Payment Standardization and Risk Adjustment for the Medicare Physician Feedback and Value Modifier Programs

National Provider Call
Wednesday, December 21, 2011
Purpose of the National Provider Call

• To provide transparency into the methodologies the Centers for Medicare & Medicaid Services (CMS) uses to adjust cost and resource use data in the Physician Feedback program to ensure fair comparisons

• To obtain stakeholder input on these cost adjustment methodologies for use in the value modifier

• To discuss ways to further improve these cost adjustment processes
Agenda

• Opening comments and background

• Presentation: Payment Standardization of Medicare Claims Data

• Comments and questions from participants

• Presentations: Adjusting Cost Data for Beneficiary Health Status
  • Background, development, and purpose of the Hierarchical Condition Category (HCC) risk adjustment methodology
  • Application of the risk adjustment to the Physician Feedback Program/Value Modifier

• Comments and questions from participants

• Closing and next steps
Background

Sheila Roman, MD, MPH
Senior Medical Officer
Performance-Based Payment Policy Group
Center for Medicare
What is the Physician Feedback Program?

- The Physician Feedback Program provides comparative performance information to physicians.

- It is one part of Medicare’s efforts to improve the quality and efficiency of medical care by:
  
  - Helping CMS provide meaningful and actionable information to physicians so they can improve the care they furnish.
  
  - Changing physician reimbursement to reward value rather than volume.
What is the Physician Feedback Program? (Cont’d)

The Program is mandated by legislation:

• The Physician Resource Use Measurement and Reporting Program was created by the Medicare Improvements for Patients and Providers Act of 2008

• The Affordable Care Act of 2010 extended and enhanced the Program – now called the Physician Feedback Program

• Under the program, CMS produces annual physician Quality and Resource Use Reports (QRURs)
What are the Quality Resource Use Reports (QRURs)?

QRURs provide comparative information so that physicians can view the clinical care their patients receive in relation to the average care and costs of other physicians' Medicare patients.

For example, CMS calculates total annual per capita cost measures for patients attributed to a physician or physician group practice.
Who Will Receive QRURs this year?

**2010 Group Reports**

- September 2011: CMS sent QRURs to 35 large group practices that chose to participate in the Physician Quality Reporting System via the Group Reporting Option (GPRO I) in 2010.

**2010 Individual Physician Reports**

- In early 2012, CMS will provide physician-level QRURs to more than 20,000 individual physicians who participated in Medicare fee-for-service (FFS) in 2010, and practiced in Iowa, Kansas, Missouri, or Nebraska.
What is the Value-based Payment Modifier?

The Affordable Care Act of 2010 requires that under the Physician Fee Schedule Medicare begin using differential payment to physicians, or groups of physicians, based upon the quality of care furnished compared with cost.

A physician’s Value-based Payment Modifier will apply to services the physician bills under the Physician Fee Schedule.

The statute requires that the Secretary apply the Value-based Payment Modifier to promote systems-based care.

CMS will propose a methodology for the Value-based Payment Modifier in next year’s Physician Fee Schedule rulemaking. We are using these outreach sessions to help us develop these proposals.
The Affordable Care Act’s Requirements

CMS is required to make adjustments to costs in both the Physician Feedback Program and Value Modifier for:

• Difference in geographic rates (Payment Standardization)

• Underlying health status of individual beneficiaries (Risk Adjustment)
What is the Implementation Timeline for the Value-based Payment Modifier?

2013
- The initial performance period is slated to begin in 2013, meaning services provided during calendar year 2013 will be used in calculating the 2015 modifier.

2015
- Beginning in 2015, the Value-based Payment Modifier will be phased-in over a two-year period
- In 2015 the HHS Secretary has discretion to apply the Value-based Payment Modifier to specific physicians and/or groups of physicians that he/she deems appropriate.

2016
- In 2016 the HHS Secretary will continue his/her efforts to apply the Value-based Payment Modifier to specific physicians and/or groups of physicians that he/she deems appropriate.

2017
- Beginning in 2017, the Value-based Payment Modifier will apply to most or all physicians who submit claims under the Medicare physician fee schedule.
Payment Standardization of Medicare Claims Data

Peter Hickman
Senior Analyst
Policy and Data Analysis Group, Center for Strategic Planning, CMS
Why Standardize Medicare Payments?

Comparing utilization levels of a single uncomplicated service across or within geographic areas is straightforward.

But what if you want to compare aggregate utilization across many services?

Similar services can be provided by:

- Different types of providers or practitioners
- The same type of practitioner:
  - In different settings, or
  - In one or multiple encounters
Why Standardize Medicare Payments? (Cont’d)

To address the limitation of utilization measures and to capture a broader picture of service use, health care spending is often used.

However, the use of health care spending raises another set of questions:

- How do you address differences in wages / practice expense?

- What about the portion of payment that serves a broader social purpose?

- What if different payment systems are used in different types of facilities or locations?

- How do you deal with differences in underlying health status?
What is Payment Standardization?

The process of adjusting Medicare-allowed charges in order to make comparisons of service use within or across geographic areas.

It is separate from risk adjustment, which deals with differences in allowed charges due to variation in beneficiary health status.
What Does Standardization do to Physician Payments?

Excludes adjustments made to reflect differences in regional labor and other costs as measured by the geographic practice cost indices.

Excludes payments that support larger Medicare program goals, such as:

- Add-on to physicians in Health Professional Shortage Areas (HPSAs)
- Participating physician differential
Maintains differences that exist in actual payments resulting from:

• The choice of setting in which a service is provided
  • Ex: Physician Office vs. Outpatient Hospital

• The choice about the type of provider who provides the service
  • Ex: Physician vs. Physician Assistant

• The choice as to whether to provide multiple services in the same encounter when it affects actual payment
What Does Standardization do to Other Payments?

- Removes:
  - Indirect Medical Education (IME) payments
  - Disproportionate Share Hospital (DSH) payments
  - Graduate Medical Education (GME)
  - Additional payments to sole community hospitals and Medicare dependent hospitals
  - Rural add-ons to Inpatient Rehabilitation Facilities (IRFs) and Inpatient Psychiatric Facilities (IPFs)
What Does Standardization do to Other Payments? (Cont’d)

• Excludes other adjustments to reflect differences in regional labor and other costs as measured by:
  • The various wage indices
  • Cost of living adjustments

• Substitutes a national amount in the case of services paid on the basis of state fee schedules

• Adjusts outlier payments
Simplified Physician Example

• Medicare Allowed Amount =
  • Conversion Factor x GPCI x Payment Modifiers (if applicable)

• Standardized Allowed Amount =
  • Conversion Factor x Payment Modifiers (if applicable)
### Simplified Physician Example #1

<table>
<thead>
<tr>
<th>Location</th>
<th>Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philadelphia, PA - Office</td>
<td>$109.16</td>
</tr>
<tr>
<td>Austin, TX - Office</td>
<td>$101.55</td>
</tr>
<tr>
<td>Chicago, IL - Facility</td>
<td>$81.94</td>
</tr>
<tr>
<td><strong>Standardized Payment - Office</strong></td>
<td><strong>$102.27</strong></td>
</tr>
<tr>
<td><strong>Standardized Payment - Facility</strong></td>
<td><strong>$75.77</strong></td>
</tr>
</tbody>
</table>

**99214 - Office/Outpatient Visit, Established Patient**

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### Simplified Physician Example #2

<table>
<thead>
<tr>
<th>Procedure Description</th>
<th>Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philadelphia, PA – Single</td>
<td>$86.11</td>
</tr>
<tr>
<td>Austin, TX - Single</td>
<td>$78.85</td>
</tr>
<tr>
<td>Chicago, IL - Second Procedure</td>
<td>$43.13</td>
</tr>
<tr>
<td>Standardized Payment - Single Procedure</td>
<td>$79.50</td>
</tr>
<tr>
<td>Standardized Payment - Second Procedure</td>
<td>$39.75</td>
</tr>
</tbody>
</table>

17000 - Destruction Premalignant Lesion

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Simplified Hospital Example

- Medicare Allowed Amount =
  - (Base Rate x Wage Index x DRG Weight) + IME and DSH (if applicable) + Outlier payment (if applicable)

- Standardized Allowed Amount =
  - (Base Rate x DRG Weight) + Adjusted Outlier payment (if applicable)
## Simplified Hospital Example

<table>
<thead>
<tr>
<th>Allowed Amount for DRG 194 - Simple Pneumonia</th>
<th>Operating</th>
<th>Capital</th>
<th>IME</th>
<th>DSH</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital A Philadelphia, PA</td>
<td>$5,514.57</td>
<td>$448.14</td>
<td>$2,408.75</td>
<td>$828.29</td>
<td>$9,199.75</td>
</tr>
<tr>
<td>Hospital B Austin, TX</td>
<td>$5,073.58</td>
<td>$411.08</td>
<td>$0.00</td>
<td>$247.59</td>
<td>$5,732.25</td>
</tr>
<tr>
<td>Hospital C Chicago, IL</td>
<td>$5,424.75</td>
<td>$441.02</td>
<td>$0.00</td>
<td>$458.93</td>
<td>$6,324.70</td>
</tr>
<tr>
<td>Standardized Payment</td>
<td>$5,242.60</td>
<td>$426.39</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$5,669.00</td>
</tr>
</tbody>
</table>
The CMS-Hierarchical Condition Categories (CMS-HCC) Risk Adjustment Model

Greg Pope
Director of the Program on Health Care Financing & Payment
RTI International
Overview of the Presentation

• Why does CMS risk adjust based on beneficiary health status?
• Principles of risk adjustment
• Overview of the model
  • Current uses
  • Development and maintenance of the model
• Included conditions and model inputs (risk adjusters, demographic factors, diagnoses)
• Model structure and calibration
• Model performance
• Example of the model
Why does CMS Risk Adjust Costs?

• Risk adjustment is a method of adjusting per capita costs either higher or lower, to account for differences in expected health costs of individuals

• For the Physician Feedback and Value Modifier programs, the purpose is to promote fair per capita cost comparisons

• Risk adjustment is intended to accurately predict risk over aggregates of individuals not to specifically predict the cost of any particular individual

• With larger aggregations of beneficiaries, below-average costs balance out above-average costs
Principles of Risk Adjustment

- Diagnostic categories should be clinically meaningful and should be able to predict costs.

- In creating an individual’s clinical profile, hierarchies should be used to characterize the individual’s illness with each disease process, while the effects of unrelated disease processes accumulate.

- Diagnostic classifications should encourage specific coding and not reward coding proliferation of same or similar codes.

- Providers should not be penalized for recording additional diagnoses.
Overview of the CMS-HCC Model

• The CMS-HCC model uses beneficiary demographic characteristics and prior year diagnoses to predict relative Part A and Part B Medicare FFS program (payments)

• The CMS-HCC model does not incorporate Medicare Part D costs, which are predicted separately by the CMS-RxHCC model

• The CMS-HCC model is prospective, meaning it uses prior year information to predict costs
  • Focus is on conditions that predict Medicare expenditures
Current Uses

• Medicare Advantage Capitation Payment
  • Implemented in 2004, fully phased-in 2007 (100% risk adjusted payments)

• Shared Savings Program Accountable Care Organizations
  • To be implemented in 2012

• Medicare Physician Quality and Resource Use Reports
  • Implemented in 2009
  • Adjust comparisons of per capita costs for patient health status
Development and Maintenance

- Originally developed under contract to CMS by researchers at Boston University and Research Triangle Institute (RTI) with clinical input from Harvard Medical School physicians

- Currently maintained by RTI under contract to CMS with clinical input from Harvard Medical School and other consultants to RTI

- The model is updated every year to incorporate new diagnosis codes and is recalibrated regularly on more recent diagnosis and expenditure data
Included Conditions

• The full CMS-HCC model classifies all conditions. But not all conditions are used in payment and other applications of the model.

• The CMS-HCC payment model includes clinically significant, generally high-cost medical conditions
  • Cancer, heart disease, hip fracture, etc.

• Conditions excluded from the payment model
  • Do not predict future cost
    • E.g., appendicitis
  • High degree of discretion or variability in diagnosis, diagnostic coding, or treatment
    • E.g., symptoms, osteoarthritis
Model Variants

• Aged-disabled
  • Community continuing enrollee
  • Institutional continuing enrollee
  • New Medicare enrollee (less than 12 months claims experience)

• End Stage Renal Disease (ESRD)
  • Dialysis
  • Transplant
  • Functioning graft (post-transplant)

• Physician Quality and Resource Use Reports are using aged-disabled community, new enrollee, and ESRD models
Model Inputs: Risk Adjusters and Demographic Factors

- **Risk Adjusters**
  - Demographics/enrollment file information
  - Diagnoses

- **Demographic Factors**
  - 24 age-sex cells (e.g., male age 80-84)
  - Medicaid dual eligible status
    - By sex and aged vs. disabled entitlement
  - Disabled status
    - Current disabled:
      - Separate age/sex and Medicaid factors
      - Selected diagnoses have different risk weights
  - Currently aged, originally entitled to Medicare by disability
    - Separate factor by sex
Diagnoses – I

• For model calibration and FFS applications: obtained from FFS provider claims (bills) submitted to Medicare

• Use International Classification of Disease, Version 9, Clinical Modification diagnosis codes (ICD-9-CM)
  • Transitioning to ICD-10 codes in FY2014

• Diagnoses from the following settings/providers are used
  • Hospital inpatient
  • Hospital outpatient
  • Physician
  • Clinically-trained non-physician (e.g., clinical psychologist)

ICD-9-CM Notice
The International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) is published by the United States Government. A CD-ROM, which may be purchased through the Government Printing Office, is the only official Federal government version of the ICD-9-CM. ICD-9-CM is an official Health Insurance Portability and Accountability Act standard.
Diagnoses – II

• Diagnoses from lab, radiology, home health, etc., not used

• The number of times a diagnosis is recorded does not matter

• The setting from which a diagnosis is reported does not matter
  • Inpatient diagnoses are not weighted more heavily than outpatient diagnoses
Severity

• The CMS-HCC model counts only the most severe manifestation among related conditions

• This principle is implemented through “disease hierarchies”

• Example
  • If both “diabetes with complications” and “diabetes without complications” are present, only the former is counted
Multiple Diagnoses

- CMS-HCC model is additive across disease hierarchies

- Unrelated conditions are counted cumulatively

- Related conditions are counted within hierarchies
  - Cancer, heart disease, lung disease, cerebrovascular disease

- Total disease burden is measured by
  - Severity within disease hierarchy (related conditions)
  - Cumulative burden of multiple conditions (unrelated conditions)

- Disease interactions are allowed for interactive effects among multiple conditions
  - For example, CHF and COPD have an interactive effect, beyond their separate, additive effects; this is recognized in the model
CMS-HCC Model Structure – (Version 12 counts)

- ICD-9-CM Codes
  \( (n = 14,000+) \)

- Diagnostic Groups (DXGs)
  \( (n = 805) \)

- Condition Categories (CCs)
  \( (n = 189) \)

- Hierarchical Condition Categories (HCCs)
  \( (n = 189) \)

- CMS Hierarchical Condition Categories
  \( (n = 70) \)

Hierarchies Imposed

Diagnoses or codes are excluded from the payment model if they are not predictive of significant future costs or they are judged to be subject to a high degree of discretion or variability in diagnosis, diagnostic coding, or treatment.
Hierarchies are imposed among related CCs, so that a person is coded for only the most severe manifestation among related diseases.

For example, ICD-9-CM ischemic heart disease codes are organized in this hierarchy, arranged in descending order of clinical severity and cost.
Clinical Vignette (V12 HCCs)

The CMS-HCC model is additive across major body systems or disease types, but hierarchical within clinical domain. To illustrate, this set of codes corresponds to a person with AMI, angina, COPD, chest pain, and ankle sprain.

<table>
<thead>
<tr>
<th>ICD-9-CM</th>
<th>DXG</th>
<th>CC</th>
<th>HCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.91 AMI of unspecified site, initial episode of care</td>
<td>81.01 AMI, initial episode of care</td>
<td>81 Acute Myocardial Infarction (AMI)</td>
<td>Excluded by hierarchy</td>
</tr>
<tr>
<td>413.9 Other and unspecified angina pectoris</td>
<td>83.02 Angina pectoris</td>
<td>83 Angina pectoris/old myocardial infarction</td>
<td></td>
</tr>
<tr>
<td>491.9 Unspecified chronic bronchitis</td>
<td>108.01 Emphysema / chronic bronchitis</td>
<td>108 Chronic Obstructive Pulmonary Disease (COPD)</td>
<td></td>
</tr>
<tr>
<td>518.1 Interstitial emphysema</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Included in payment model*

*Excluded from payment model*

<table>
<thead>
<tr>
<th>ICD-9-CM</th>
<th>DXG</th>
<th>CC</th>
<th>HCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>786.50 Unspecified chest pain</td>
<td>166.18 Chest pain</td>
<td>166 Major Symptoms, Abnormalities</td>
<td></td>
</tr>
<tr>
<td>845.00 Ankle sprain</td>
<td>162.12 Sprains</td>
<td>162 Other Injuries</td>
<td>162 Other Injuries</td>
</tr>
</tbody>
</table>
Model Calibration

- Calibrated on 100% Medicare FFS data
  - 25-30 million beneficiaries

- Two years of data, e.g., 2009-2010
  - Base year to accumulate diagnostic profile (2009)
  - Prediction year for Medicare payments (2010)

- Predict: Medicare program payments
  - Excludes beneficiary cost sharing

- Adjust for partial year two eligibility (e.g., due to death)
  - Full 12 months of year one eligibility is required

- Multiple regression is used to estimate incremental cost impact of each demographic factor and diagnostic category
Model Performance: $R^2$

- Percentage of variation in individual beneficiary expenditures explained ($R^2$) is ~ 12%

- This may seem low, but much of health expenditure variation is acute/random and not predictable with prior year information

- $R^2$ is ~ 1% with demographics-only model
## Model Performance: Quintile of $

<table>
<thead>
<tr>
<th>Quintile of Predicted $</th>
<th>Mean $: Actual</th>
<th>Mean $: Predicted</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (lowest)</td>
<td>$2,800</td>
<td>$2,513</td>
<td>0.90</td>
</tr>
<tr>
<td>2</td>
<td>$4,211</td>
<td>$4,057</td>
<td>0.96</td>
</tr>
<tr>
<td>3</td>
<td>$5,929</td>
<td>$6,010</td>
<td>1.01</td>
</tr>
<tr>
<td>4</td>
<td>$8,898</td>
<td>$9,120</td>
<td>1.03</td>
</tr>
<tr>
<td>5 (highest)</td>
<td>$19,403</td>
<td>$19,556</td>
<td>1.01</td>
</tr>
</tbody>
</table>

Note: aged-disabled community continuing enrollee model, 2007 expenditures.
## Model Performance: Diagnoses

<table>
<thead>
<tr>
<th>Condition</th>
<th>Actual $</th>
<th>Predicted $</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV/AIDS</td>
<td>$13,695</td>
<td>$13,695</td>
<td>1.00</td>
</tr>
<tr>
<td>Metastatic Cancer</td>
<td>$33,559</td>
<td>$33,559</td>
<td>1.00</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>$18,424</td>
<td>$18,424</td>
<td>1.00</td>
</tr>
<tr>
<td>COPD</td>
<td>$15,693</td>
<td>$15,692</td>
<td>1.00</td>
</tr>
<tr>
<td>Hip Fracture</td>
<td>$18,916</td>
<td>$18,916</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note: aged-disabled community continuing enrollee model, 2007 expenditures.
Example of risk score calculation

Male, 82 years old, with prior year diagnoses of AMI and COPD

<table>
<thead>
<tr>
<th>Predicted Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male, age 80-84</td>
</tr>
<tr>
<td>AMI, HCC 81</td>
</tr>
<tr>
<td>COPD, HCC 108</td>
</tr>
<tr>
<td>Total predicted cost (sum)</td>
</tr>
<tr>
<td>Population mean cost</td>
</tr>
<tr>
<td>Risk score = (predicted cost)/(mean cost)</td>
</tr>
</tbody>
</table>

**Interpretation**

This beneficiary is predicted to be 13 percent more expensive than the average cost Medicare beneficiary.
Risk Adjustment and the 2010 QRURs

Jeff Ballou
Eric Schone
Mathematica Policy Research, Inc.
Overview: From Beneficiaries to Physicians

1. Estimate relationship between risk and cost
2. Compute expected costs for each beneficiary
3. Divide beneficiaries’ observed costs by expected costs (physician level)
4. Convert cost ratio to dollars
5. Compare adjusted cost to peers
What Gets Risk Adjusted?

• The 2010 QRURs adjust per capita cost measures to account for each beneficiary’s expected cost given the beneficiary’s health status

• QRURs adjust per capita costs for five populations
  1. All beneficiaries
  2. Beneficiaries with CAD
  3. Beneficiaries with COPD
  4. Beneficiaries with diabetes
  5. Beneficiaries with heart failure
Who Gets Risk Adjusted?

• Excluded
  • Beneficiaries not eligible for attribution in 2010
  • Beneficiaries with total Medicare costs in the bottom one percent of the unadjusted cost distribution

• Included
  • All remaining beneficiaries with a 2009 HCC new enrollee or community risk score
    • If both scores are provided, the new enrollee score is used
1. Costs above the 99th percentile are set to the 99th percentile value

2. 2010 costs are regressed on
   • 2009 HCC risk score (+)
   • 2009 HCC risk score squared
   • 2009 indicator of ESRD (+)

3. Use multipliers estimated from regression to compute “expected” costs from risk factors
Computing a Physician’s Per Capita Costs

- Based on a ratio of observed to expected costs

- Observed costs: sum of costs for the physician’s attributed beneficiaries

- Expected costs: sum of expected costs for the physician’s attributed beneficiaries

- To convert the observed-to-expected ratio into dollars, multiply by mean cost of all beneficiaries in the sample

- Physicians with low observed-to-expected costs do best in peer comparisons for resource use
## Example: Beneficiary Data

<table>
<thead>
<tr>
<th>Beneficiary</th>
<th>Observed Cost ($)</th>
<th>Community Risk Score</th>
<th>New Enrollee Risk Score</th>
<th>End-Stage Renal Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthur</td>
<td>8,457</td>
<td>1.739</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Betty</td>
<td>24,068</td>
<td>2.617</td>
<td>-</td>
<td>Yes</td>
</tr>
<tr>
<td>Carol</td>
<td>15,282</td>
<td>-</td>
<td>1.305</td>
<td>No</td>
</tr>
<tr>
<td>David</td>
<td>17,104</td>
<td>0.742</td>
<td>-</td>
<td>No</td>
</tr>
<tr>
<td>Sample mean</td>
<td>11,379</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Example: Computing Arthur’s Expected Cost

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Multiplier</th>
<th>Contribution to Expected Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1</td>
<td>2,289</td>
<td>2,289</td>
</tr>
<tr>
<td>Community risk score</td>
<td>1.739</td>
<td>8,681</td>
<td>15,096</td>
</tr>
<tr>
<td>Community risk score squared</td>
<td>3.024</td>
<td>-204</td>
<td>-617</td>
</tr>
<tr>
<td>New enrollee risk score</td>
<td>0</td>
<td>8,091</td>
<td>0</td>
</tr>
<tr>
<td>New enrollee risk score squared</td>
<td>0</td>
<td>3,692</td>
<td>0</td>
</tr>
<tr>
<td>ESRD indicator</td>
<td>0</td>
<td>38,929</td>
<td>0</td>
</tr>
<tr>
<td>Expected cost (sum of effects)</td>
<td></td>
<td></td>
<td><strong>16,768</strong></td>
</tr>
</tbody>
</table>
## Example: Computing Risk Adjusted Cost

<table>
<thead>
<tr>
<th>Beneficiary</th>
<th>Observed Cost ($)</th>
<th>Expected Cost ($)</th>
<th>Responsible Physician</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthur</td>
<td>8,457</td>
<td>16,768</td>
<td>Smith</td>
</tr>
<tr>
<td>Betty</td>
<td>24,068</td>
<td>62,539</td>
<td>Smith</td>
</tr>
<tr>
<td>Carol</td>
<td>15,282</td>
<td>19,135</td>
<td>Jones</td>
</tr>
<tr>
<td>David</td>
<td>17,104</td>
<td>8,618</td>
<td>Jones</td>
</tr>
</tbody>
</table>

- **Observed-to-Expected Ratio**
  - Smith: 0.410
  - Jones: 1.170

- **Dollar-Denominated Adjusted Cost ($)**
  - For Smith: 4,665
  - For Jones: 13,313
Closing

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Thank you for your participation in today’s call.