Physical
  • Psychological
  • Psycho-social functioning

• MDS designed as a care-planning tool
  • Used by researchers, policy-makers, and payers
**Minimum Data Set (MDS)**

- **MDS assessments**
  - Admission, quarterly, annual
- **Five SNF MDS assessments**
  - 5, 14, 30, 60, 90 day
  - Assessment captures therapy minutes over a seven day period
  - Covers up to 100 skilled days of SNF care

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**Rehabilitation RUG categories**

<table>
<thead>
<tr>
<th>Resource Utilization Group (RUG)</th>
<th>Therapy Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Rehab RUG</td>
<td>none</td>
</tr>
<tr>
<td>Low Rehab RUG</td>
<td>45-149</td>
</tr>
<tr>
<td>Medium Rehab RUG</td>
<td>150-324</td>
</tr>
<tr>
<td>High Rehab RUG</td>
<td>325-499</td>
</tr>
<tr>
<td>Very High Rehab RUG</td>
<td>500-719</td>
</tr>
<tr>
<td>Ultra High Rehab RUG</td>
<td>720+</td>
</tr>
</tbody>
</table>
Research and the MDS

- MDS 2.0 rolled out June 22, 1998
- The MDS 3.0 rolled out October, 2010
  - Introduced the “resident’s voice” to assessment

**Core Therapy Components**

- Therapy utilization for all three rehabilitation disciplines
  - Occupational therapy
  - Physical therapy
  - Speech therapy
- Utilizes a seven day look-back period

**MDS 2.0**
- Number of days of therapy for each discipline
- Number of minutes of therapy for each discipline

**MDS 3.0**
- Distinguishes individual, concurrent, and group therapy
- Modified assessment schedule was implemented Oct 1, 2011
# MDS Assessment Schedule

## Old Schedule

<table>
<thead>
<tr>
<th>Medicare MDS Assessment type</th>
<th>Reason for Assessment (A0310B code)</th>
<th>Assessment Reference Date Window</th>
<th>Assessment Reference Date Grace Days</th>
<th>Applicable Medicare Payment Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 day*</td>
<td>01</td>
<td>Days 1 – 5</td>
<td>6 - 8</td>
<td>1 through 14</td>
</tr>
<tr>
<td>14 day</td>
<td>02</td>
<td>Days 11 - 14</td>
<td>15 – 19</td>
<td>15 through 30</td>
</tr>
<tr>
<td>30 day</td>
<td>03</td>
<td>Days 21 – 29</td>
<td>30 – 34</td>
<td>31 through 60</td>
</tr>
<tr>
<td>60 day</td>
<td>04</td>
<td>Days 50 – 59</td>
<td>60 – 64</td>
<td>61 through 90</td>
</tr>
<tr>
<td>90 day</td>
<td>05</td>
<td>Days 80 – 89</td>
<td>90 – 94</td>
<td>91 through 100</td>
</tr>
</tbody>
</table>

## Revised Schedule

<table>
<thead>
<tr>
<th>Medicare MDS Assessment type</th>
<th>Reason for Assessment (A0310B code)</th>
<th>Assessment Reference Date Window</th>
<th>Assessment Reference Date Grace Days</th>
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<tbody>
<tr>
<td>5 day*</td>
<td>01</td>
<td>Days 1 – 5</td>
<td>6 - 8</td>
<td>1 through 14</td>
</tr>
<tr>
<td>14 day</td>
<td>02</td>
<td>Days 13 - 14</td>
<td>15 – 18</td>
<td>15 through 30</td>
</tr>
<tr>
<td>30 day</td>
<td>03</td>
<td>Days 27 – 29</td>
<td>30 – 33</td>
<td>31 through 60</td>
</tr>
<tr>
<td>60 day</td>
<td>04</td>
<td>Days 57 – 59</td>
<td>60 – 63</td>
<td>61 through 90</td>
</tr>
<tr>
<td>90 day</td>
<td>05</td>
<td>Days 87 – 89</td>
<td>90 – 93</td>
<td>91 through 100</td>
</tr>
</tbody>
</table>

August 23, 2011

RUG-IV and MDS 3.0

http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/SNFPPS/Downloads/mds30_rugiv_train_slides_081811.pdf
USING THE MDS: AN EXAMPLE

Background

- As length of stay in US hospitals decreased, patient care shifted to post-acute care (PAC) settings

- PAC settings
  - Nursing homes that provide SNF services
  - Inpatient rehabilitation facilities (IRF)
  - Home healthcare (HH)
  - Long term care hospitals (LTCH)

(MEDPAC, 2012; OIG, 2001; Liu et al., 1999; Cotterill et al, 2002)
Background

• Historically, nursing homes have cared for long-term residents

• The past 20 years have seen a growth in PAC admissions to nursing homes (i.e., short-stay patients)
  • Foster continued medical recovery
  • Maximize functional independence

(Keeler et al., 1981; Leland et al., 2012; Leland et al., 2015)
Background

- 22% of Medicare beneficiaries experience adverse events, of which 59% are preventable
- Adverse events have been associated with poor outcomes, such as hospital readmissions
- 20% of short-stay patients fall during that initial transition to a nursing home, of which 4.7% result in a hip fracture
  - Achievement of prioritized patient outcomes is not known (e.g., successful community discharge)

(Morley et al, 2014; OIG, 2014; Mor, 2010; Unruh, 2013; Leland, 2012; Colon-Emeric, 2002)
Study Objectives

• Examine the 90-day outcomes of PAC patients who experience an accidental fall and subsequent hip fracture in nursing home

• Identify the proportion of patients who achieve their PAC rehabilitation goal of getting home and staying home (i.e., successful community discharge)
Methods

Cohort

• All fee-for-service Medicare beneficiaries 75 and older with an index hip fracture (1999-2007)
• Used a 5-year look-back period to isolate first hip fracture
Methods

Data

• 100% MEDPAR inpatient Medicare Part A data
• US nursing home Minimum Data Set (MDS) 2.0
• Centers for Medicare and Medicare Services standard analytic files from Part A claims:
  – Inpatient
  – SNF
  – Hospice
  – Home health services
  – Medicare outpatient claims
Hip Fracture Cohort (n=1,386,310)

In nursing home at time of fracture using SNF benefit (n=37,362)

Living in community (n=1,155,484)
Hospice (n=16,101)
Nursing home long-term care (n=175,275)
Other health care institution (n=2,088)

LTC residents using SNF benefit (n=3,986)
No surgical repair (n=2,787)
Suspect claims (n=2,418)
Censured to follow-up* (n=866)

Final study sample (n=27,305)

*censured to follow-up= those admitted to hospital after September 30, 2007
Methods

Cohorts:
• The final cohort include 27,305 patients who were:
  – Short-stay nursing home patients
  – Receive SNF-level care for another medical condition
  – Residing in the community prior to this nursing home stay
Outcomes Post-Hip Fracture Hospitalization

• Acute hospital discharge setting
  – Skilled nursing facility (SNF)
  – Long-term care hospital (LTCH)
  – Psychiatric hospital
  – Inpatient rehabilitation facility (IRF)
  – Community
  – Died in the hospital
Outcomes Post-Hip Fracture Hospitalization

- 90-day outcomes after acute hospital discharge for hip fracture
  - Successful community discharge, returned to the community and stayed at least 30 days
  - Discharged to the community, with a length of stay less than 30 days
  - Still in a healthcare institution at 90 days
  - Died before community discharge

Covariates

• Baseline status before fracture (MDS 2.0)
  – Rehab use
  – Function & fall history
  – Cognitive and medical information
  – Prior living status (MDS 2.0 only)

• Hip fracture hospitalization (Part A claims)
  – Length of stay
  – Complications
  – ICU utilization
  – Surgical repair
  – Elixhauser comorbidity score
Results

• Timing of the PAC accidental fall and hip fracture
  – 96% of patients had been in the nursing home for SNF level-services less than 30-days

  – 7 days [IQR 3,13] in the SNF prior to hip fracture hospitalization
Results

• Discharge setting after hip fracture hospitalization
  – 84% were discharged to a SNF
    • 99% went back to the same SNF where the fall and fracture occurred
  – Remaining 16%
    • 5% died in the hospital
    • 1.6% returned to the community with or without services
    • 4.6% to IRF
    • 2.0% to nursing home without skilled care
    • 1.3% to hospice
    • 1.5% to LTCH or psychiatric hospital
## Cohort Characteristics, by 90-day Outcome

<table>
<thead>
<tr>
<th></th>
<th>Cohort (n=27,305)</th>
<th>Successful Community Discharge (n=3,823)</th>
<th>Community Discharge (n=1,982)</th>
<th>In a Healthcare Institution (n=14,898)</th>
<th>Died (n=6,602)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD)</td>
<td>84.9 (5.5)</td>
<td>83.9 (5.2)</td>
<td>84.4 (5.4)</td>
<td>84.8 (5.5)</td>
<td>85.6 (5.6)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Female, %</td>
<td>70.8</td>
<td>77.4</td>
<td>69.3</td>
<td>74.3</td>
<td>59.5</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>White, %</td>
<td>94.0</td>
<td>94.6</td>
<td>93.6</td>
<td>93.5</td>
<td>95.0</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Black, %</td>
<td>3.9</td>
<td>3.3</td>
<td>4.3</td>
<td>4.3</td>
<td>3.3</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Hispanic,%</td>
<td>0.8</td>
<td>1.0</td>
<td>0.8</td>
<td>0.9</td>
<td>0.6</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Other race, %</td>
<td>1.0</td>
<td>1.0</td>
<td>1.1</td>
<td>1.0</td>
<td>0.9</td>
<td>NS</td>
</tr>
<tr>
<td>Lived alone prior to SNF admission, %</td>
<td>21.0</td>
<td>26.2</td>
<td>23.4</td>
<td>20.4</td>
<td>18.7</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Cohort Characteristics, by 90-day Outcome

<table>
<thead>
<tr>
<th>Receipt of rehabilitation during index SNF stay,%</th>
<th>Cohort (n=27,305)</th>
<th>Successful Community Discharge (n=3,823)</th>
<th>Community Discharge (n=2,982)</th>
<th>In a Health Care Institution (n=14,898)</th>
<th>Died (n=6,602)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Rehabilitation</td>
<td>86.4</td>
<td>91.2</td>
<td>89.8</td>
<td>85.9</td>
<td>83.9</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Occupational Therapy</td>
<td>74.1</td>
<td>80.7</td>
<td>78.0</td>
<td>73.5</td>
<td>70.5</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Physical Therapy</td>
<td>83.1</td>
<td>88.9</td>
<td>86.8</td>
<td>82.3</td>
<td>80.4</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Speech Therapy</td>
<td>21.0</td>
<td>16.6</td>
<td>18.0</td>
<td>22.0</td>
<td>22.3</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
## Cohort Characteristics, by 90-day Outcome

<table>
<thead>
<tr>
<th></th>
<th>Cohort (n=27,305)</th>
<th>Successful Community Discharge (n=3823)</th>
<th>Community Discharge (n=2,982)</th>
<th>In a Health Care Institution (n=14,898)</th>
<th>Died (n=6602)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional and medical status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADL status, 0-28 point scale, mean (SD)</td>
<td>15.0(5.9)</td>
<td>14.3(5.7)</td>
<td>14.7(5.8)</td>
<td>15.0 (5.9)</td>
<td>15.5(5.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>History of falls in past 30 days,%</td>
<td>53.3</td>
<td>53.3</td>
<td>52.8</td>
<td>52.8</td>
<td>54.4</td>
<td>NS</td>
</tr>
<tr>
<td>No. of medications, mean (SD)</td>
<td>9.7(4.3)</td>
<td>10.0(4.5)</td>
<td>10.1(4.4)</td>
<td>9.5(4.3)</td>
<td>9.8(4.3)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Cognitive Performance Scale (CPS), %</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low CPS (1-2)</td>
<td>51.1</td>
<td>70.0</td>
<td>59.0</td>
<td>48.2</td>
<td>44.3</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Moderate CPS (5-6)</td>
<td>41.1</td>
<td>26.0</td>
<td>35.0</td>
<td>43.7</td>
<td>45.9</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>High CPS (5-6)</td>
<td>7.8</td>
<td>4.0</td>
<td>6.1</td>
<td>8.2</td>
<td>9.8</td>
<td>&lt;.001</td>
</tr>
</tbody>
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<thead>
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<th></th>
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<th>Community Discharge (n=1982)</th>
<th>In a Health Care Institution (n=14,898)</th>
<th>Died (n=6602)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hip fracture hospital stay characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICU use, %</td>
<td>20.1</td>
<td>16.2</td>
<td>20.4</td>
<td>17.0</td>
<td>29.1</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Elixhauser score, mean(SD)</td>
<td>2.7 (1.4)</td>
<td>2.6 (1.4)</td>
<td>2.7 (1.3)</td>
<td>2.6 (1.3)</td>
<td>2.9 (1.3)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Hospital stay in days, mean(SD)</td>
<td>6.8 (4.7)</td>
<td>6.4 (4.7)</td>
<td>6.8 (5.1)</td>
<td>6.4 (4.0)</td>
<td>7.9 (5.8)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Hospital complication, %</td>
<td>8.8</td>
<td>7.0</td>
<td>8.4</td>
<td>6.9</td>
<td>14.4</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Ninety-day Outcomes

Still in a Healthcare Institution, 54.6%
Successful Community Discharge, 14.0%
In the community >30 days, 7.3%
Expired, 24.1%

Of those still in a healthcare institution:
- Nursing Home as Short-Stay Resident, 46.2%
- Nursing Home as Long-Term Resident, 46.4%
- Acute Care Hospital, 3.5%
- Other, 1.0%
- Hospice, 2.8%

(N=27,305)
## Predicting Successful Community Discharge

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratios</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.93</td>
<td>(0.96-0.97)</td>
</tr>
<tr>
<td>Female</td>
<td>1.40</td>
<td>(1.29-1.52)</td>
</tr>
<tr>
<td>Any rehabilitation</td>
<td>1.52</td>
<td>(1.45-1.71)</td>
</tr>
<tr>
<td>Urinary Incontinence</td>
<td>0.79</td>
<td>(0.67-0.95)</td>
</tr>
<tr>
<td>Bowel Incontinence</td>
<td>0.96</td>
<td>(0.80-1.14)</td>
</tr>
<tr>
<td>Cognitive performance score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1: Low Cognitive Impairment</td>
<td>reference</td>
<td></td>
</tr>
<tr>
<td>2-4: Moderate Cognitive Impairment</td>
<td>0.43</td>
<td>(0.39-0.46)</td>
</tr>
<tr>
<td>5-6: High Cognitive Impairment</td>
<td>0.34</td>
<td>(0.29-0.41)</td>
</tr>
<tr>
<td>Any hospital complications</td>
<td>0.84</td>
<td>(0.73-0.96)</td>
</tr>
</tbody>
</table>

Logistic Regression was adjusted for race/ethnicity, baseline MDS status, elixhauser score, ICU stay, hospital length of stay.
Discussion

• Adverse events during PAC, such as accidental falls, limit SNF patients’ ability to achieve successful community discharge

• Future research needed to examine how the PAC interdisciplinary team collaborates
  – Prevent accidental falls
  – Optimize high-quality care
Discussion

• The ability to examine the delivery of short-term care is in its infancy

• The findings of this study underscore the long-term impact of accidental falls on PAC patients

• Need measures assessing the quality of the health care processes
Limitations

- Unable to capture information of health care providers’ clinical decision-making
- Data does not include the circumstances of fall events
- Cannot quantify whether fall prevention was integrated into the care plan
Limitations

• Study limited to individuals 75 years and older

• Data limited in the ability to capture
  – Details about the fall event
  – Type and frequency of fall prevention strategies
  – Use of non-Medicare services received in the community
Conclusion

• Outcomes are poor after experiencing a fall and hip fracture during a PAC stay in a SNF
• There is a 43% difference in successful community discharge after a hip fracture
  – 14% among those who fall during a SNF stay
  – 57% among community residing older adults

Leland NE, Gozalo PL, Bynum J, Mor V, Wetle T, Teno JM. (2015). An examination of the first 30 days after patients are discharged to the community from hip fracture post-acute care. Medical Care, 53(10):879-87.
Implications for PAC Rehabilitation

• Fall-prevention needs to be a fundamental part of the PAC plan of care
• Core set of evidence-based fall prevention care processes
  – Guide clinical practice
  – Quantify documented best practices
  – Foster quality improvement
Acknowledgements

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Julie Bynum MD, MPH
Vincent Mor PhD
Joan M. Teno MD, MS

These findings have been published: Leland NE, Gozalo PL, Bynum J, Mor V, Teno J. (2015). What happens to the patient when they fracture their hip during SNF care? Journal of the American Medical Directors Association, 19(9):767-74. doi: 10.1016/j.jamda.2015.03.026.

Funding
National Center Medical Rehabilitation Research (NICHD) and the National Institute Neurological Disorders and Stroke (K12 HD055929)

AHRQ Patient Centered outcomes career development award (K01 HS022907)
Thank You!
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