OASIS, Outcomes, and Risk Adjustment: What Agencies Need to Know

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Presenter Biographies

Eugene J. Nuccio, Ph.D.  Assistant Professor
Dr. Nuccio contributes significantly to the development of risk adjustment model for current outcome measures using high-level multivariate (OLS and Logistic regression) methods. He makes both empirical and theoretical contributions in the development of new risk adjustment approaches including aggregation of episodic information by home health agency (HHA). Dr. Nuccio is responsible for the development of prediction models to risk adjust 41 outcome measures for >10K agencies that is provided nationwide to these HHAs and on the Center for Medicare and Medicaid Services’ (CMS) Home Health Compare web site. Additionally, he has a leadership role in evaluating the effectiveness of a pay-for-performance demonstration for HHAs, and has led the analytic tasks associated with the improvement of the CMS survey process for home health care providers, including the development of a selection metric to prioritize home health care providers for future surveys. Dr. Nuccio has a secondary interest and expertise in the effectiveness of nursing home enforcement actions based on survey findings.

Angela A. Richard, MS, RN
Ms. Richard is a Research Associate as the University of Colorado Denver. She has been integrally involved in research and demonstration projects related to OASIS, outcome measurement, OBQI, and health information technology in home health care for the past eighteen years. Her background includes clinical and managerial experience in home care. In addition, she has experience in training and supporting HHAs as they implemented electronic health record systems. She has authored or co-authored several articles related to OASIS data collection, outcomes measurement and OBQI, and presented at numerous professional meetings, including NAHC annual meetings.

Rhonda Will, RN, BS, COS-C, HCS-D
Ms. Will is the Assistant Director of the Competency Institute for Fazzi Associates, Inc and is responsible for developing and overseeing Fazzi’s OASIS competency products and services focused on the comprehensive OASIS assessment. She has thirty eight years experience as a registered nurse and has extensive experience in staff development and training. Her areas of expertise include care planning, care management, patient outcomes, process measures and basic ICD-9-CM coding. Rhonda has acted as the Co-Director of the National OASIS Integrity Project 2004, clinical director of the National OASIS-C Best Practices Project 2009, and a facilitator at the Delta National Excellence in Therapy Forum September 2010.
Objectives

- To provide an explanation of how OASIS outcomes are calculated
- To give an overview of how risk models are developed
- To highlight the importance of accurate OASIS data

OBQI Outcomes Calculation Overview

1. The observed outcome rate for the agency is calculated for all eligible patients receiving care from the agency during the most recent twelve month period.

2. For each of the same patients, a predicted outcome probability is calculated based on the statistical risk model and the patient’s condition at admission to home health care.

3. Predicted outcome probabilities are averaged across all of the eligible patients served over a twelve month period, to yield a predicted outcome rate for the agency:

\[
\text{Agency pred} = \frac{\text{sum of predicted probability}}{\# \text{of patients eligible for outcome}}
\]
OBQI Outcomes Calculation Overview (cont.)

4. National observed and predicted rates are calculated in the same manner for the same twelve month period, by aggregating across all eligible patients for each outcome served by any home health agency in the United States.

5. The national rate is risk adjusted for each agency by adding to the observed national rate the difference between the agency predicted rate and the national predicted rate, using the following formula:

\[ \text{National}^{\text{ra}} = \text{National}^{\text{obs}} + (\text{Agency}^{\text{pred}} - \text{National}^{\text{pred}}) \]

6. On the agency performance reports available through CASPER, the observed agency rate is reported and compared to the risk adjusted national rate.


OBQI Outcome Report vs. Home Health Compare

- Same techniques and risk models used for data displayed on Home Health Compare

- The DIFFERENCE is that for Home Health Compare measures the agency measures are risk-adjusted using the following formula:

\[ \text{Agency}^{\text{ra}} = \text{Agency}^{\text{obs}} + (\text{National}^{\text{pred}} - \text{Agency}^{\text{pred}}) \]

and this value is compared with National observed value and State risk adjusted value

Why is risk adjustment needed?

- Risk adjustment is a statistical method used when comparing two groups (i.e., your data vs. national data; current data vs. prior data) for the purpose of accounting for baseline differences between groups that could affect the outcomes

- Used for OBQI outcomes and adverse event outcomes

- Not used for process measures

- Each outcome has a unique risk model
What are risk factors?

- OASIS risk factors are patient characteristics identified at SOC or ROC
- 320 possible risk factors
  - Range 23-118 per outcome measure
    - 118 - Improvement in lower body dressing
    - 110 - Improvement in light meal prep
    - 99 - Acute care hospitalization
    - 83 - Emergency room with hospitalization
    - 23 – Discharged to Community Needing Wound Care or Medication Assistance

OASIS-C Risk Models

- Data from Jan. 1, 2010—Sept. 30, 2010
  - 3 million episodes of care
- Logistical regression models for 48 outcomes:
  - 3 utilization outcomes
  - 22 functional improvement outcomes
  - 11 functional stabilization outcomes
  - 12 potentially avoidable events
- Home Health Compare
  - 1 utilization
  - 7 functional improvement
  - 1 potentially avoidable event

How are risk models developed?

- Iterative process
- Starts with dividing all risk factors into 6 groups and running logistic regressions on the outcome
- If a risk factor has a better than 1 in 5 chance that it influences the outcome, it is kept
- If kept, it joins all other risk factors making the “first cut” and two groups are formed
How are risk factors selected for each risk model?

- Ordinary least squares analysis run on each of the two groups
- Each risk factor that is statistically significant at p<0.01 (i.e., highly likely that it influences the outcome) is reviewed by clinical team to determine if it should be included
- Logistic regression is run on the final list of risk factors

Stability of the Model

- Goodness of fit tests (i.e., how well the model explains the variance between the observed and predicted outcome values) are computed and evaluated using a combination of r-square, C-statistic, and/or Hosmer-Lemeshow statistics
- Models were evaluated as excellent performers if r-square or tau-A ≥ 0.10 and C-statistic ≥ .70
- Correlations between each risk factor used in a model and the outcome are calculated to document the direction of the relationship between the risk factor and the outcome

Clinical review of model

- Group of clinicians and statisticians review every model
- If a risk factor in a model is not clinically plausible, the risk factor is eliminated and the revised model is recomputed and re-evaluated
- Model is created on a developmental sample and validated in a validation sample
Reading the Prediction Models

- Risk factors measured at SOC and ROC

- Coefficients considered significant if the "(95%CI)" values are both on the same side of "1"

- Odds ratio: The strength of the relationship between a risk factor and an outcome measure
  
  - The larger or smaller an odds ratio (i.e. >1.00 or <1.00), the more influence the risk factor has on an outcome measure in a positive or negative direction

Acute Care Hospitalization

- Total of 99 risk factors

- R-square is 0.146

- C-statistic is 0.740

- Model is considered to have excellent predictive qualities
Outcome Calculation: Review

- For each outcome report, first the actual outcomes are calculated for each eligible patient
- Reminder: quality episode is defined as SOC or ROC to transfer/discharge/death

Improvement Outcomes

- Calculated for all patients who CAN improve (not at the highest or most independent level)
- The agency outcome shows the agency’s rate of improvement:
  \[
  \frac{\text{# patients who improved}}{\text{# patients who could have improved}} \times 100
  \]

Stabilization Outcomes

- Stabilization = non-worsening (improved or stayed same)
- Calculated for all patients who CANNOT worsen (not at the lowest or most dependent level)
- The agency outcome shows the agency’s rate of stabilization:
  \[
  \frac{\text{# patients who did not worsen}}{\text{# patients who could have worsened}} \times 100
  \]
Potentially Avoidable Event Outcomes

- "Untoward" events; relatively rare
- Calculated as:

\[
\frac{\text{# patients for whom PAE occurred}}{\text{Total # patients}} \times 100
\]

Outcome Calculation: Review

- After each outcome has been calculated, then the predicted outcome is calculated using risk models
- Then, aggregate observed and predicted agency and national rates are calculated as well as the national and agency risk adjusted values:

\[
\text{Agency pred} = \frac{\text{sum of predicted probability}}{\text{# of patients eligible for outcome}}
\]

\[
\text{National ra} = \text{National obs} + (\text{Agency pred} - \text{National pred})
\]

\[
\text{Agency ra} = \text{Agency obs} + (\text{National pred} - \text{Agency pred})
\]

Differences between reports

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<th>Home Health Compare</th>
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<tbody>
<tr>
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Implications

- Data accuracy critical, not just for OASIS payment items!
- Each model is unique and uses multiple OASIS items
- If concerned about outcome, focus both on a) data quality and b) care processes (OBQI)
- Note that models are re-estimated periodically (approx 3-5 years)

Questions?

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