



# Managing Cost and Outcome of Post Hospital Care

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The National Predictive Modeling Summit  
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# The dilemma for post hospital care?

- MCO's spent \$7.9B on SNF and Home Health in 2005 (MedPac 2007)
- 1/3 of hospitalized seniors will receive post acute care
- 1/3 of those will not go to the most appropriate setting
- Misalignment of incentives: per diem
- High degree of practice variation
- Over-utilization unnecessarily exposes members to institutional risks



# Managing Cost and Outcome of Post Hospital Care

- **Diagnosis vs Function**
- The Predictive Model
  - Regression
  - Severity adjustment
- Application
  - Real-time decision support
  - Retrospective comparison
- Influence on cost and outcome

# Key Predictor

People go to the Hospital because they are Sick:

***Disease Driven***

Acute

***Treat the  
Illness***

People get postacute care because they are frail  
and Care Dependent:

***Function Driven***

Postacute

***Restore the  
Ability***

# Functional Measurement

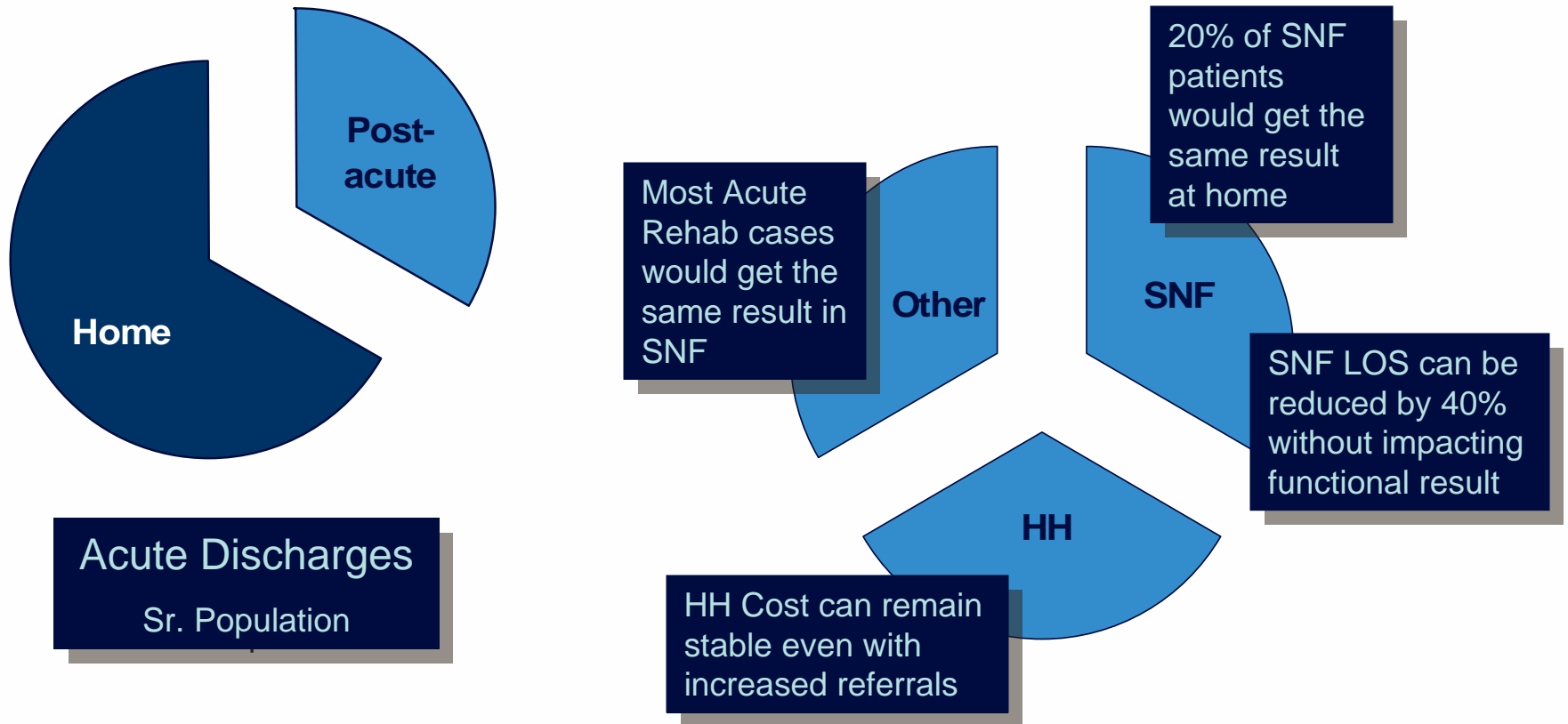
## Functional Independence Measure - FIM (18-126)

- **Eating**
- ***Grooming***
- **Bathing**
- ***Dressing Upper Body***
- ***Dressing Lower Body***
- ***Toileting***
- ***Bladder Management***
- ***Bowel Management***
- ***Bed, Chair, WC Transfer***
- **Toilet Transfer**
- ***Tub/Shower Transfer***
- ***Walk/WC***
- **Stairs**
- **Expression**
- ***Comprehension***
- **Social Interaction**
- ***Problem Solving***
- ***Memory***

# Function → Burden of Care

- Functional needs
  - Drives >90% of skilled utilization
  - Admit function- predict outcome
  - Discharge setting : 5 points FIM equate to one hour caregiver burden/day

# Calibrate the Continuum





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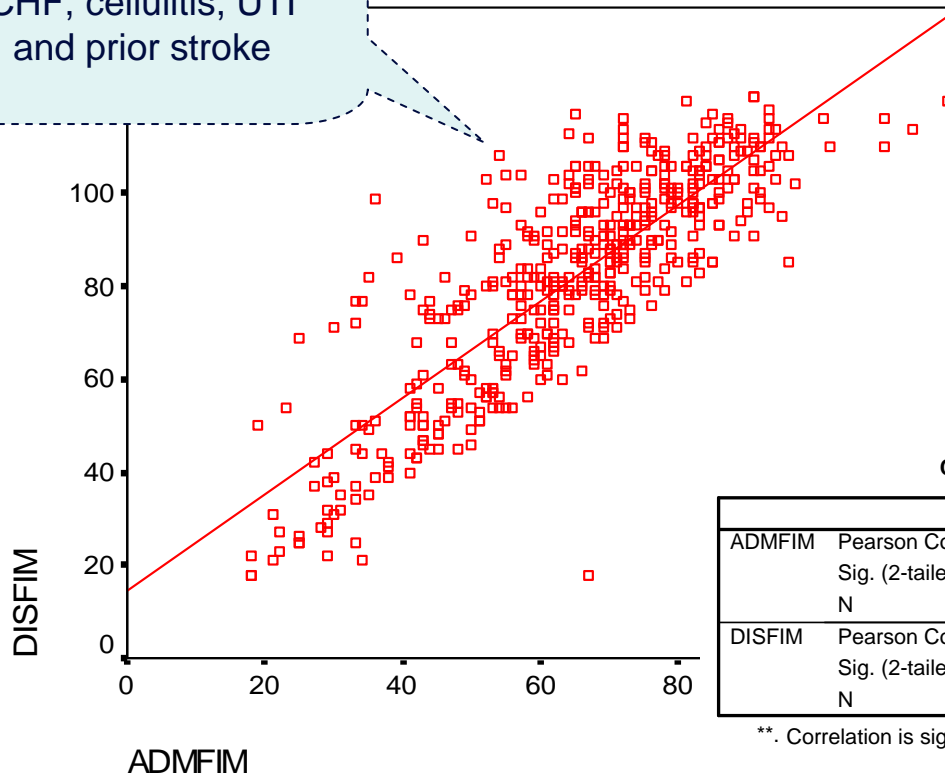


- Leader in post-acute outcome measurement since 1995
- Manage over 900,000 Senior lives in SNF, Acute Discharge, Acute Rehab, Home Health
- Database of 250,000+ post-acute cases
  - Over 30,000 new records added each year
- California, Colorado, Washington, Maryland, District of Columbia, Virginia, Arizona, Pennsylvania and Tennessee
- Kaiser Permanente, PacifiCare, Health Net, Group Health Coop, and AmeriGroup
- MHS Participant



# Improvement in Function in SNF: Predictable

80 yr old female with  
CHF, cellulitis, UTI  
and prior stroke



Correlations

|        |                     | ADMFIM | DISFIM |
|--------|---------------------|--------|--------|
| ADMFIM | Pearson Correlation | 1.000  | .818** |
|        | Sig. (2-tailed)     | .      | .000   |
|        | N                   | 500    | 500    |
| DISFIM | Pearson Correlation | .818** | 1.000  |
|        | Sig. (2-tailed)     | .000   | .      |
|        | N                   | 500    | 500    |

\*\* . Correlation is significant at the 0.01 level

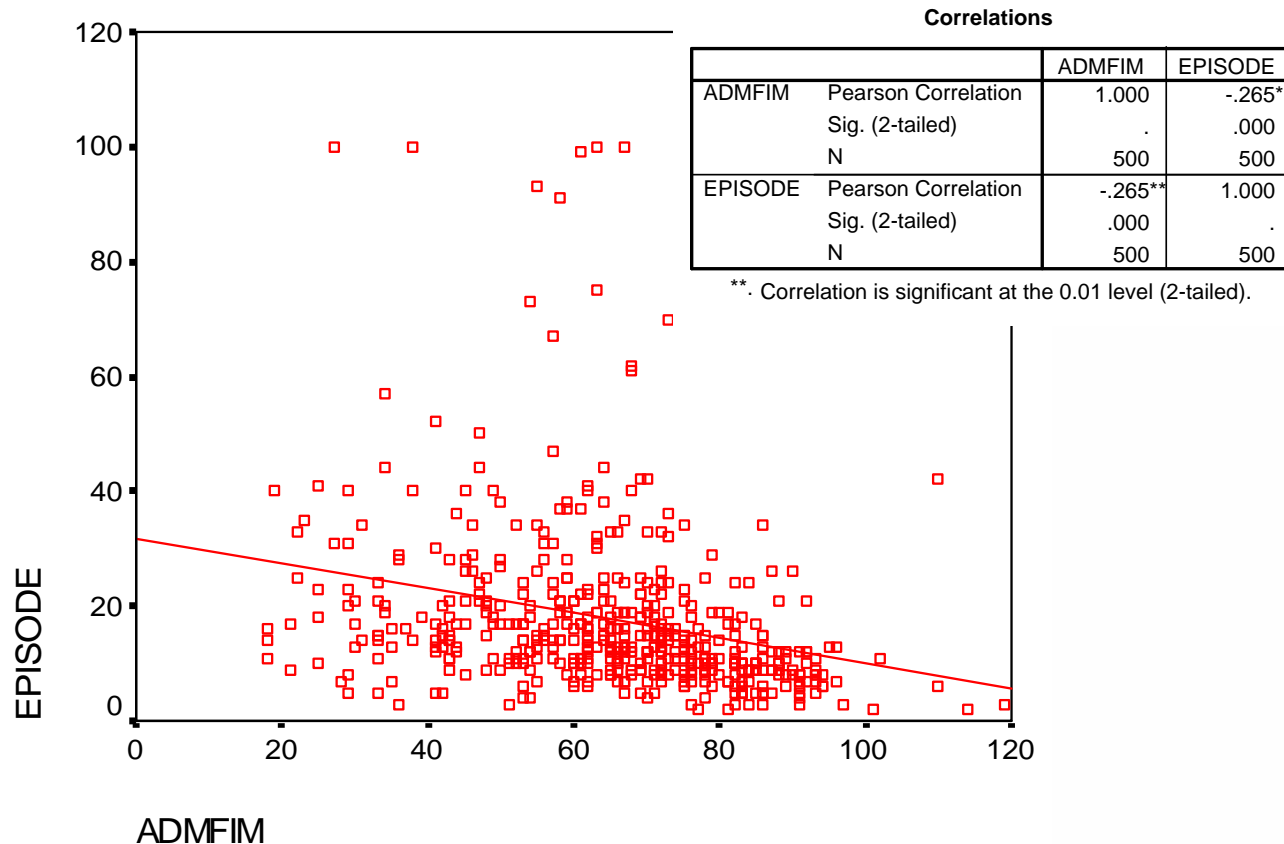
# Discharge Site and Functional Level

## (FIM 18-126)

| Discharge Site Considerations                              | FIM Score     |
|--|---------------|
| Home Alone<br>OP Therapy/Home Safety                       | >108          |
| Home with Assist<br>OP (Outpatient) Therapy                | >90           |
| <b>Home w/Assist or ALF</b><br><b>Home Health Services</b> | <b>&gt;80</b> |
| Home, SNF, Custodial, B&C w/<br><b>24-hour Assistance</b>  | <79           |

*Diagnosis, medical complexity or other social, caregiver or medical issues may influence the functional level at which the patient is discharged.*

# Length of SNF Stay: Less Predictable





# Medical Complexity Scale

- Level 0: No systemic disease other than primary diagnosis
- Level 1: Pre-morbid, inactive and/or irrelevant
- Level 2: Active, relevant. Not limiting function
- Level 3: Active, relevant. Limiting function
- Level 4: Active, relevant. Severely limiting function
- Level 5: Moribund/Terminal



# Relevant Conditions

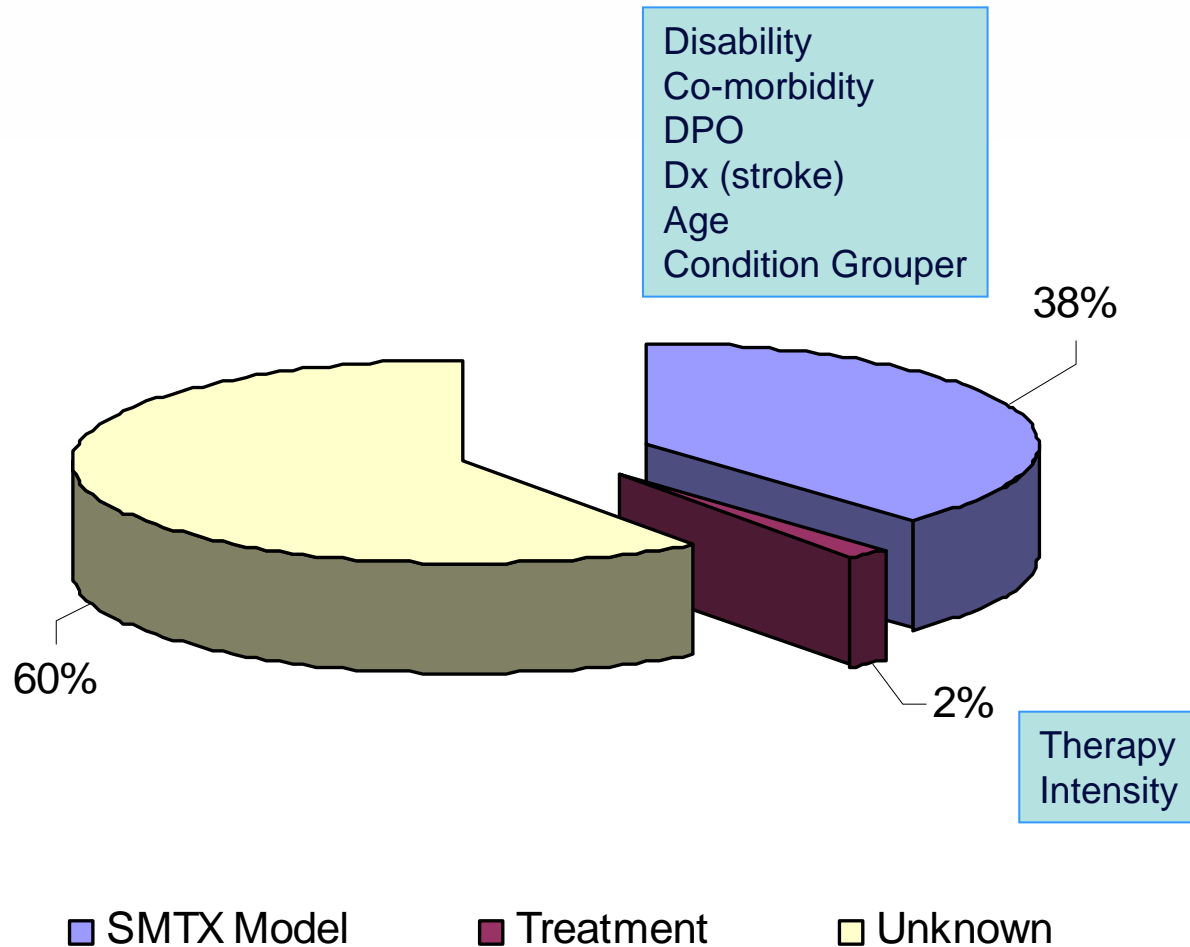
- Restricted Weight Bearing
- Pressure Wound: II, III or IV
- Vascular (non-pressure) wound
- IV
- Vent
  - Hospital: not currently dependent
  - Currently Dependent
- Severe Obesity
- Hemodialysis

# Regression: Length of Skilled Stay

82 y/o female  
UTI  
Acute: 6 days

| Independent Variable    | Coefficient |   | Patient's Actual Value  | Result               |
|-------------------------|-------------|---|-------------------------|----------------------|
| Random Error (constant) |             |   |                         | = 24.45<br>+         |
| Admission FIM           | -.234       | X | 65                      | = -15.21<br>+ (9.24) |
| Age                     | .034        | X | 82                      | = 2.78<br>+ (12.02)  |
| Days Post Onset         | .565        | X | 4                       | = 2.26<br>+ (14.28)  |
| Condition (IV/Obese)    |             |   |                         | = 13.1<br>↓          |
|                         |             |   | Predicted Episode LOS = | <b>27.38</b>         |

# How powerful is the model?





# SMTX National Comparison

# Actual Values

(60% most efficient facilities)

**Pt. #30:** CVA, 75 yrs, DPO 12, Adm FIM 30, and Med Complex 4

**Pt. # 1:** UTI, 82 yrs, DPO 31, Adm FIM 57, and Med Complex 3

Pts #2-30

**Q  
u  
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r  
y**

LOS: 15 days DC FIM: 50

LOS: 21 days DC FIM: 50

LOS: 11 days DC FIM: 81

LOS: 14 days DC FIM: 81

Best Practice Calculation  
LOS: 13 days DC FIM: 62.5

Actual Calculation  
LOS: 18 days DC FIM: 62

**VARIANCE**  
LOS: 28%  
DC FIM: 1%

**REGRESSION**

EACH patient is case adjusted:  
Impairment Group  
Age  
DPO  
Adm FIM  
Med Complex





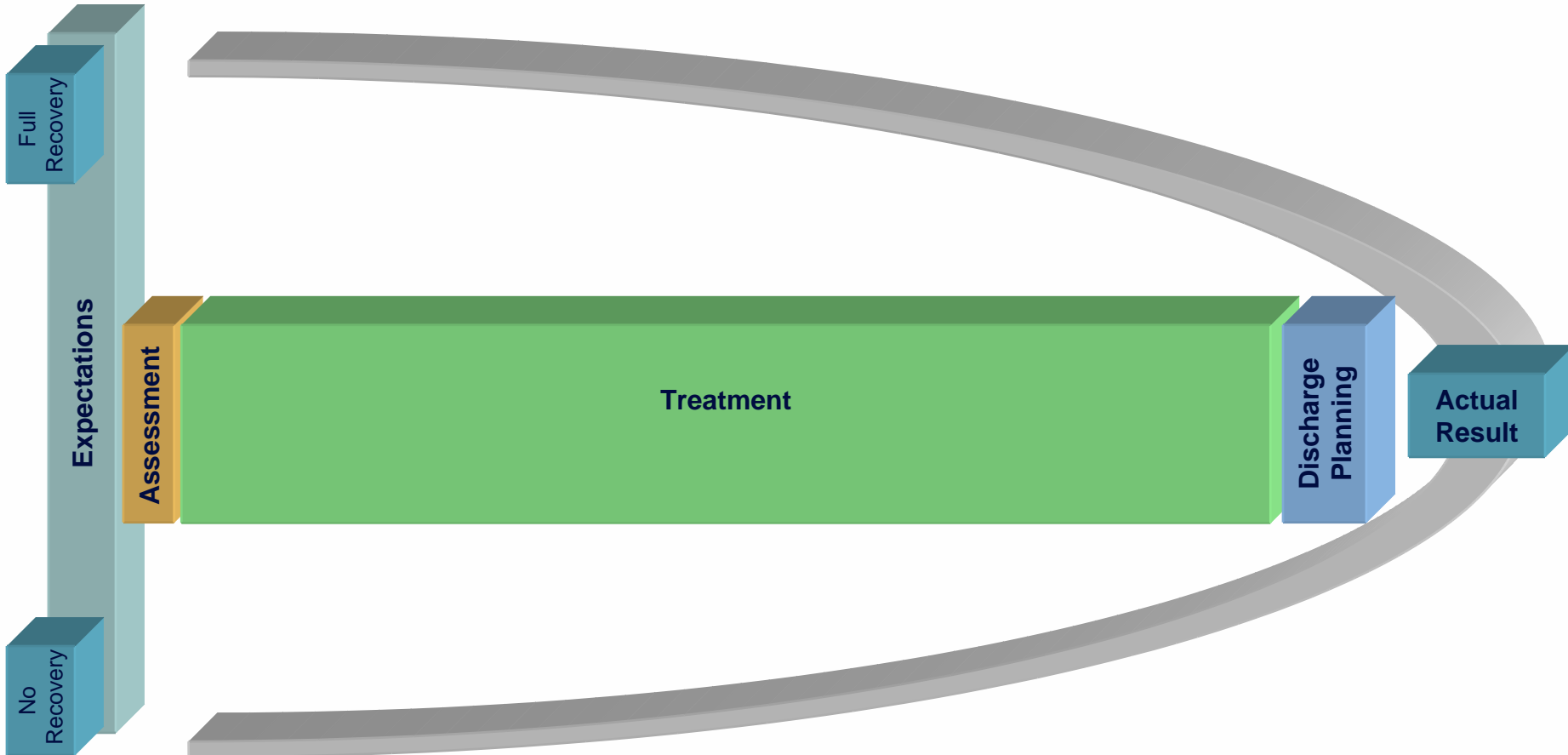
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# High Practice Variation

Admission

Discharge



Postacute Episode




# OPT

outcome prediction tool

Welcome rwarren, [Logoff](#)

|                     |  |                   |
|---------------------|--|-------------------|
| Patient First Name: | <input type="text" value="Peyton"/>              | <a href="#">?</a> |
| Patient Last Name:  | <input type="text" value="Manning"/>             | <a href="#">?</a> |
| Impairment Group:   | <input type="text" value="Orthopedic Conditio"/> | <a href="#">?</a> |
| Diagnosis Category: | <input type="text" value="Hip Fracture"/>        | <a href="#">?</a> |
| Admission FIM:      | <input type="text" value="65"/>                  | <a href="#">?</a> |
| Medical Complexity: | <input type="text" value="3"/>                   | <a href="#">?</a> |
| Skilled Admit Date: | <input type="text" value="12/13/2007"/>          | <a href="#">?</a> |

Submit

 [click here to view the screencast](#)

## Results

**# of Records: 1,114**  
**Therapy Cycle**

|       |      |       |
|-------|------|-------|
| Low:  | 11.9 | days* |
| Avg:  | 12.1 | days  |
| High: | 12.3 | days* |

**Therapy Hours/Day**  
**Avg FIM Gain: 21**

|              |      |
|--------------|------|
| 7 Days/Week: | 1.38 |
| 6 Days/Week: | 1.62 |
| 5 Days/Week: | 1.94 |

**Avg D/C FIM: 87**  
**Discharge Setting**

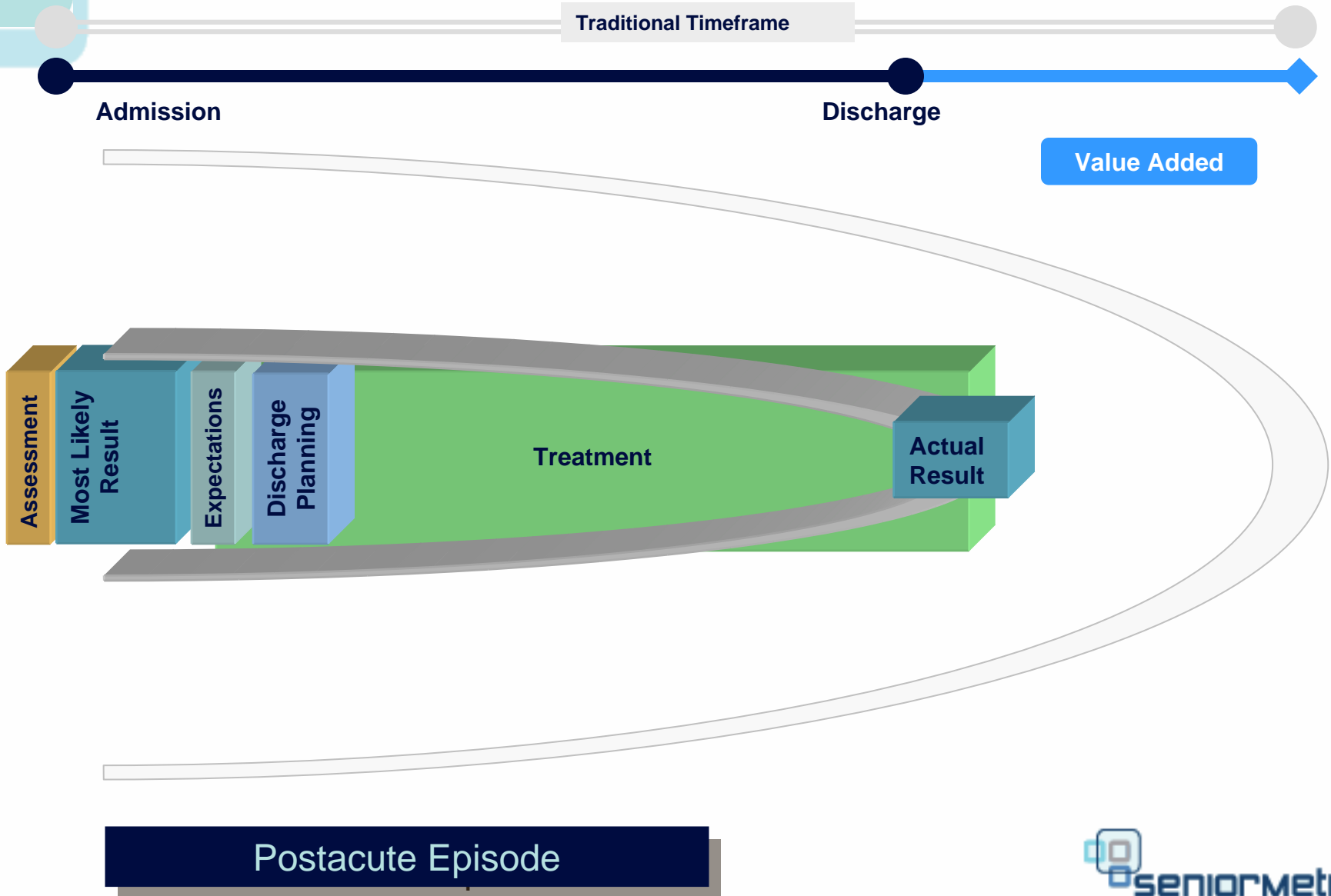
|                    |     |
|--------------------|-----|
| Community:         | 75% |
| Home Alone:        | 8%  |
| Home w/ Caregiver: | 60% |
| Assisted Living:   | 1%  |
| Board and Care:    | 5%  |

Projected Last Paid/Covered Date: 12/25/2007

\*95% Confidence Interval (p<.05)

## Real-Time Decision Support

# Reduced Practice Variation



# Retrospective Comparison

## Severity-Adjusted Comparison

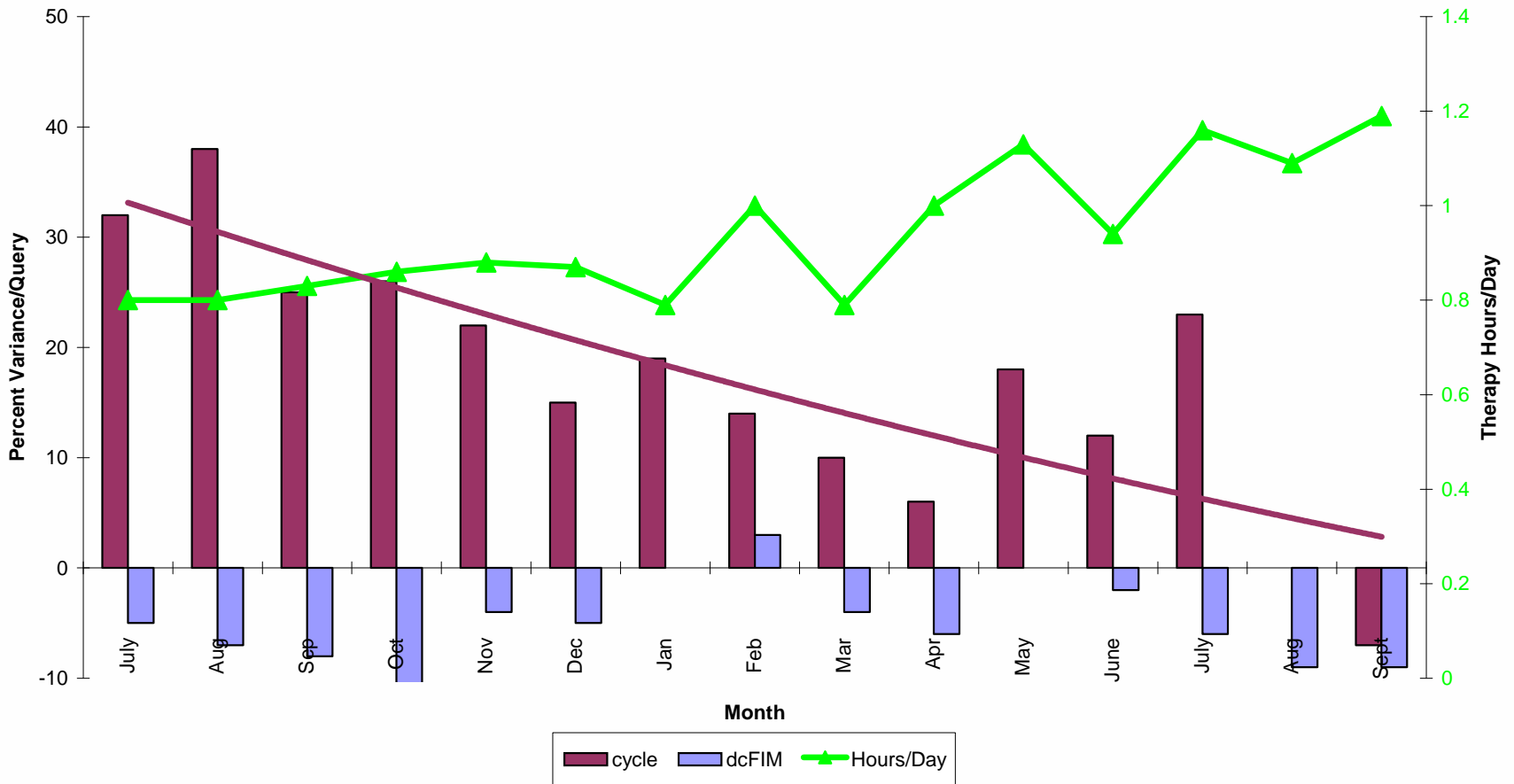
|               | Efficiency    |                 |                     |                    |                      |               |            | Quality                |                      |                        |                           |                     |
|---------------|---------------|-----------------|---------------------|--------------------|----------------------|---------------|------------|------------------------|----------------------|------------------------|---------------------------|---------------------|
| Jan-Mar 2006  | Cases in SMTX | Rehab Start Lag | Optimal Rehab Cycle | Actual Rehab Cycle | Rehab Cycle Variance | Discharge Lag | Rehab ALOS | Expected Discharge FIM | Actual Discharge FIM | FIM Discharge Variance | % Discharged to Community | Therapy Hrs per Day |
| Jefferson Av  | 45            | 1.4             | 7.9                 | 10.2               | 28%                  | 1.1           | 12.7       | 101.2                  | 96.0                 | -5%                    | 0.83                      | 0.97                |
| Mercy Court   | 67            | 1.3             | 11.7                | 12.1               | 3%                   | 0.8           | 14.2       | 77.0                   | 76.1                 | -1%                    | 0.83                      | 1.43                |
| St Allens     |               |                 |                     |                    |                      |               |            |                        |                      |                        |                           |                     |
| Garden Ridge  |               |                 |                     |                    |                      |               |            |                        |                      |                        |                           |                     |
| San Angelo    |               |                 |                     |                    |                      |               |            |                        |                      |                        |                           |                     |
| Pacific Crest |               |                 |                     |                    |                      |               |            |                        |                      |                        |                           |                     |
| CareBrook     |               |                 |                     |                    |                      |               |            |                        |                      |                        |                           |                     |
| Total/Average |               |                 |                     |                    |                      |               |            |                        |                      |                        |                           |                     |



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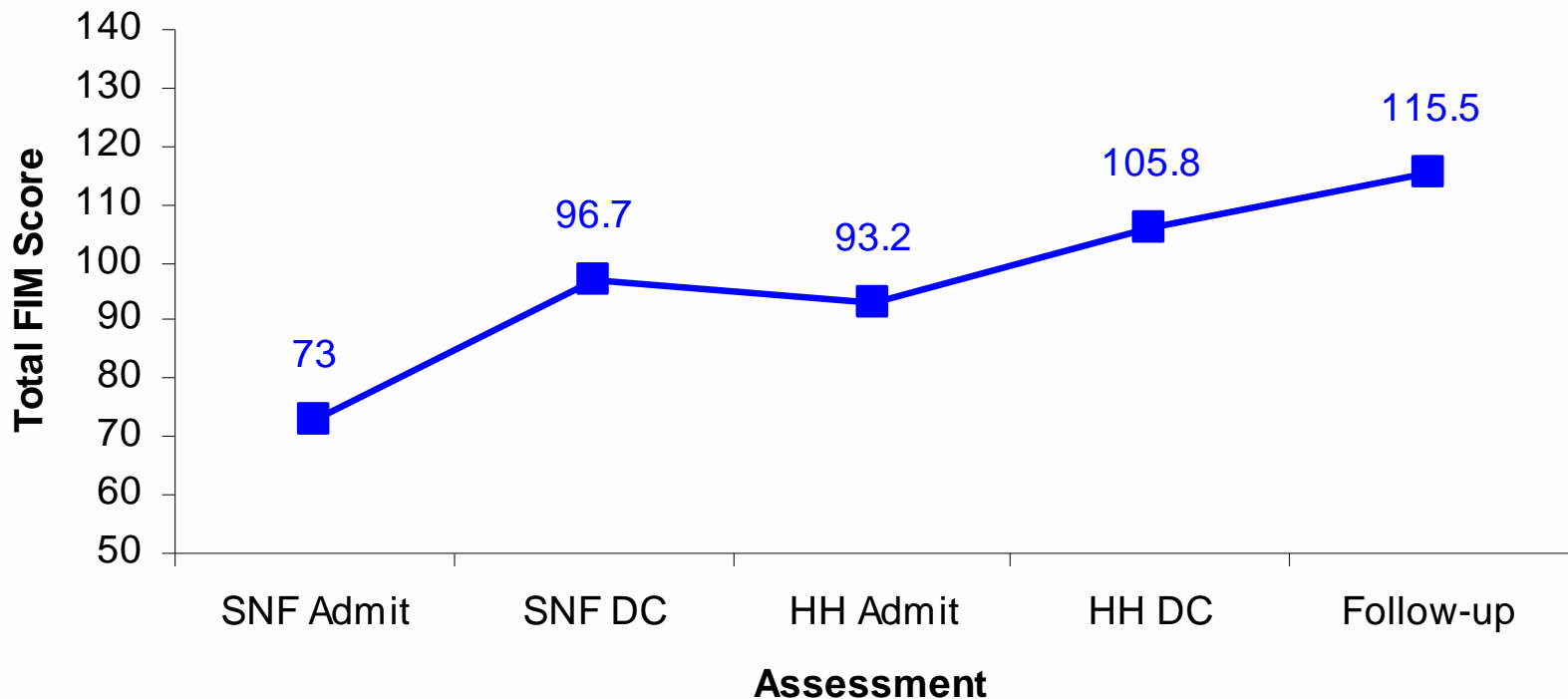
# SNF LOS Variance Trend





# Functional recovery Across Settings: SNF thru HH to Follow-up\*

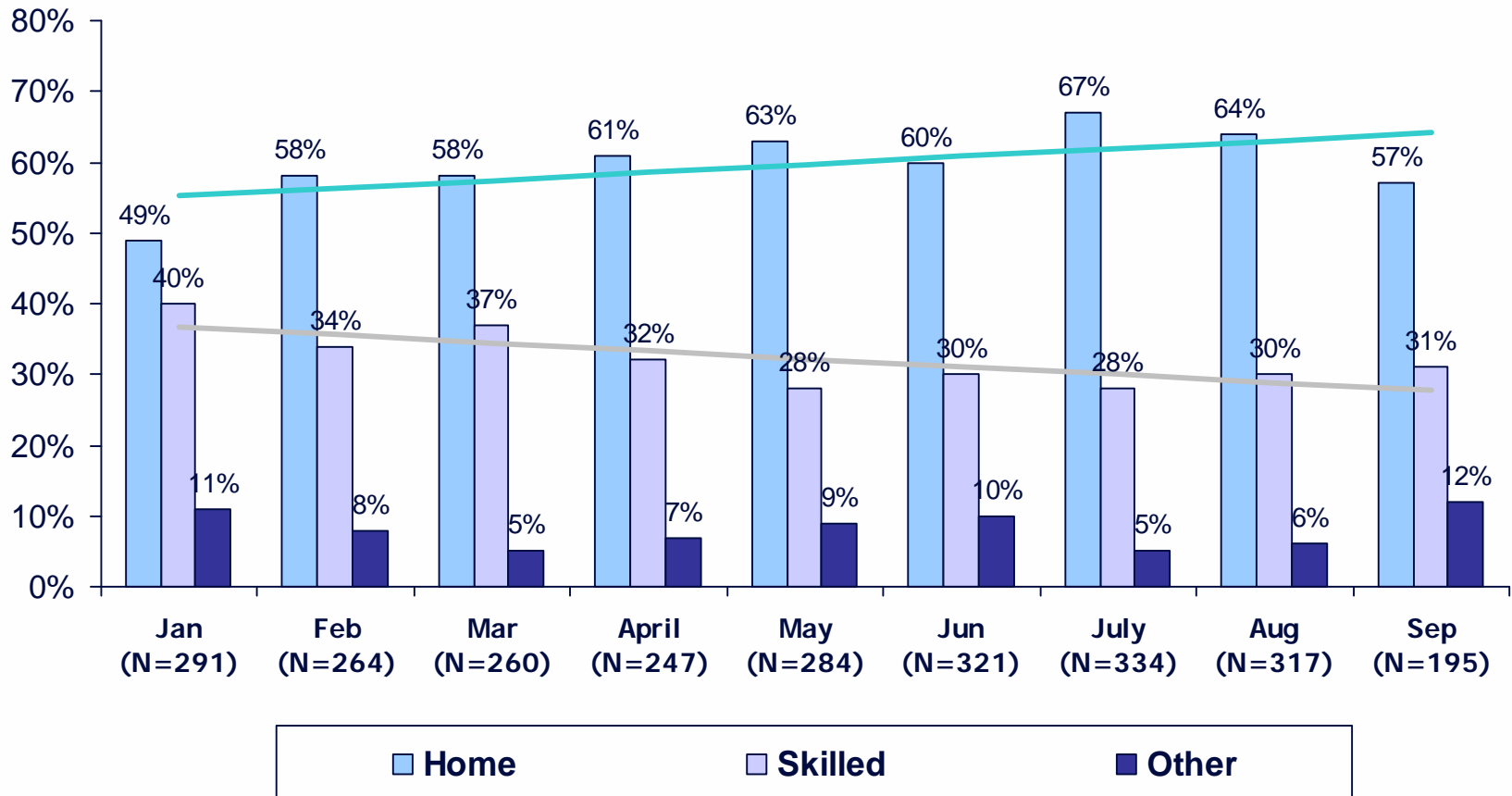
11-01 to 9-05



SNF: all dc home  
HH: all admitted from SNF  
Follow -up: all records (N=1259)



# Improving Acute DC Placement

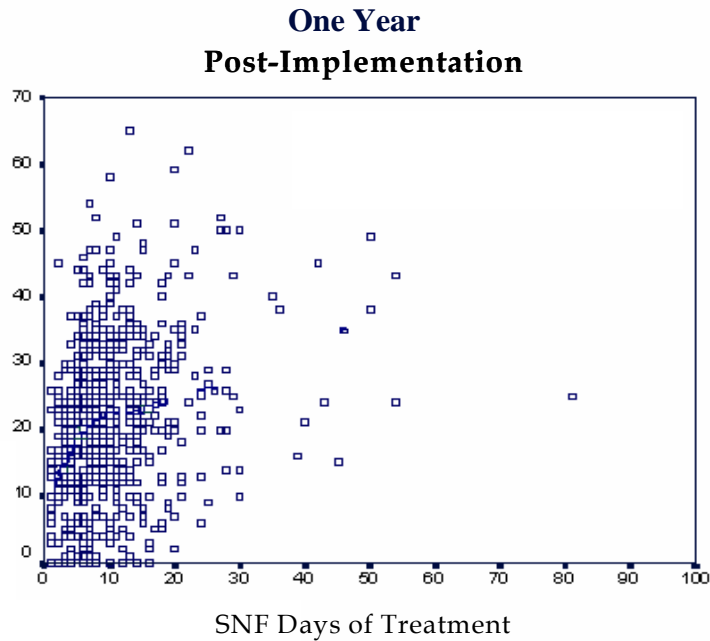
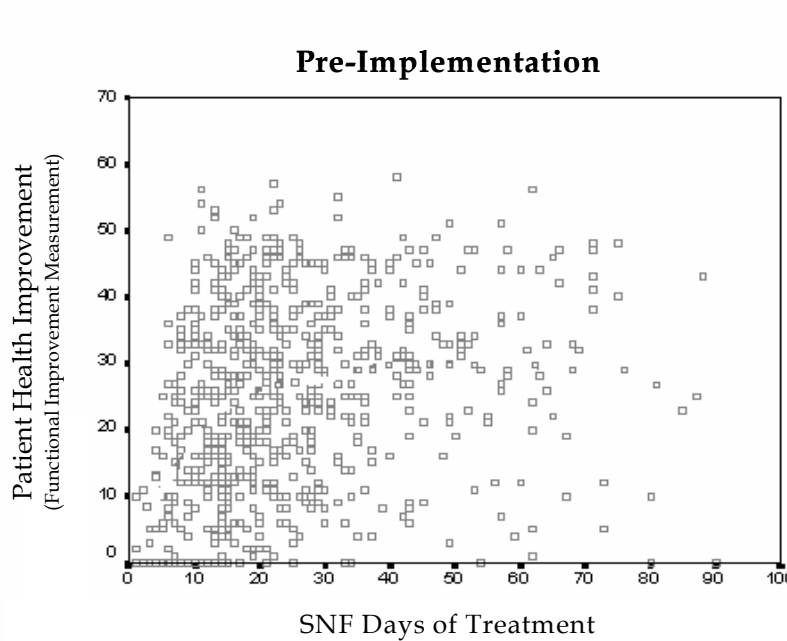




# Influence on Utilization

- Average Medicare Plan
  - LOS: 22 days
  - SNF Admits/k: 50-65
  - SNF Days/k: 900-1100
  - PMPM: \$33
- Predictive Model Results
  - LOS: 16 days
  - SNF admits/k: 40-50
  - SNF days/k: 600- 800
  - PMPM: \$22.50

# Reducing Practice Variation Using Predictive Models



**\$5,655 average cost per case**

**23 point average gain in Functional Improvement Measurement (“FIM”), an internationally recognized scale of disability**

**\$4,485 average cost per case (20.7% decrease)**

**23 point average gain in FIM (unchanged)**