Tracking Functional Outcomes throughout the Continuum of Acute and Postacute Rehabilitative Care

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Disclosures

• Robert Rondinelli, MD, PhD: None
• Paulette Niewczyk, MPH, PhD: Directly employed by UDSMR, the developer of the FIM® instrument and its derivatives
• Maggie DiVita, MS, PhD: Directly employed by UDSMR, the developer of the FIM® instrument and its derivatives
• K. Danielle Hahn, BS: None
Introduction

- There have been many recent changes to health-care policy—and even more proposed changes—that have major implications on the medical rehabilitation field
- Various payment reform ideas have been proposed, some of which are bundled payments, site-neutral payments, and value-based purchasing

The IMPACT Act

- The Improving Medicare Post-Acute Care Transformation (IMPACT) Act requires the collection of standardized functional data in all postacute care venues for the following purposes:
  - Comparing quality across PAC settings
  - Improving hospital and PAC discharge planning
  - Using the collected data to reform PAC payments (via site-neutral or bundled payments, for example) while ensuring continued beneficiary access to the most appropriate setting of care
The IMPACT ACT: Comparing Quality across PAC Settings

- The collection of standardized functional data in all postacute care venues to compare quality across PAC settings will not be meaningful without an established severity-adjustment method
- Determining the level of severity is critical
  - Postacute care venues treat different types of impairments
  - Postacute care venues treat similar conditions with varying levels of illness severity
  - Functionality metrics can help estimate severity
- Determining quality requires a parsimonious outcome metric that measures the same thing across various PAC venues

The IMPACT Act: Improving Hospital and PAC Discharge Planning

- The majority of patients are admitted to postacute care directly from an acute hospital
- The acute hospital is the start of the “continuum of care”
- A standardized functional data collection metric for acute care is important because the appropriate setting of postacute care is often determined in the acute care hospital
Research Purpose

- To measure patient function using the AcuteFIM® instrument, a standardized instrument in the acute hospital
- To track patient function, using the same items, across multiple postacute care trajectories to determine outcomes of care
- To determine whether the AcuteFIM® instrument, when administered in the acute hospital, can aid in predicting discharge destination and postacute care placement

UPH-DM Continuum of Care
Additional Components

- UPH-DM
  - Multispecialty physician group
  - Acute care hospital
  - Inpatient rehabilitation facility (distinct part; 23 beds)
  - Transitional care unit (16 beds)
  - Long-term acute care hospital (LTACH) services
  - Cedar Rapids
  - “Affiliated” skilled nursing facilities (SNFs)
  - Shared medical direction from UPH-DM’s physician group

PAC Triage Decisions
**Ideal**

- Simple and predictable pathway for postacute care that is initiated on the acute side and customized to the patient’s needs

**Acute Care Programmatic Integration at UPH-DM**

- Stroke certification by Det Norske Veritas (DNV)
  - Fully integrated acute stroke care from admission through discharge
  - Total stroke admissions > 200 patients/year
Postacute Care Programmatic Integration at UPH-DM

- Can be accomplished by creation of a virtual tracking of functional outcomes within and between various PAC trajectories using the common metrics of the FIM® instrument and its derivatives

Uniform Data System for Medical Rehabilitation (UDSMR)

- Simplified derivatives of the FIM® instrument were developed to be used in acute and postacute care venues
- The AcuteFIM® instrument and the SigmaFIM™ instrument are FIM® derivatives
  - Simple, function-based, common assessment methodology
  - Patients can be assessed on the same items throughout the care continuum
Study Design and Population

- Prospective cohort study
- Adult acute ischemic stroke patients admitted to Iowa Methodist Medical Center
  - Rolling enrollment
- Participants recruited within seventy-two hours after acute hospital admission

Methods

- Identification and tracking of adult ischemic stroke patients
- CMS criteria were used to implement patient screening and triage within and between acute and postacute venues
- Administer AcuteFIM® instrument to all acutely enrolled patients, then administer the IRF-PAI and/or the SigmaFIM™ instrument to appropriate patients admitted to IRF or TCU/SNF-level PAC from the acute hospital to determine functional outcomes, then follow up with all patients enrolled at thirty to ninety days postdischarge from the last setting of care
- Compare functional outcomes across various postacute pathways
Methods

• Identify potential patient subjects from “stroke alert” process at IMMC
• Daily review of cerebral CT and MRI results reported at IMMC for adult patients diagnosed with acute ischemic CVA
• Rehab coordinator visits identified potential patient to obtain informed consent (by patient or legal proxy)

• Upon signed consent, administer AcuteFIM® instrument within seventy-two hours of admission to the acute hospital
• Follow patients as they transition throughout the continuum
• Track demographic, medical, and functional data
Acute Discharge Trajectories

Study Variables

- Functional
  - AcuteFIM® instrument
  - FIM® instrument
  - SigmaFIM™ instrument
- Sociodemographic
  - Age
  - Gender
  - Race/ethnicity
  - Marital status
  - Prehospital living situation
  - Primary payer
Study Variables

- Medical
  - Acute DRG
  - Acute length of stay
  - Acute discharge destination
  - Postacute length of stay
  - Postacute discharge destination
  - Acute rehospitalization
  - Functional change from acute to postacute
  - Functional change from postacute discharge to thirty days follow-up

The FIM® Instrument

- Thirteen motor items and five cognitive items
- Seven-level rating system
  - 1 = complete dependence
  - 7 = complete independence
- Training and mastery exam
- Used primarily in inpatient rehabilitation to assess function and demonstrate the outcomes of intensive therapy
- Embedded in the Inpatient Rehabilitation Patient Assessment Instrument (IRF-PAI)
AcuteFIM® Instrument

- Four motor items and two cognitive items
  - Eating, Grooming, Bowel Mgmt., Toilet Transfer
  - Expression, Memory
- Three-level rating system
  - A = independent
  - B = modified independence
  - C = dependent
- Takes five minutes to administer
  - Extensive training or a mastery exam not required
- Produces a projected FIM® rating
- Useful for discharge planning, patient and family communication of care needs upon discharge, and preadmission information for placement in IRF or SNF

SigmaFIM™ Instrument

- Thirteen motor items and five cognitive items
- Three-level rating system (A, B, C)
- Takes approximately ten minutes to administer
  - Extensive training or a mastery exam not required
- Intended for use in:
  - Outpatient facilities
  - Less-rehabilitation-intensive SNFs
  - LTAC facilities
  - Home health
- Provides a projected FIM® rating and can estimate patient function
Data Analysis

- **Study characteristics:** Demographic, medical, and rehabilitation variables across the postacute care trajectories
- Comparison of MS-DRG and AcuteFIM® instrument
- Incidence of readmissions (thirty days, ninety days, all readmissions) by postacute care trajectory
- Logistic regression modeling used to calculate odds ratio (OR) and 95% confidence interval (95% CI) for association between the total AcuteFIM® rating and discharge to community, and between trajectory and acute readmission

Results
Characteristics of Study Population

- Total sample $N = 234$
- Average age = 69.5
- Average acute LOS = 3.5
- 51.5% male ($n = 121$)
- 63.8% Medicare ($n = 150$)
- 97.4% white ($n = 229$)
- Discharge destination from acute:
  - 28.6% home with no services ($n = 67$)
  - 17.0% SNF ($n = 40$)
  - 49.4% IRF ($n = 112$)

<table>
<thead>
<tr>
<th></th>
<th>Home with no care</th>
<th>IRF</th>
<th>SNF</th>
<th>Home with HH</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Cases</td>
<td>67</td>
<td>112</td>
<td>40</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>AcuteFIM® Total (Mean, SD)</td>
<td>92.5 (21.9)</td>
<td>66.5 (19.3)</td>
<td>66.8 (22.9)</td>
<td>97.7 (14.7)</td>
<td>69.8 (23.8)</td>
</tr>
<tr>
<td>Age (Mean, SD)</td>
<td>62.5 (14.5)</td>
<td>70.5 (13.3)</td>
<td>76.6 (9.9)</td>
<td>72.1 (11.5)</td>
<td>76.7 (16.8)</td>
</tr>
<tr>
<td>Acute Care LOS (Mean, SD)</td>
<td>3.0 (3.3)</td>
<td>3.1 (4.6)</td>
<td>6.3 (6.3)</td>
<td>0.67 (1.1)</td>
<td>2.6 (3.4)</td>
</tr>
<tr>
<td>Gender (N, %)</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Male</td>
<td>37 (55.2)</td>
<td>64 (57.1)</td>
<td>15 (37.5)</td>
<td>3 (33.3)</td>
<td>2 (33.3)</td>
</tr>
<tr>
<td>Female</td>
<td>30 (44.8)</td>
<td>48 (42.9)</td>
<td>25 (62.5)</td>
<td>6 (66.7)</td>
<td>4 (66.7)</td>
</tr>
<tr>
<td>Race (N, %)</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>White</td>
<td>66 (98.5)</td>
<td>109 (97.3)</td>
<td>40 (100)</td>
<td>8 (88.9)</td>
<td>6 (100)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (1.5)</td>
<td>3 (2.7)</td>
<td>-</td>
<td>1 (11.1)</td>
<td>-</td>
</tr>
<tr>
<td>Married (N, %) missing n = 91</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Married</td>
<td>25 (62.5)</td>
<td>39 (57.4)</td>
<td>11 (39.3)</td>
<td>1 (33.3)</td>
<td>3 (75.0)</td>
</tr>
<tr>
<td>Widowed/separated/ divorced</td>
<td>11 (27.5)</td>
<td>18 (26.5)</td>
<td>15 (53.6)</td>
<td>2 (66.7)</td>
<td>1 (25.0)</td>
</tr>
<tr>
<td>Never married</td>
<td>4 (10.0)</td>
<td>10 (14.7)</td>
<td>2 (7.1)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Primary Payer (N, %)</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>Medicare</td>
<td>29 (43.3)</td>
<td>76 (67.9)</td>
<td>36 (90.0)</td>
<td>5 (55.6)</td>
<td>4 (66.7)</td>
</tr>
<tr>
<td>Commercial</td>
<td>21 (31.3)</td>
<td>20 (17.9)</td>
<td>2 (5.0)</td>
<td>2 (22.2)</td>
<td>2 (33.3)</td>
</tr>
<tr>
<td>Other</td>
<td>17 (25.4)</td>
<td>16 (14.3)</td>
<td>2 (5.0)</td>
<td>2 (22.2)</td>
<td>-</td>
</tr>
</tbody>
</table>
## Results: AcuteFIM® Correlations

<table>
<thead>
<tr>
<th>Category</th>
<th>n</th>
<th>Correlation with AcuteFIM® Instrument</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute length of stay</td>
<td>234</td>
<td>-0.259</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Admission FIM® total</td>
<td>110</td>
<td>0.643</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Discharge FIM® total</td>
<td>104</td>
<td>0.494</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Admission SigmaFIM™ total</td>
<td>74</td>
<td>0.566</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Follow-up FIM® total</td>
<td>70</td>
<td>0.355</td>
<td>0.003</td>
</tr>
</tbody>
</table>

### Association of AcuteFIM® Instrument and Discharge to the Community*

**Odds Ratio (OR) interpretation:**
- OR = 1: null; no difference
- OR >1: increased odds/likelihood

**C-Statistic Interpretation**
- 0.5: no better than predicting an outcome than random chance.
- > 0.7 indicates a good model.
- > 0.8 indicates a strong model.

![Graph showing odds ratio and C-statistic](image)

C-Statistic: 0.882

*Model is also adjusted for age
MS-DRG Definitions

- **MS-DRG 64**: INTRACRANIAL HEMORRHAGE OR CEREBRAL INFARCTION W MCC
  - N = 33 (14.5%)
  - Average AcuteFIM® total = 64.0
- **MS-DRG 65**: INTRACRANIAL HEMORRHAGE OR CEREBRAL INFARCTION W CC OR TPA IN 24 HRS
  - N = 105 (46.1%)
  - Average AcuteFIM® total = 73.0
- **MS-DRG 66**: INTRACRANIAL HEMORRHAGE OR CEREBRAL INFARCTION W/O CC/MCC
  - N = 51 (22.4%)
  - Average AcuteFIM® total = 88.2
- **Other MS-DRG** Group:
  - N = 39 (17.1%)
  - Average AcuteFIM® total = 69.6

Association of MS-DRG and Discharge to the Community*

*Model is also adjusted for age

Other MS-DRG was the only significant MS-DRG category:
95% CI 1.71 – 13.18

C-Statistic = 0.728
### Readmissions to Acute Care

<table>
<thead>
<tr>
<th>Readmission to Acute/ED within 30 Days</th>
<th>Readmission $n$</th>
<th>Total $n$</th>
<th>Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>After community discharge</td>
<td>4</td>
<td>67</td>
<td>6.0%</td>
</tr>
<tr>
<td>After IRF discharge</td>
<td>17</td>
<td>112</td>
<td>15.2%</td>
</tr>
<tr>
<td>After SNF discharge</td>
<td>9</td>
<td>40</td>
<td>22.5%</td>
</tr>
<tr>
<td>Other discharge</td>
<td>3</td>
<td>15</td>
<td>20.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Readmission to Acute/ED within 90 Days</th>
<th>Readmission $n$</th>
<th>Total $n$</th>
<th>Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>After community discharge</td>
<td>5</td>
<td>67</td>
<td>7.5%</td>
</tr>
<tr>
<td>After IRF discharge</td>
<td>12</td>
<td>112</td>
<td>10.7%</td>
</tr>
<tr>
<td>After SNF discharge</td>
<td>5</td>
<td>40</td>
<td>12.5%</td>
</tr>
<tr>
<td>Other discharge</td>
<td>2</td>
<td>15</td>
<td>13.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>All Readmissions to Acute/ED (30 and 90 days)</th>
<th>Readmission $n$</th>
<th>Total $n$</th>
<th>Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>After community discharge</td>
<td>8</td>
<td>67</td>
<td>11.9%</td>
</tr>
<tr>
<td>After IRF discharge</td>
<td>24</td>
<td>112</td>
<td>21.4%</td>
</tr>
<tr>
<td>After SNF discharge</td>
<td>11</td>
<td>40</td>
<td>27.5%</td>
</tr>
<tr>
<td>Other discharge</td>
<td>5</td>
<td>15</td>
<td>33.3%</td>
</tr>
</tbody>
</table>

---

**Association of PAC Trajectory and 30-Day Readmissions**

*Discharge to SNF (95% CI 1.5 - 25.4) and Discharge to Other (95% CI: 1.0 - 36.6) were significant.*

**C-Statistic** 0.750

*Model is also adjusted for payer source and dyslipidemia.*

- Community: 1.00
- IRF: 3.22
- SNF*: 6.2
- Other*: 6.15
Results Summary

- The AcuteFIM® instrument was significantly correlated with acute LOS and the postacute functional instruments (FIM® instrument and SigmaFIM™ instrument)
- The AcuteFIM® score was a better predictor of discharge from acute to community than MS-DRG
- There was a significantly increased likelihood of acute readmission for patients discharged to a SNF, home health, or other postacute care setting as opposed to those discharged to an IRF or directly to home

Overall Conclusions

- The AcuteFIM® instrument was predictive of discharge trajectory from the acute hospital
- Derivatives based on the FIM® instrument can be captured throughout all PAC trajectories
- Derivatives based on the FIM® instrument may be the appropriate tool to collect the standardized functional data, as required by the IMPACT Act
- Future research will expand the impairment groups included and incorporate additional facilities in other geographic areas