Speakers: Jaclyn Warshauer PT – Milwaukee, WI – Aegis Therapies; Lynn Freeman, PT, PhD, DPT, GCS, CWS – Sammamish, WA – Aegis Therapies and PATH Clinical Research Institute; Mark Besch, PT – Plano, TX – Aegis Therapies

1. Session description
   a. The Institute of Medicine has documented variation in Post-Acute Care (PAC) services nationally, raising concerns about care quality, which has fueled sweeping healthcare reform dictating that special attention be paid to PAC outcomes. Specifically, enactment of the Improving Medicare Post-Acute Care Transformation Act, will expand value-based purchasing (VBP) to PAC and rectify the lack of standardized outcome measures across these settings, incentivizing providers to deliver patient-center, cost effective, high quality care. The advent of VPB will require PAC providers to build the infrastructure and capabilities necessary for analysis of clinical and administrative data to manage variations in cost and quality of care that will produce a return on investment, regardless of the specific PAC setting. Participants will be presented with data demonstrating the direct relationship between quality PAC rehab outcomes and reduction to healthcare burden, evidence-based models to design care pathways, translation and integration of research and best practices within post-acute care to achieve success in a VBP environment.

2. Objectives
   a. Describe the current body of scientific and empirical evidence, related to PAC rehab outcome measures, including cross-walks to support patient-centered continuum of care transitions.
   b. Translate research into PAC practice related to cost and quality of rehab outcomes, including recent findings from a large practice-based research network.
   c. Apply evidence-based strategies to build an analytics infrastructure and design care pathways to reduce variation in cost in a single setting or across PAC practice settings
   d. Summarize four or more enhanced clinical and financial PAC results related to (re)designing care and outcomes for the VBP environment.

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(Re)Design Care and Outcomes for Success in a Value-Based Purchasing Environment

I. Slide Presentation

II. Bibliography
Disclosure of Commercial Interests

- We DO have commercial interests in the following organization(s): (or I consult for the following organizations)
  - Name: Aegis Therapies
  - Type: Healthcare across post-acute healthcare continuum

- We DO NOT have commercial interests in the following organization(s): (or I consult for the following organizations)
  - Name: Casamba SMART, Microsoft, Tableau, InfoEd, Stata
  - Type: Software manufacturers

Session Learning Objectives

1. Describe the current body of scientific and empirical evidence, related to PAC rehab outcome measures, including cross-walks to support patient-centered continuum of care transitions.
2. Translate research into PAC practice related to cost and quality of rehab outcomes, including recent findings from a large practice-based research network.
3. Apply evidence-based strategies to build an analytics infrastructure and design care pathways to reduce variation in cost in a single setting or across PAC practice settings.
4. Summarize four or more enhanced clinical and financial PAC results related to (re)designing care and outcomes for the VBP environment.
Jaclyn Warshauer
Introduction and Background

VALUE

Value = health outcomes achieved per dollar spent


OUTCOME

OUTCOMES

- Degree of health or recovery
  - Functional level achieved
  - Pain level achieved
  - Extent of return to physical activities
  - Ability to return to work
- Time to recover and time to return to normal activities
  - Time to return to physical activities
  - Time to return to work
- Sustainability of health or recovery and nature of recurrences
  - Maintained functional level
  - Ability to live independently

COST
PATIENT-CENTERED VALUE

- Value for the patient is created by providers’ combined efforts over the full cycle of care. The benefits of any one intervention for ultimate outcomes will depend on the effectiveness of other interventions throughout the care cycle.

Porter. NEJM 2010

DATA UTILIZATION TRENDS IN PAC REGULATION

INCREASED DATA TRANSPARENCY

- CMS is evolving its infrastructure and data systems to enhance transparency of quality and cost information and to allow for payment and management of accountable, value-based care
  - CMS Quality Strategy 2016
  - 5 Star
  - PUF Reports: Public Use Files - Utilization
For residents who are transferred to another SNF or who are discharged to a HHA, IRF, or LTCH, assist residents and their resident representatives in selecting a post-acute care provider by using data that includes, but is not limited to SNF, HHA, IRF, or LTCH standardized patient assessment data, data on quality measures, and data on resource use to the extent the data is available. The facility must ensure that the post-acute care standardized patient assessment data, data on quality measures, and data on resource use is relevant and applicable to the resident’s goals of care and treatment preferences.

We expect that facilities will not use the data to recommend facilities, but rather present the data to residents and their families in order to assist them in making an informed decision regarding the selection of a post-acute care provider.

We note that the data presented must be based on the individual goals and preferences of the resident. In addition, we expect that facilities will demonstrate compliance with this requirement by showing evidence that the relevant data was presented to a resident and their family for consideration.

**QUALITY MEASURES AND RESOURCE USE MEASURES**

- **Quality Measures**: defined in the IMPACT Act as measures relating to at least the following domains: Standardized patient assessments, including functional status, cognitive function, skin integrity, and medication reconciliation

- **Resource Use Measures**: defined as including total estimated Medicare spending per individual, discharge to community, and measures to reflect all-condition risk-adjusted preventable hospital readmission rates
FROM THE DISCHARGE PLANNING PROPOSED RULE
We advise providers to use other sources for information on PAC quality and resource use data, such as the data provided through the Nursing Home Compare and Home Health Compare Web sites, until the measures stipulated in the IMPACT Act are finalized. Once these measures are finalized, providers will be required to use the measures as directed by the appropriate regulations and issuances.

SNF QAPI
Each LTC facility, including a facility that is part of a multiunit chain, must develop, implement, and maintain an effective, comprehensive, data-driven QAPI program that focuses on indicators of the outcomes of care and quality of life.

Facility maintenance of effective systems to identify, collect, and use data and information from all departments, including but not limited to the facility assessment required at § 483.70(e) and including how such information will be used to develop and monitor performance indicators.

Improvement projects must include at least annually a project that focuses on high risk or problem-prone areas identified through the data collection and analysis.

SNF QAPI
We believe that our focus on outcomes is appropriate. We agree that QAPI should focus on improving processes and practices, and believe that data is a necessary element in doing so. Data is used to identify problems in processes and practices and to set goals related to improving those processes and practices. It is then used to validate that a change is successful in improving that process or practice and subsequently to monitor that the change is sustained. Using data involves critical reasoning and analytical thinking; these are not mutually exclusive.
We agree that information other than data may be useful in the QAPI process, but we also believe that data-facts, measurements, and statistics collected for analysis and planning are an integral part of the QAPI process.

In addition, while it is true that many facilities provide excellent care under the current requirements, data and incidents continue to show that there are LTC facilities that have room for improvement. These updated and revised requirements establish a framework for those facilities to raise their quality of care.

As proposed and now finalized in this rule, § 483.70(e) requires that facilities must, among other things, conduct and document a facility-wide assessment to determine what resources are necessary to care for its residents competently during both day-to-day operations and emergencies and this assessment must address or include the care required by the resident population considering the types of diseases, conditions, physical and cognitive disabilities, overall acuity; and other pertinent facts that are present within that population.

The HHA must develop, implement, evaluate, and maintain an effective, ongoing, HHA-wide, data-driven QAPI program. The HHA's governing body must ensure that the program reflects the complexity of its organization and services.

The HHA must measure, analyze, and track quality indicators, including adverse patient events, and other aspects of performance that enable the HHA to assess processes of care, HHA services, and operations.

The HHA must use the data collected to:
(i) Monitor the effectiveness and safety of services and quality of care; and
(ii) Identify opportunities for improvement.
CARE DELIVERY MODELS

EFFECTIVE AND EFFICIENT = POSITIVE OUTCOMES = VALUE

DECISION MAKING

Scientific Method
Logical Reasoning
Trial and Error
Authority

Portney and Watkins, 2009

ICF: CARE MANAGEMENT AND PLANNING

Health condition
Body Functions & Structure
Activity
Participation
Environmental Factors
Personal Factors
Contextual Factors
MEDICARE DELIVERY SYSTEM REFORM

- Shifts payment to systems that incorporate some link to the “value” of the care
  - Patient outcomes. Medicare spending
- Encourages better care coordination across settings while reducing provider inefficiencies and potentially lowering costs
VALUE BASED PURCHASING

• The cornerstones of VBP are the development of a broad array of consensus based clinical measures, effective resource utilization measurement, and the payment system redesign
• The overarching goal would be to foster joint clinical and financial accountability in the healthcare system.

CMS Fact Sheet:
Better Care.
Smarter Spending.
Healthier People:
Paying Providers for Value, Not Volume

Target percentage of Medicare FFS payments linked to quality and alternative payment models in 2016 and 2018

HHS reaches goal of tying 30 percent of Medicare payments to quality ahead of schedule

A major milestone in the effort to improve quality and pay providers for what works

Thanks to tools provided by the Affordable Care Act, an estimated 30 percent of Medicare payments are now tied to alternative payment models that reward the quality of care over quantity of services provided to beneficiaries. HHS announced today. Today’s announcement means that over 15 million Medicare patients are getting improved quality of care by having more time with their doctors and better, more coordinated care – nearly a year ahead of schedule.
IT'S NOT JUST MEDICARE

• Health Care Transformation Task Force Goal: 75% of their contracts into alternative payment models by 2020
  – Coalition of private insurers and provider organizations
  – Includes Aetna and Blue Cross

Effects of Bundled Payment: Example

• St. Luke’s University Health Network implemented Medicare bundled payments for 84 services
• Needed to “whittle” down the list of preferred post-acute providers to improve outcomes and save costs
• Collected performance data from nursing facilities to promote competition, informing them that they could be removed from the preferred list if they don’t perform well enough
• Narrowed from 16 to 9 post-acute providers
• Reduced length of stay and re-hospitalizations

Modern Health Care: Hospitals Must Create Stellar Post-Acute Care Networks to Meet New Medicare Payment Models

TRANSLATING RESEARCH INTO PRACTICE

The PAC-QAPI Files

CASE REVIEW
K.I.S.S.

• “Organizations must invest in the tools and skills needed to create a culture of evidence-based practices where questions are encouraged and systems are created to make it easy to do the right thing.”
  - Titler, 2010: Translation Science and Context
IMAGINE…

What other medical conditions does the patient have that might impact their therapy? (MHx)

(Some common conditions that should be further assessed will be prompted later on for the add'l assessments, e.g. COPD, dementia, hemiplegia) (Need to add conditions that will specifically impact the THA patient such as pacemaker; heart and lung problems; hand issues)

PROBLEM ORIENTED DOCUMENTATION (POD)

• Functionality within Casamba’s SMART documentation program
• The electronic version of the old paper condition-specific eval forms
• Training. Follow up audits. Statistical Analysis

DOCUMENTATION REDESIGN: EFFECTS OF PROBLEM-ORIENTED DOCUMENTATION TRAINING ON REHAB DOCUMENTATION QUALITY

• Rehab documentation quality significantly improved after POD implementation among the same therapists. Among the doc quality grades that changed within each POD condition, the majority improved (69.7%).
DOCUMENTATION FIELD CONSOLIDATION INITIATIVE
- Within Casamba’s SMART Documentation Program
- Training. Follow up audits. Statistical Analysis
- Results: Most fields maintained quality after the consolidation. One field did not, resulting in re-activating that field

Mark Besch
Re(De)sign PAC Delivery

Evidence Care and Quality
- Adherence to care processes and management such as clinical practice guidelines, prediction rules, and algorithmic pathways reduce cost and improve outcomes of rehab by decreasing care management variability among providers.

‘Adherent care had fewer PT visits and lower charges, and showed more improvement in disability and pain.’
Fritz (2007)
**Evidence**

**Pathway Development for PAC**

- Approach to **redesign care to create value** adapted from HEOR; comprises 6 core-competencies and 3 elements. Establish **patient-centered** goals and improvement targets

2. Payer/provider relationship mgmt.
3. Disease mgmt.
4. Outcomes mgmt.
5. Financial/cost mgmt.
6. Information mgmt.

**Value Equation**

\[ V = \frac{O}{C} \pm \text{Accessibility} + \text{Satisfaction} + \text{Marginal Profit} \]

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**Evidence**

**Person-centered….patient perspectives**

- Recent reform reduced cost (better value) of orthopedic care, but with unintended negative effects on patient experience such as post-acute support for mental outlook and care continuity

  - “There was no rehab in the hospital this time, you were just shuttled out the door after four days, and so obviously that was cost-saving” – Webster et al, 2014

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**Element 1: Strategy**

- Team(s) that **own** redesign goals
- Performance frameworks
- Performance report cards (REAL data)
- Measure …**despite** imperfect instruments
- Report…**despite** imperfect tools
- Target populations or DRGs
- Target population outcomes \(\geq 1\)
Element 2: Tactics

- Appraise current evidence
- Map care processes
  - D/C readiness tools
  - Companion checklists
- Validate evidence-based and consensus driven
- Implement and disseminate

Key “Pause Points”

- assessing barriers to cancer care and tailoring navigation to barrier type could enhance patients’ experiences with health care. Post (2015)

Element 3: Operations

- Make new “habit” part of organizational structure and focus
- Realign incentives: reward high-volume to high value
- Provide analysis-ready data access to manage performance

Challenges

Resource Management

Barriers
- Human
- Care Redesign Teams
- Capital
- EMR w/Decision Support
- EMR w/Analysis-Ready Data

Strategies
- Recruit or Collaborate
- Population Segments
- Procure or Collaborate
  - e.g. OTS or Home Grown
  - Work vendor for analysis-ready data
  - Rely on practice-vendor liaison
• Universities → PAC Provider
  – Access to CITI
  – Access to library database
  – Labor (Researchers and statisticians)

• Sponsors → PAC Provider
  – Biomedical equipment
  – Education & training
  – Consultative services

• PAC Provider → Universities/Sponsors
  – Labor (Researchers and clinicians)
  – Access to patient database
  – Peer-Reviewed Publications

**Strategy**

**Resource Management**

- **Shared Resources**
- **Human & Capital**

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**Challenges**

**COI Management**

**Barriers**

- Institutional & Financial
  - Direct Holdings
  - Personal Holdings
- Payer
  - Variable measures
  - Variable methods
  - Variable Reimbursement
  - Variable Profitability

**Strategies**

- Manage Compliance
  - All applicable federal statues
- Ensure Adherence
  - All applicable guidelines
  - Recommend standards

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**Challenges**

**Implementation & Dissemination**

**Barriers**

- Resource Constraints
- Setting Constraints
  - Outcome Measures
  - Reimbursement Models

**Strategies**

- Realign Resources
- Practice Facilitators
  - Support translation within and between practices
  - Practice facilitation improves quality 2.7% vs EBP guideline adoption and ~40% ROI estimate

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Diehr et al (1999), Methods for analyzing health care utilization and costs

Irwin (2015, Hogg (2005), Baskerville (2012, Systematic review and meta-analysis of practice facilitation within primary care settings)
**Strategy Implementation**

1. Senior management ▲ adoption success
2. Clinical leadership ▲ adoption speed
3. Valid data analytics ▲ adoption and dissemination
4. Required cultural changes ► adoption speed
5. Coordination ▼ diffusion speed
6. Dissemination infrastructure ▲ adoption speed and sustainability
7. Infrastructure and organization relationship ► adoption speed
8. Perceived reduction of external threats ► dissemination speed

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**Population Joint Replacement**

- CMS mandatory bundle payment pilot in 67 designated Metropolitan Statistical Areas (MSAs)
- Episode is initiated with admission to the acute hospital and ends 90 days after discharge for 2 DRGs (469 and 470)
- Episode encompasses surgical procedures, inpatient stay related care under parts A & B which includes ALL post-acute services regardless of setting or provider
Aims and Methods

- To evaluate the effect of Care Redesign, pathway development, on outcomes among Comprehensive Joint Replacement (CJR) sites compared to controls.
- Analysis of EMR data on 470 patients from CJR (342) compared to controls (128) between April and August 2016.
- To compare group differences, independent t-tests and MANOVA was used for LOS, gain while z-tests and logistic regression was used for hospitalizations and discharge disposition.

Methods

Donabedian Triad

Structure

Processes

Outcome

Demographics and Characteristics. Independent t-test and z-tests show statistically significant differences between groups for Rehab-LOS, Functional Admit & Mobility Admit.
Distribution of rehab length of stay in PAC sites within the designated MSA. Mean # of days with 95% confidence intervals by Facility Type (CJR vs. Non-CJR). *Significant difference (p < .05).

Distribution of functional admission scores in PAC sites within the designated MSA. Mean gain with 95% confidence intervals by Facility Type (CJR vs. Non-CJR). *Significant difference (p < .05).

Distribution of mobility admission scores in PAC sites within the designated MSA. Mean gain with 95% confidence intervals by Facility Type (CJR vs. Non-CJR). *Significant difference (p < .05).
### Conclusions

- Compared to controls, patients receiving PAC in CJR sites have significantly lower functional status on admit but achieve greater gains in significantly less time.
- Interestingly, rehospitalizations were significantly higher among CJR sites. In contrast, type of joint replacement did not significantly influence rehospitalization status.

### Valuation – Care Redesign

| Outcomes from Value Report Card for Joint Replacement on Patients (N=342) at Three Aegis sites, 2014 to 2015* |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                | SNF 1 | SNF 2 | SNF 3 | Total, Avg. [SD] |
| Rehab LOS      | 19    | 23    | 18    | 21 (0-92) [15]   |
| Functional Gain| 1.29  | 1.43  | 1.29  | 1.36 (0-3) [0.69]|
| Community DC   | 81.0% | 78.3% | 79.7% | 79.2% (n=271)    |
| Rehospitalization | 15.5% | 12.7% | 14.4% | 13.7% (n=47)     |

Comparative change in **value**? Reduced costs (utilization, dollars)? Increased **outcomes** (quality, efficacy, safety)?
**Valuation Joint Replacement**

**Value = Improvement / Cost**

**Volume-Based (-2015)**

\[
10.2 = \frac{1.36}{21} + 79.2% \]

**Vs.**

**Value-Based (2016-)**

\[
14.0 = \frac{1.24}{15} + 85.7% \]

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**Lynn Freeman**

Re(De)sign PAC Outcomes

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**The Perils of Overlooking Gradual Change**

**Today...**

Defer → Delivery → *Follow Innovation*

**Tomorrow...**

Discover → Value → *Lead Innovation*
Evidence
Outcomes and Quality

• PAC reform requires data collection using standard assessments
• Medical acuity affects quality measures:
  – Access, Outcome, Pt. Experience, Process, Structure, Cost, Management, Use of Service, User-Enrollment, Efficiency
• Analytics required, yet lacking, for organizations to assess value using data

https://www.qualitymeasures.ahrq.gov/

Evidence
HEOR in Health Policy Decision-Making

• Health economics research assesses “value” of system changes and interventions by comparing outcomes with costs
• “Big Data” and advanced analytics, expanded from –cost-effectiveness to model-based analyses.

Evidence
Outcomes and Analytics for PAC

• Approach to redesign outcomes to create value adapted from HEOR; comprises methodological research (development and testing of measurement instruments) and 3 applications.

1. Methodological Research
   1. Reliability
   2. Validity
   • Considerations
     – NQMC Domain Framework
     – Data Sources
     – Individual and Population Factors e.g. Risk-Adjusted for MCCs

1. Biosensors
2. Data mgmt.
3. Analytics

Value Equation

V = (O/C)…

+ Accessibility
+ Satisfaction
+ Marginal Profit
Evidence
Person-centered….Data Source

- Analysis by high-risk subgroup
- Analysis by subgroup
- Case-mix adjustment
- Paired data at patient level
- Risk adjustment by measure/condition
- Risk adjustment method

Evidence
Person-centered….Patient Perspectives

- Functional change & patient experience effect quality; Greatest opportunity in management and relational continuity
  - Consistency and flexibility of care + established relationships (14-25% satisfaction)
  - Flexibility of care (18.5% Change)
- There is a lack of access to non-medical post-acute rehab for chronic conditions; Tele-rehab is comparatively effective

Evidence
Person-centered….Patient Perspectives

- Terminology: Where’s the Change?
  - Change Scores

*Often used interchangeably with Minimal Clinically Detectable Difference (MCDD)*

Within-Person Continuum of Change, Portney and Watkins (’09)

- MDC
- MCID

*How many kg of symptomatic change is minimal clinically meaningful for elderly with MS? 55 kg, 10 kg, 15 kg? Affected domain?? Abstract non-abstract??*
Key Terms

Research vs. Quality Improvement

- **Quality of care research:** Systematic examination of how people get access to health care, how much care costs, and what happens to patients as a result of this care, which is intended to identify the most effective ways to organize, manage, finance, and deliver high quality care; reduce medical errors; and improve patient safety.

- **Collaborative inter-organizational quality improvement:** Initiatives in which multiple separate health care entities participate and work together to analyze performance and make systematic efforts to improve it.

Mold et al (2005), Primary care practice-based research networks: working at the interface between research and quality improvement.

https://www.qualitymeasures.ahrq.gov/

COMPARE Research QI CONTRAST

**Generate New Knowledge**

Efficacy vs Effective

Grounded in Scientific Method

Cause vs Relation

Rely on Data to Drive Practice

Validate Fact vs Change

Plan

Study

Act

Question

Hypothesis

Experiment

Analysis

Conclusion

Together Translation Practice

http://www.ihi.org/

“to enhance integration of research and practice, we need to change how we perform research program development, evaluation, and reporting. It will be much easier for local practitioners and policymakers to judge program relevance if researchers (a) pay greater attention to context and external validity and (b) partner with relevant decision makers and target audiences at the outset. This is only one of many strategies needed to increase translation of evidence-based interventions, but it is a critical component and excellent starting point.”

Glasgow and Emmons

(Annual Review of Public Health 2007)

OUTCOMES REDESIGN AND QUALITY

EBP Strategies
Building PAC Analytics Infrastructure

Challenges
Process Management

Barriers
1. Competing Requests
2. Competing Demands
3. Human Research Protection Program
4. Quality Assurance Process Improvement

Strategies
1. Align Intake-Output
2. Prioritize Agenda
3. Ensure Institutional Review Compliance
4. Ensure Practice/Policy Translation

Likumahuwa et al (2013), Building research infrastructure in community health centers
Chouvarda et al (2016), Connected health and integrated care: Toward new models for chronic disease
Maglaveras (2016), Integrated Care and Connected Health Approaches: Leveraging Personalized Health through Big Data
1. Evidence development & testing; interpretation and packaging
2. Political, professional, economic, social, organizational, attitudes of stakeholders
3. Behavior change strategies; management practices, engagement

Challenges: Data Management

Bars: Human, Capital

Strategies: Recruit or Collaborate, Procure or Collaborate

- Science Support
- BI Software
- eRA + DC Software
- Statistical Software
- e.g. Tableau v. Excel
- e.g. InfoEd v. REDCap
- e.g. Stata v. R-Statistics

Strategy - Data Management (Capital)

Descriptive: Excel, SPSS

Inferential: Stata, SAS, R

Collaboration: COS, ResearchGate

Caution: Some summary descriptive can error.
Strategy - Data Management (Human)

Purchase

Lack of Time
- Prioritization
- Organization
Lack of Motivation
- Lack of Confidence

Prioritize-Organize
- Writing Goals
- EndNote, Paper Pile
Accountability Partner
- Skill Development

Challenges

External Implementation & Dissemination

Barriers

External (Industry P&P) vs 'Institutional'

Strategies

TRANSLATING RESEARCH INTO PRACTICE

CASE REVIEW
Policy demands standardized instruments to measure relative value of rehabilitation across PAC.

Rehabilitation Outcome Measure (ROM) lacks sufficient clinometric testing.

The Minimal Data Set (MDS) 3.0 have undergone several comparative validity and reliable studies.

### Domain
#### Functional Status
- Policy demands standardized instruments to measure relative value of rehabilitation across PAC
- Rehabilitation Outcome Measure (ROM) lacks sufficient clinometric testing.
- The Minimal Data Set (MDS) 3.0 have undergone several comparative validity and reliable studies.

### Standard Measures in:
- Medical acuity
- Functional status
- Cognitive impairment
- Social support

### Related to:
- Resource need
- Outcomes
- Continuity of care

### For use in:
- all PAC settings

### Timeline of Major Deliverables in the IMPACT Act of 2014

#### Aim and Methods
- To evaluate clinometric properties of the ROM and its relationship to function among skilled nursing facility inpatients with multiple chronic conditions.
- Study included 13,161 patient EMRs that reflected 9,650 (OT), 11,274 (PT), and 3,187 (ST) treatment episodes.
- For construct, we hypothesized that ROM scores would vary with age and discharge disposition. For responsiveness, we examined changes between admit and discharge scores using t-tests and ANCOVA.
**Methods**

**Donabedian Triad**

- Structure
- Process
- Outcome

[Image](https://www.qualitymeasures.ahrq.gov/)

**Methods**

**Understanding and interpreting change**

- Measuring Change
  - Factors Affecting Validity of Change
    - Level of Measurement
    - Reliability
    - Stability
    - Baseline Scores
    - Responsiveness
    - Criterion-Referencing
    - Norm-Referencing

**Rehabilitation Outcome Measure (ROM)**

- Scoring (Ordinal Scale)
- ICF Activity and Participation = 7 Levels
- Discipline-specific variant of discipline-free FIM
- IR reliability pilot study; moderate-to-good ($r = 0.5-0.7$)

<table>
<thead>
<tr>
<th>OT/PT</th>
<th>SLP</th>
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</thead>
<tbody>
<tr>
<td>0.0 – Dependent</td>
<td>0.0 – Profound</td>
</tr>
<tr>
<td>0.5 – Maximum</td>
<td>0.5 – Severe</td>
</tr>
<tr>
<td>1.0 – Moderate</td>
<td>1.0 – Moderate/Severe</td>
</tr>
<tr>
<td>1.5 – Minimum</td>
<td>1.5 – Moderate</td>
</tr>
<tr>
<td>2.0 – Standby Assist</td>
<td>2.0 – Mild/Moderate</td>
</tr>
<tr>
<td>2.5 – Modified Independent</td>
<td>2.5 – Mild</td>
</tr>
<tr>
<td>3.0 – Independent</td>
<td>3.0 – Independent</td>
</tr>
</tbody>
</table>
Methods
Minimal Data Set 3.0

- **SNF Comprehensive Item Set**
  - Scoring (Ordinal Scale)
    - Hearing, Speech, Vision (B) – Hearing
    - Cognitive Patterns (C)
    - Functional Status (G) – ADLs
    - Functional Status (G) – Bathing
  - Levels = 2/5
    - 0 (Independent/No Problem) ► 5 (Dependent/Problem)

---

Most frequent primary medical diagnosis. Excludes episodes with missing values \( n = 1064 \) (4.4%). Partitioned row represents least frequent.

<table>
<thead>
<tr>
<th>Primary Medical Diagnosis (ICD-9 code)</th>
<th>Frequency (%)</th>
<th>Cum %</th>
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</thead>
<tbody>
<tr>
<td>Muscle weakness, generalized (728.87)</td>
<td>1197 (5.0)</td>
<td>[5.2]</td>
</tr>
<tr>
<td>Other musculoskeletal disease (840.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fracture, neck of femur (820.8)</td>
<td>969 (4.3)</td>
<td>[9.6]</td>
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<tr>
<td>Urinary tract infection, site not specified (599.0)</td>
<td>764 (3.1)</td>
<td>[13.8]</td>
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<td>Nephritis, unspecified (585.0)</td>
<td>700 (2.9)</td>
<td>[17.1]</td>
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<tr>
<td>Conspicuous skin lesions, unspecified (709.8)</td>
<td>575 (2.4)</td>
<td>[20.4]</td>
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<tr>
<td>Primary generalized OA (715.0)</td>
<td>549 (2.3)</td>
<td>[22.7]</td>
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<tr>
<td>Primary generalized OA (715.0)</td>
<td>549 (2.3)</td>
<td>[22.7]</td>
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<td>Altered mental status, unspecified (780.97)</td>
<td>432 (1.8)</td>
<td>[27.4]</td>
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<td>Tracheostomy, unspecified (516.81)</td>
<td>406 (1.7)</td>
<td>[29.1]</td>
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<td>Impaired range of motion (517.9)</td>
<td>378 (1.6)</td>
<td>[30.8]</td>
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<td>Complications of surgical and medical care (999.3)</td>
<td>1 (0.0)</td>
<td>[100.0]</td>
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</table>

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Most frequent primary medical diagnosis. Excludes episodes with missing values \( n = 1075 \) (4.5%). Partitioned row represents least frequent.

<table>
<thead>
<tr>
<th>ROM Description</th>
<th>Count</th>
<th>Frequency %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Count Words</td>
<td>7831</td>
<td>35.3%</td>
</tr>
<tr>
<td>Dressing</td>
<td>3767</td>
<td>16.6%</td>
</tr>
<tr>
<td>Bed Mobility</td>
<td>3156</td>
<td>13.8%</td>
</tr>
<tr>
<td>NG tube insertion</td>
<td>2714</td>
<td>11.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measures</th>
<th>Count</th>
<th>Frequency %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-Aspiration</td>
<td>1524</td>
<td>6.5%</td>
</tr>
<tr>
<td>Bathing / Showering</td>
<td>983</td>
<td>4.2%</td>
</tr>
<tr>
<td>Toilet Hygiene</td>
<td>948</td>
<td>3.9%</td>
</tr>
<tr>
<td>Swallowing</td>
<td>854</td>
<td>3.6%</td>
</tr>
<tr>
<td>Home Management</td>
<td>603</td>
<td>2.5%</td>
</tr>
<tr>
<td>Meal Preparation / Cleanup</td>
<td>470</td>
<td>1.9%</td>
</tr>
<tr>
<td>Standing Balance</td>
<td>376</td>
<td>1.6%</td>
</tr>
<tr>
<td>Grooming / Hygiene</td>
<td>355</td>
<td>1.5%</td>
</tr>
<tr>
<td>Feeding</td>
<td>301</td>
<td>1.3%</td>
</tr>
<tr>
<td>Speech Comm.</td>
<td>283</td>
<td>1.2%</td>
</tr>
<tr>
<td>Expression Language</td>
<td>245</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

ROM deficit areas. Excludes episodes with missing values \( n = 1075 \) (4.5%).
1. ROM temporal responsiveness of Admit, D/C scores, and degree of improvement (Gain scores) across all deficit areas. *Significant difference (p < 0.05).

2. Paired t-test (all p-values < .001).

3. Adjusted Avg. ROM DC ≤ 45: 1.71
   Adjusted Avg. ROM DC ≥ 75: 1.63
   Adjusted Avg. ROM DC Community: 2.13
   Adjusted Avg. ROM DC Other: 1.20
   Age effect: 0.002 (0.2%)
   DC disposition effect: 0.209 (20.9%)

   Adjusted Avg. ROM Admit ≤ 45: 0.81
   Adjusted Avg. ROM Admit ≥ 75: 0.80
   Adjusted Avg. ROM D/C Community: 0.88
   Adjusted Avg. ROM D/C Other: 0.73
   Age effect: <.001 (0%)
   DC disposition effect: 0.007 (0.7%)

4. ROM is related to functional gain captured in the MDS and discharge destination.
   ROM demonstrates responsiveness, but its capacity to measure change over time requires further study.
   MDS D/C disposition significantly related to the variance in ROM d/c scores, thus construct validation of nursing care burden.

Conclusions

• ROM is related to functional gain captured in the MDS and discharge destination.
• ROM demonstrates responsiveness, but its capacity to measure change over time requires further study.
• MDS D/C disposition significantly related to the variance in ROM d/c scores, thus construct validation of nursing care burden.
### Limitations and Future

- Variability between ROM index and corresponding MDS assessment dates limits concurrent validation, limit to ± 2 wks.
- Lack of diagnostic specificity for construct validation, ICD-10 rectifies this limitation for further analyses.
- **Future**
  - Further meaningful change (MDC, MDIC)
  - Evaluate relationship to hospital readmissions and community D/C for transition planning
  - Develop cross-walks to predict scores between other standardized rehab (CARE, NOMS, OPTIMAL) and practice (MDS, OASIS)

### Quality and Efficacy

\[
\text{Value} = \frac{\text{Outcome}}{\text{Cost}}
\]

- Quality
- Efficacy
- Safety
- Resource tallies
- Dollars

### Valuation Analytics for PAC

- TALK IS CHEAP, BUT ACTIONS ARE PRICELESS
Questions?

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Thank you!
Bibliography


