Quality Outcomes and Financial Benefits of Nutrition Intervention

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EVOLVING DEMOGRAPHICS AND HEALTH POLICY ENABLE NUTRITION TO HAVE A POSITIVE ECONOMIC IMPACT

↑ Aging Population

↑ Life Expectancy

↑ Disease Incidence

↑ Healthcare Consumption

↔ Evolving Demographics

↓ CMS Payments

↑ Quality of Care

↓ Costs of Care

↑ Quality of Life

↑ Role of Nutrition in Economic Impact and Quality of Patient Care

Transitional Care

↓ Quality of Care
Malnutrition is prevalent across healthcare settings

<table>
<thead>
<tr>
<th>Healthcare Setting</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>30-50%&lt;sup&gt;1-4&lt;/sup&gt;</td>
</tr>
<tr>
<td>Long-Term Care</td>
<td>21%-51%&lt;sup&gt;5&lt;/sup&gt;</td>
</tr>
<tr>
<td>Outpatient &amp; Homecare</td>
<td>13-30%&lt;sup&gt;5&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Risk is increased in:<sup>6</sup>

- Older adults
- Critically ill patients
- Patients with comorbid chronic diseases, e.g., cancer, COPD, chronic kidney disease

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BED REST, AGE AND HOSPITALIZATION INCREASE LOSS OF MUSCLE

- Healthy Young: 28 Days Inactivity
  - ≈ 1 lb loss of muscle

- Healthy Elders: 10 Days Inactivity
  - ≈ 2.2 lb loss of muscle

- Elderly Inpatients: 3 Days Hospitalization
  - ≈ 2.2 lb loss of muscle

LOSS OF LEAN BODY MASS INCREASES RISK FOR COMPLICATIONS¹

<table>
<thead>
<tr>
<th>% Loss of Total LBM</th>
<th>Complications</th>
<th>Associated Mortality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Decreased immunity, increased infections</td>
<td>10</td>
</tr>
<tr>
<td>20</td>
<td>Decreased healing, weakness, infection</td>
<td>30</td>
</tr>
<tr>
<td>30</td>
<td>Too weak to sit, pressure ulcers, pneumonia, no healing</td>
<td>50</td>
</tr>
<tr>
<td>40</td>
<td>Death, usually from pneumonia</td>
<td>100</td>
</tr>
</tbody>
</table>

NUTRITIONAL STATUS IS PROGRESSIVELY COMPROMISED OVER THE CONTINUUM OF CARE

Upon Admission to the Hospital
30% to 50% of patients are malnourished upon admission\(^1\)

During Hospital Stay
Many patients with normal nutrition status experience a decline during hospitalization\(^1\)

Post-discharge
Weight loss and loss of muscle increase risk of readmissions\(^2,3\)

NUTRITION CONTRIBUTES TO POST-HOSPITAL SYNDROME\(^1\)

Associated Causes:
- Poor Nutrition
- Pain and Discomfort
- Decline in Mental Functioning
- Sleep Deprivation

Malnutrition during hospitalization may cause poor outcomes, yet often receives little attention

UNRECOGNIZED MALNUTRITION CAN LEAD TO COSTLY CONSEQUENCES

- Increased LOS\(^1\)
- Increased readmission rates\(^1\)
- Increased cost of care\(^1\)

- Higher complication rates\(^1\)
- Increased morbidity/mortality\(^1\)
- Increased risk of pressure ulcers\(^2\)

PRE-EXISTING MALNUTRITION/WEIGHT LOSS INCREASES RISK OF NEVER EVENTS$^1$

<table>
<thead>
<tr>
<th>Condition</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical site infection</td>
<td>2.5</td>
</tr>
<tr>
<td>Pressure Ulcer</td>
<td>3.8</td>
</tr>
<tr>
<td>Catheter-associated UTI</td>
<td>5.1</td>
</tr>
<tr>
<td>Mediastinitis after CABG</td>
<td>5.3</td>
</tr>
</tbody>
</table>

MALNUTRITION IS A COMMON REASON FOR READMISSION\(^1\)

National Surgical Quality Improvement Project protocol to identify risk factors associated with 30-day readmission.

Preoperative, intraoperative, and postoperative outcomes were collected 1442 inpatient general surgery procedures at a single academic center between 2009 and 2011.

<table>
<thead>
<tr>
<th>Four Most Common Readmission Reasons</th>
<th>Operations With Highest Readmission Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastrointestinal complications (28%)</td>
<td>Pancreatectomy (18%)</td>
</tr>
<tr>
<td>Surgical infection (22%)</td>
<td>Colectomy/colostomy (13%)</td>
</tr>
<tr>
<td><strong>Malnutrition (10%)</strong></td>
<td>Small bowel resection (12%)</td>
</tr>
<tr>
<td>Wound complications (8%)</td>
<td>Gastrectomy (11%)</td>
</tr>
</tbody>
</table>

ORAL NUTRITION SUPPLEMENTATION (ONS) HAS SHOWN SIGNIFICANT CLINICAL BENEFITS

1. Reduction in Pressure Ulcer Incidence
   - 25%
   - 0.75 95% CI (0.62-0.89)
   - P<0.001

2. Reduction in Serious Complications (e.g., infections)
   - 19%
   - P<0.001

3. Reduction in Hospital Readmission
   - 30%
   - P<0.004

A LARGE HEALTH ECONOMIC STUDY OF ONS DURING HOSPITALIZATION DOCUMENTED ECONOMIC BENEFITS

Study Design
• 11-year retrospective analysis

Premier Research Database
• Includes detailed information on adult (18+) U.S. hospital episodes from 2000 to 2010
  – 460 hospitals in the United States
  – 44 million adult inpatient episodes
  – ONS use identified in 724,027 of 43,968,567 adult inpatient episodes
  – Rate of ONS use=1.6%

LARGE HEALTH ECONOMICS STUDY SHOWED ONS DURING HOSPITALIZATION IMPROVED OUTCOMES

- **6.7% decrease** in probability of 30-day readmissions
- **21% decrease** in LOS (2.3 days)
- **21.6% decrease**† in episode costs ($4734)

*Readmission defined as return to study hospital for any diagnosis.
Data measured delayed readmission and do not include patients not readmitted due to recovery or death.
†Monetary figures are based on 2010 US dollars and inflation-adjusted.

# ONS Improved Outcomes and Reduced Hospital Costs in Four Targeted Medicare Populations\(^1,2\)

Data from 2 retrospective health economic studies\(^1,2\)

<table>
<thead>
<tr>
<th>Condition</th>
<th>30-day Readmission Probability</th>
<th>Length of Stay (LOS)</th>
<th>Episode Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acute Myocardial Infarction (AMI)</strong>(^1)</td>
<td>-12%*</td>
<td>-1.2 days</td>
<td>$1,538</td>
</tr>
<tr>
<td><strong>Congestive Heart Failure (CHF)</strong>(^1)</td>
<td>-10.9%*</td>
<td>-1.0 days</td>
<td>$1,266</td>
</tr>
<tr>
<td><strong>Pneumonia (PNA)</strong>(^1)</td>
<td>-14.2%*</td>
<td>-1.3 days</td>
<td>$1,516</td>
</tr>
<tr>
<td><strong>Chronic Obstructive Pulmonary Disease (COPD)</strong>(^2)</td>
<td>-21.50%*</td>
<td>-1.88 days</td>
<td>$1,570</td>
</tr>
</tbody>
</table>

*Indicates significance at the 1% level.
†Indicates significance at the 5% level.
‡One to one matched sample was created from a 10,322 ONS episodes and 368,097 non-ONS episodes data population (N=14,326).

NUTRITION INTERVENTION ALIGNS WITH THE INSTITUTE FOR HEALTHCARE IMPROVEMENT (IHI) TRIPLE AIM\(^1\)

ADVOCATE HEALTH CARE QUALITY IMPROVEMENT STUDY OVERVIEW

**Study Design**
Multi-site, 2-group, pre-post QIP study
Conducted from October 13, 2014 to April 2, 2015

**Patient Population**
(N=1269*; 45.2% at risk for malnutrition)
- Older adults; mean age of 66.6 ± 17.2 years
- Most were white/caucasian (70.4%)
- Admitted for a primary medical diagnosis (77.3%)

**Study Scheme**

| Two hospitals implemented a QIP-basic program—QIP-b | Two hospitals implemented a QIP-enhanced program—QIP-e |

*2808 patients were screened with 1269 patients enrolled.

THE RESEARCH QUESTION AND ENDPOINTS

• **Study Hypothesis:** Nutrition-focused QIP will decrease *30-day readmission rate by 20%* compared with existing ONS protocol in patients at risk/malnourished

• **Primary Endpoint:** Non-elective readmission 30-days post-discharge

• **Secondary Endpoint:** Length of hospital stay

• **Patient Population:** Aged 18+ years, any primary diagnosis, risk for malnutrition (Malnutrition Screening Tool [MST] score ≥2)
### DIFFERENCES BETWEEN QIP-E AND QIP-B

<table>
<thead>
<tr>
<th>Differences between QIP-e and QIP-b Programs</th>
<th>QIP-e</th>
<th>QIP-b</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MST is a part of EMR</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>RN completes MST</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>ONS selection via automatic drop-down menu by RN</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>ONS ordered by MD, RN, or RD</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>RD consultation</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Time to RD consultation: &lt;24 hours</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td><strong>Time to ONS delivery (in hours)</strong></td>
<td>1 – 24 h</td>
<td>24 – 48 h</td>
</tr>
<tr>
<td>Discharge planning instructions</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Discharge materials including coupons and literature</strong></td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>Standard post-discharge phone calls (24-72 hours)</td>
<td>✓*</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Nutrition-focused post-discharge phone calls (N = 4)</strong></td>
<td>✓*</td>
<td>-</td>
</tr>
</tbody>
</table>

MST=Malnutrition Screening Tool
EMR=Electronic Medical Record
*Nutrition-focused questions were incorporated in the standard post-discharge phone calls.
QIP-E PROGRAMS REDUCED READMISSIONS, LOS, AND COSTS

QIP-e, including ONS therapy, reduced all cause 30-day readmission rates by 29% vs pre-QIP

1. All-cause 30-day Readmissions -29%*

QIP-e, including ONS therapy, reduced length of hospital stay by 26% (1.9 ±3.6] days) vs pre-QIP

2. Costs

6-Month Savings: $4,896,758

A Healthcare Quality Outcomes Study that included interventions with Abbott Nutrition formulary for the QIP hospitals during a 6-month period reduced healthcare costs from avoided readmissions and reduced LOS

*Data from QIP-e intervention, percentage expressed as relative risk reduction (RRR) compared to pre-QIP.
†Data from validation comparison cohort: 6-month hospital savings for the 4 QIP hospitals was $4,896,758 (when QIP program cost is subtracted).
‡Products available in each hospital's formulary were used.


ALL SUBPOPULATIONS BENEFITED FROM THE NUTRITION FOCUSED QIP\textsuperscript{1-4}

<table>
<thead>
<tr>
<th>Age &lt;65</th>
<th>Age 65+</th>
<th>Medical Patients</th>
<th>Surgical Patients</th>
<th>CV</th>
<th>Oncology</th>
<th>GI</th>
</tr>
</thead>
</table>

Across all MST Scores

MST = 2

MST > 2

NUTRITION INTERVENTION IMPROVES OUTCOMES FOR ALL MALNOURISHED PATIENTS

All-cause 30-day Readmissions*1,3-6

Length of Hospital Stay*1,3-6

Costs2†‡

*Data from QIP-e intervention, percentage expressed as RRR compared to pre-QIP. Products available in each hospital’s formulary were used.
† Data from baseline comparison cohort: 6-Month Hospital Savings for the 4 QIP hospitals was $5,452,309 (when QIP program cost is subtracted).
‡ Products available in each hospital’s formulary were used.

NUTRITIONAL QIP INITIATIVES—WHERE DO WE GO FROM HERE?

• Malnourished hospitals patients often do not have their nutrition needs addressed while in the hospital

• Studies show that nutrition-based QIPs can improve readmission, length of stay, and cost outcomes for all patients at risk/malnourished

• An appropriate QIP includes:
  – Malnutrition risk screening at admission
  – Prompt initiation of ONS
  – Nutrition support during hospital stay and at discharge

• Keys to success:
  – Foster a culture of nutrition science
  – Multidisciplinary team work
  – Provide continuing staff education
  – Monitor and adjust the process to ensure continuous quality improvement
3 STEPS FOR ADDRESSING MALNUTRITION

1. Screen and recognize all patients at risk of malnutrition

2. Rapidly implement nutrition interventions and continue monitoring your patients

3. Include nutrition in every discharge plan with education on why nutrition is important to recovery
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