Performance of the Health Care Delivery System for Dually Eligible Medicare Beneficiaries

3M Clinical and Economic Research

Richard F. Averill, MS
Ronald E. Mills, PhD

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Executive Summary

Individuals who are eligible for Medicare and who qualify for Medicaid are referred to as dually eligible or “duals.” The objective of this study was to determine whether there are substantive differences in the care delivered to duals and non-dual Medicare beneficiaries based on measures of quality and delivery system effectiveness. Although the dual population is primarily a low-income population, it is composed of two very different subpopulations, which had to be accounted for in the analysis: the under-65 population of primarily disabled beneficiaries and the 65-and-over population having a substantial proportion of beneficiaries residing in nursing homes.

The care delivered to the dual and non-dual Medicare populations was measured based on six quality measures and three service volume measures. Using Medicare 2017-2018 fee-for-service data, the actual and risk-adjusted expected rates for the quality and service volume measures were determined for the 65-and-over and under-65 Medicare populations. The quality measures for both the under- and over-65 populations revealed a pattern of higher-than-expected risk-adjusted rates for duals, indicating poor performance (excess number of quality-of-care failures). Dual beneficiaries have more than expected per capita admissions and emergency department visits, more readmission and post-discharge returns to the emergency department and more inpatient complications.

For the service volume measures, dual beneficiaries are less likely to be admitted from the emergency department for low-severity medical care and have fewer physician or care management visits than non-dual beneficiaries, especially for duals residing in low socioeconomic areas. These results demonstrate substantive differences in the care delivered to Medicare dual and non-dual beneficiaries, and suggest that overall, the health care delivery system is performing at a less effective level for the dual Medicare population.

Introduction

Individuals who are eligible for Medicare and who qualify for Medicaid are referred to as dually eligible or “duals.” An individual is eligible for Medicare if they are 65 years or older or are under 65 and qualify for Social Security Disability Insurance (SSDI) benefits. To qualify for SSDI, an individual must not be able to engage in any substantial gainful activity because of a medically determinable physical or mental impairment or have certain specified diseases such as amyotrophic lateral sclerosis or end-stage renal disease. To be eligible for Medicare, the individual must be entitled to SSDI benefits for at least 24 months. In addition, a child or widow(er) of an individual who qualifies for SSDI may also be eligible for Medicare coverage.

Medicaid provides health coverage for low-income people, families and children, pregnant women, the elderly, and people with disabilities. For the elderly population with low incomes, Medicaid is the primary payer for nursing home care that would otherwise be unaffordable. Medicaid programs receive federal support and must follow federal guidelines, but coverage and costs differ from state to state. In particular, Medicaid eligibility based on income varies from state-to-state and is usually expressed as a percent of the Federal Poverty Limit (FPL).

While the dual population is primarily a low-income population, it is composed of two very different subpopulations, with the under-65 population being primarily disabled beneficiaries and the 65-and-over population having a substantial proportion of beneficiaries residing in nursing homes.¹

The objective of this study was to determine whether there are substantive differences in the care delivered to duals and non-dual Medicare beneficiaries based on measures of quality and delivery system effectiveness.
Quality and Delivery System Effectiveness

The care delivered to the dual and non-dual Medicare populations was measured using the following six quality measures and three service volume measures:

**Quality Measures**

- Per Capita Potentially Preventable Admissions (PPAs)
- Per Capita Potentially Preventable Emergency Department Visits (PPVs)
- Potentially Preventable Readmissions (PPRs)
- Potentially Preventable Return Emergency Department Visits (PPREDs)
- Inpatient Potentially Preventable Complications (PPCs)
- 30-Day Post-Inpatient Procedure Mortality

**Service Volume Measures**

- Per Capita Ambulatory Physician and Care Management Encounter (PCMEs)
- Non-Surgical, Short-Stay, Low-Severity Admissions from the Emergency Department
- Admission to a Skilled Nursing or Rehabilitation Facility within Four Days of Hospital Discharge

The first five “potentially preventable” measures are widely used in Medicaid payment systems and by other major payers, and as the basis of extensive analysis in the health care research literature. Attachment A contains a detailed description of each measure. Attachment B contains a bibliography of published articles using these measures.

While the dual population is primarily a low-income population, it is composed of two very different subpopulations, with the under-65 population being primarily disabled beneficiaries and the 65-and-over population having a substantial proportion of beneficiaries residing in nursing homes.

To compare the performance of the health care delivery system for the dual and non-dual populations, it was first necessary to risk adjust for the mix of beneficiaries in each population. The nine performance measures were risk adjusted using All Patient Refined DRGs (APR DRGs) or Clinical Risk Groups (CRGs). Both methods of risk adjustment are categorical clinical models composed of mutually exclusive and exhaustive clinically meaningful risk categories. Each beneficiary can be assigned to only a single risk category. A categorical clinical model allows the rate of occurrence of a performance measure in each risk category to be compared to the rate of occurrence of the performance measure in a reference population (norm) such as a national database. Attachment C contains a detailed description of each of the risk adjustment methods and Attachment D includes a bibliography of published articles using these methods of risk adjustment. Table 1 contains a summary description of the measures.
Table 1: Summary Description of Measures

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>Type</th>
<th>Methodology</th>
<th>Risk Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Measures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Capita Potentially Preventable Admissions</td>
<td>Population</td>
<td>Potentially Preventable Admissions (PPAs)</td>
<td>Clinical Risk Groups (CRGs)</td>
</tr>
<tr>
<td>Per Capita Potentially Preventable Emergency Department Visits</td>
<td>Population</td>
<td>Potentially Preventable Emergency Department Visits (PPVs)</td>
<td>Clinical Risk Groups (CRGs)</td>
</tr>
<tr>
<td>Potentially Preventable Readmissions</td>
<td>Post-Acute</td>
<td>Potentially Preventable Readmissions within 30 days of hospital discharge (PPRs)</td>
<td>Discharge APR DRG with Severity-of-Illness Subclasses</td>
</tr>
<tr>
<td>Potentially Preventable Return Emergency Department Visits</td>
<td>Post-Acute</td>
<td>Potentially Preventable ED Visit within 30 days of hospital discharge (PPREDs)</td>
<td>Discharge APR DRG with Severity-of-Illness Subclasses</td>
</tr>
<tr>
<td>Inpatient Potentially Preventable Complications</td>
<td>Inpatient</td>
<td>One or more Potentially Preventable Complications during a hospital admission (PPCs)</td>
<td>Admission APR DRG with Severity-of-Illness Subclasses</td>
</tr>
<tr>
<td>30-Day Post-Inpatient Procedure Mortality</td>
<td>Inpatient</td>
<td>Death within 30 days of an inpatient procedure</td>
<td>Admission APR DRG with Risk-of-Mortality Subclasses</td>
</tr>
<tr>
<td>Service Volume</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Capita Ambulatory Physician and Care Management Encounter</td>
<td>Population</td>
<td>Any non-ED ambulatory visit with an Evaluation and Management code (PCMEs)</td>
<td>Clinical Risk Groups (CRGs)</td>
</tr>
<tr>
<td>Non-Surgical, Short-Stay, Low-Severity Admissions from the Emergency Department</td>
<td>Emergency Department</td>
<td>Short-stay non-surgical low-severity hospital admissions from the ED</td>
<td>Admission APR DRG with Severity-of-Illness Subclasses</td>
</tr>
<tr>
<td>Admission to a Skilled Nursing or Rehabilitation Facility within Four Days of Hospital Discharge</td>
<td>Post-Acute</td>
<td>Admission to a skilled nursing or rehabilitation facility within four days of hospital discharge</td>
<td>Discharge APR DRG with Severity-of-Illness Subclasses</td>
</tr>
</tbody>
</table>

Socioeconomic Status

In general, Medicaid eligibility guidelines determine low-income beneficiaries. However, the substantial variability in Medicaid income eligibility requirements across states makes dual status an inconsistent measure of relative income. In addition, a dual beneficiary may reside in a community of high or low socioeconomic status (SES) with potentially different health care delivery systems. The Centers for Disease Control (CDC) has developed the Social Vulnerability Index (SVI) that includes a measure of SES for geographic areas based on the following factors:16

- Below Poverty
- Unemployed
- Income
- No High School Diploma

The CDC publishes the SES rank for all counties in the U.S. Based on this ranking, the study identified beneficiaries residing in the 25% of counties with the lowest SES to further distinguish the dual population.
Comparing Performance

Because the under-65 and 65-and-older dual populations are so different, a separate national norm was created for each population. The national norms contain the rate of occurrence of each performance measure for each risk category in the national data. For each performance measure, the expected value (E) for any subset of beneficiaries (e.g., dual beneficiaries) is the number of beneficiaries in each risk category times the national norm value for the risk category summed over all risk categories (indirect rate standardization). The difference between the actual value (A) and the expected value (E) represents lower-than-expected performance if (A-E) is negative (A<E) and higher-than-expected performance if (A-E) is positive (A>E). The %(A-E)/E is the percent by which the actual performance is lower than expected (%(A-E)/E is negative) or higher than expected (%(A-E)/E is positive).

In general, Medicaid eligibility guidelines determine low-income beneficiaries. However, the substantial variability in Medicaid income eligibility requirements across states makes dual status an inconsistent measure of relative income.

The dual and non-dual populations are compared using the %(A-E)/E for each of the nine measures. The potentially preventable measures and the 30-day post-inpatient procedure mortality measure are negative events which a well-functioning delivery system should seek to minimize. Higher-than-expected rates (%(A-E)/E positive) of these measures are indicative of a delivery system that is not functioning as intended. The service volume measures can have multiple interpretations. A lower-than-expected service volume rate could be caused by underutilization (a quality-of-care problem) and a higher-than-expected rate could be caused by over utilization (unnecessary services).

Data

The analysis used data in the Medicare Standard Analytic Files (Limited Data Set (LDS)) for calendar years 2017 and 2018. The LDS files contain 100% of Medicare fee-for-service (FFS) claims data for inpatient, outpatient, skilled nursing facilities and home health agencies. The LDS carrier file contains Medicare FFS claims data for professional providers, including physicians, physician assistants, clinical social workers, and nurse practitioners for a random sample of 5% of Medicare beneficiaries. The LDS Master Beneficiary Summary File (MBSF) contains enrollment data on all Medicare beneficiaries enrolled in or entitled to Medicare within a given calendar year.

Claims data for 2018 was used for the hospital and emergency department measures and includes only hospitals paid under the inpatient prospective payment system (IPPS). For the SES analysis, beneficiaries were assigned to a county based on their county of residence.

For the per capita population measures, it was necessary to build a complete longitudinal record of all FFS claims for each Medicare beneficiary. Because the LDS carrier file is limited to a 5% sample of Medicare beneficiaries, the data used for the per capita population measures was limited to the beneficiaries in the LDS carrier file. The carrier file is a sample of all types of beneficiaries, including...
beneficiaries in Medicare Advantage plans. To create a sample of just FFS beneficiaries, MBSF data was used to apply the following edits:

- Exclude beneficiaries who were not enrolled in both Medicare Part A and B for the full year (i.e., newly enrolled, disenrolled or reported died)
- Exclude beneficiaries who were enrolled in a managed care plan for one or more months
- Exclude beneficiaries who were enrolled in hospice

Calendar year 2017 was used to assign the CRG risk category to each beneficiary and calendar year 2018 was used to assign the population measures to each beneficiary. Depending on the hospital performance measure, the admission APR DRG or discharge APR DRG was used with either the severity-of-illness subclasses or risk-of-mortality subclasses (see Table 1 for details).

**Results**

Table 2 contains the characteristics of Medicare beneficiaries for the dual and non-dual populations in the under-65 and 65-and-over populations. The under-65 population makes up 20.0% of the Medicare FFS population. Overall, 16.7% of the Medicare FFS population is dually eligible. A much higher percent of the under-65 population are duals (65.5%) compared to the 65-and-over population (12.4%). In both the under-65 and 65-and-over populations, the percent of duals living in low SES counties is roughly the same at 19.2% and 18.2%, respectively. The average age of the 65-and-over population is 74.1 years compared to 56.9 for the under-65 population. For non-duals, a higher percent of the under-65 population are minority beneficiaries (22.9%) compared to the 65-and-over population (13.4%). For dual beneficiaries, a slightly lower percent of the under-65 population are minority beneficiaries (34.2%) compared to the 65-and-over population (40.3%).

**Table 2: Characteristics of the dual and non-dual populations**

<table>
<thead>
<tr>
<th>Age 65 or Greater</th>
<th>Age Less Than 65</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Duals</td>
</tr>
<tr>
<td>Enrollees</td>
<td>27,410,353</td>
</tr>
<tr>
<td>Overall % Enrollees</td>
<td>71.1</td>
</tr>
<tr>
<td>Within % Enrollees</td>
<td>100.0</td>
</tr>
<tr>
<td>% FPL</td>
<td>100.0</td>
</tr>
<tr>
<td>Average Age</td>
<td>74.1</td>
</tr>
<tr>
<td>% White</td>
<td>86.6</td>
</tr>
<tr>
<td>% Black</td>
<td>6.6</td>
</tr>
<tr>
<td>% Hispanic</td>
<td>1.0</td>
</tr>
<tr>
<td>% Asian</td>
<td>1.4</td>
</tr>
<tr>
<td>% Native Am</td>
<td>0.4</td>
</tr>
<tr>
<td>% Oth/Unkn race</td>
<td>3.9</td>
</tr>
</tbody>
</table>

The income eligibility limit for Medicaid varies from state to state and can be expressed as a percent of the federal poverty level (FPL). To examine the impact of this variation, each beneficiary was assigned the eligibility limit for a family of three to qualify for full Medicaid eligibility in their state of residence, expressed as a percent of the FPL for 2018. In Table 2, the row labeled “Eligibility %FPL” contains the average Medicaid eligibility percent FLP. Dual beneficiaries residing in low SES...
counties have a %FLP of about 90%. This means that dual beneficiaries who live in counties with lower SES tend to live in states with lower Medicaid eligibility income limits, making it more difficult to qualify for Medicaid from an income perspective.

**Performance for the 65-and-over population**

Using the 65-and-over population and computing expected performance based on the 65-and-over national norm, the %(%A-E)/E for each measure for duals and non-duals is contained in Table 3. The last column in Table 3 further differentiates the dual population by identifying the subset of dual beneficiaries who reside in the 25% of counties with the lowest SES. Table 3 demonstrates that the actual Per Capita Potentially Preventable Admission rate for non-dual beneficiaries is 5.1% lower than the expected risk-adjusted rate and for dual beneficiaries is 25.4% higher than the expected risk-adjusted rate.

**Table 3: %(%A-E)/E for Medicare Beneficiaries 65 and older**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Non-Duals</th>
<th>Duals</th>
<th>Duals Low SES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Measures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Capita Potentially Preventable Admissions (PPAs)</td>
<td>-5.1</td>
<td>25.4</td>
<td>24.5</td>
</tr>
<tr>
<td>Per Capita Potentially Preventable Emergency Department Visits (PPVs)</td>
<td>-6.1</td>
<td>36.8</td>
<td>33.1</td>
</tr>
<tr>
<td>Potentially Preventable Readmissions (PPRs)</td>
<td>-4.3</td>
<td>16.2</td>
<td>17.2</td>
</tr>
<tr>
<td>Potentially Preventable Return Emergency Department Visits (PPREDs)</td>
<td>-5.3</td>
<td>20.2</td>
<td>29.3</td>
</tr>
<tr>
<td>Inpatient Potentially Preventable Complications (PPCs)</td>
<td>-1.8</td>
<td>8.2</td>
<td>5.7</td>
</tr>
<tr>
<td>30-day Post Inpatient Procedure Mortality</td>
<td>0.0</td>
<td>-0.2</td>
<td>14.3</td>
</tr>
<tr>
<td>Service Volume</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Capita Ambulatory Physician and Care Management Encounter (PCMEs)</td>
<td>0.5</td>
<td>-3.2</td>
<td>-9.6</td>
</tr>
<tr>
<td>Non-Surgical, Short-Stay, Low-Severity Admissions From the Emergency Department</td>
<td>2.8</td>
<td>-10.1</td>
<td>-17.8</td>
</tr>
<tr>
<td>Admission to a Skilled Nursing or Rehabilitation Facility Within Four Days of Hospital Discharge</td>
<td>-5.1</td>
<td>20.3</td>
<td>9.8</td>
</tr>
</tbody>
</table>

With the exception of 30-day Post-Inpatient Procedure Mortality, duals have a higher-than-expected risk-adjusted rate for all the quality measures, indicating poor performance (excess number of quality failure). There is virtually no difference between the actual and risk-adjusted expected rate for the 30-day Post-Inpatient Procedure Mortality rate for duals and non-duals except for duals residing in low SES areas who have a 14.3% higher-than-expected rate. For the subset of duals residing in low SES areas, the higher-than-expected risk-adjusted rate is consistent with the overall dual population except for Potentially Preventable Return Emergency Department Visits (increases from 20.2 to 29.3% higher than expected) and 30-day Post-Inpatient Procedure Mortality (increases from -0.2 to 14.3% higher than expected).

Results for the service volume measures are less consistent than for the quality measures. For the Per Capita Ambulatory Physician and Care Management Encounters measure, there is only a small
difference between the actual and the expected risk-adjusted rate except for duals residing in low SES areas who have a 9.6% lower-than-expected rate. The Non-Surgical Short-Stay, Low-Severity Admissions from the Emergency Department measure shows lower-than-expected risk-adjusted rates with the expected risk-adjusted rates even lower for the subset of duals residing in low SES areas (actual rate 17.8% lower than expected). Thus, dual beneficiaries are less likely to be admitted to the hospital from the emergency department for low-severity medical care and have fewer physician or care management visits than non-dual beneficiaries, especially for the subset of duals residing in low SES areas. Results for the Admission to a Skilled Nursing or Rehabilitation Facility within Four Days of Hospital Discharge measure are somewhat surprising with duals having a higher-than-expected rate (20.3%). This may be associated with many of the 65-and-over duals residing in nursing homes and requiring post-hospital discharge skilled nursing care before returning to a nursing home. Unfortunately, the data did not identify beneficiaries residing in nursing homes so this hypothesis could not be directly tested.

**Performance for the under-65 population**
Using the under-65 population and computing expected performance based on an under-65 national norm, the \( \% ( A-E ) / E \) for each measure for duals and non-duals is contained in Table 4. For the quality measures, the performance of the under-65 population was consistent with the 65-and-over population with duals having a higher-than-expected risk-adjusted rate for all the quality measures with the exception of the 30-day Post-Inpatient Procedure Mortality. While there was virtually no difference in the 30-day Post-Inpatient Procedure Mortality rate for duals and non-duals for the 65-and-over population, in the under-65 population the non-duals have a higher-than-expected rate (9.0% above expected) and the duals have lower-than-expected rate (7.4% below expected).

**Table 4: \( \% ( A-E ) / E \) for Medicare Beneficiaries under 65**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Non-Duals</th>
<th>Duals</th>
<th>Duals Low SES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quality Measures</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Capita Potentially Preventable Admissions (PPAs)</td>
<td>-4.6</td>
<td>2.8</td>
<td>9.8</td>
</tr>
<tr>
<td>Per Capita Potentially Preventable Emergency Department Visits (PPVs)</td>
<td>-29.9</td>
<td>19.3</td>
<td>10.9</td>
</tr>
<tr>
<td>Potentially Preventable Readmissions (PPRs)</td>
<td>-12.6</td>
<td>8.2</td>
<td>6.3</td>
</tr>
<tr>
<td>Potentially Preventable Return Emergency Department Visits (PPREs)</td>
<td>-26.0</td>
<td>15.8</td>
<td>13.8</td>
</tr>
<tr>
<td>Inpatient Potentially Preventable Complications (PPCs)</td>
<td>-3.9</td>
<td>2.8</td>
<td>0.1</td>
</tr>
<tr>
<td>30-Day Post-Inpatient Procedure Mortality</td>
<td>9.0</td>
<td>-7.4</td>
<td>1.2</td>
</tr>
<tr>
<td><strong>Service Volume</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per Capita Ambulatory Physician and Care Management Encounter (PCMEs)</td>
<td>-0.8</td>
<td>0.5</td>
<td>-3.3</td>
</tr>
<tr>
<td>Non-Surgical, Short-Stay, Low-Severity Admissions from the Emergency Department</td>
<td>18.1</td>
<td>-8.9</td>
<td>-11.6</td>
</tr>
<tr>
<td>Admission to a Skilled Nursing or Rehabilitation Facility within Four Days of Hospital Discharge</td>
<td>-16.3</td>
<td>11.5</td>
<td>-0.9</td>
</tr>
</tbody>
</table>
In analyzing service volume measures for the under-65 population, there was virtually no difference between the dual and non-dual populations for Per Capita Ambulatory Physician and Care Management Encounters. Performance results for duals and non-duals for the under-65 population are consistent with the 65-and-over population for Non-Surgical, Short-Stay, Low-Severity Admissions from the Emergency Department and Admission to a Skilled Nursing or Rehabilitation Facility within Four Days of Hospital Discharge.

While the magnitude of the performance difference between duals and non-duals differed between the under-65 and 65-and-over populations, the pattern of above and below expected was quite consistent. The one exception was the 30-day Post-Inpatient Procedure Mortality rate. The overall pattern for duals in both the under- and over-65 populations is higher-than-expected rates for the quality measures indicating poor performance (excess number of quality failure), and with the exception of Admission to a Skilled Nursing or Rehabilitation Facility within Four Days of Hospital Discharge, to have lower-than-expected rates for the services volume measures (fewer than expected services).

**Summary and Conclusions**

While the dual population is primarily a low-income population, it is composed of two very different subpopulations with the under-65 population being primarily disabled beneficiaries and the 65-and-over population having a substantial proportion of beneficiaries residing in nursing homes. The care delivered to the dual and non-dual Medicare populations was measured using six quality measures and three service volume measures. The quality measures for both the under- and over-65 populations reveal a pattern of higher-than-expected risk-adjusted rates indicating poor performance (excess number of quality-of-care failures). Dual beneficiaries have more than expected per capita admissions and emergency department visits, more readmission and post-discharge returns to the emergency department and more inpatient complications. The service volume measures indicate that dual beneficiaries are less likely to be admitted from the emergency department for low-severity medical care and have fewer physician or care management visits than non-dual beneficiaries, especially for duals residing in low socioeconomic areas. These results demonstrate that there are substantive differences in the care delivered to Medicare dual and non-dual beneficiaries. Overall, the analysis suggests that the health care delivery system is performing at a less effective level for the dual Medicare population.
References


17 Kaiser Family Foundation (KFF). Medicaid Income Eligibility Limits for Parents, 2002-2022. Web page: https://www.kff.org/medicaid/state-indicator/medicaid-income-eligibility-limits-for-parents/?currentTimeframe=0&selectedDistributions=january-2018&selectedRows=%7B%22states%22:%7B%22all%22:%7B%7D%7D%22wrapups%22:%7B%22united-states%22:%7B%7D%7D%7D%22sortModel%3D%7B%22collId%3D%22%22Location%3D%22%22sort%3D%22%22asc%3D%22%7D
Appendix A: Description of Performance Measures

Potentially Preventable Admissions (PPAs)
Potentially Preventable Admissions (PPAs) are hospital admissions that can often be avoided. There are six broad categories of PPAs:

- Admissions for chronic disease management that could potentially have been managed in the outpatient setting (e.g., asthma)
- Admissions for acute diseases that could potentially have been managed in the outpatient setting (e.g., viral pneumonia)
- Admissions for a procedure that can be done in an outpatient setting (e.g., cardiac catheterization for non-acute disease such as atherosclerosis)
- Admissions for a procedure for which there is a less invasive alternative procedure (e.g., percutaneous coronary angioplasty with a stent instead of coronary bypass surgery)
- Admissions for a procedure that research has shown to be prone to overuse (e.g., spinal procedures for back pain)
- Admissions that could potentially have been avoided for residents of a residential care facility such as a skilled nursing facility (e.g., trauma due a fall)

The most prevalent PPAs are for medical management of chronic and acute diseases. These hospital admissions may result from hospital or ambulatory care inefficiency, lack of adequate access to outpatient care, or inadequate coordination of ambulatory care services. In many cases PPAs are for flare-ups of chronic conditions (e.g., heart failure) for which adequate monitoring and follow-up, such as proper medication management, could have avoided the need for hospitalization.

Potential preventability is assessed relative to the care given in the immediate period preceding a hospital admission (months). Conditions that require an extended period of coordinated and integrated care are not considered potentially preventable. For example, an admission for renal failure is not considered a PPA because it is not preventable unless appropriate care has been given for several years before the admission making it difficult to judge potential preventability based solely on the care given in the immediate period preceding the admission. Preventability is also assessed based on the relative acuteness of the reason for the admission. For example, an admission for a cardiac catheterization is considered potentially preventable for patients with a diagnosis of coronary atherosclerosis, but not preventable for patients with an acute myocardial infarction or unstable angina.

Medicare beneficiaries living in residential care facilities such as a SNF or nursing home generally are expected to be receiving a higher level of coordinated care than beneficiaries living at home. Many conditions such as fever, urinary tract infections, metabolic disturbances and pneumonia can often be managed in a residential care facility, thereby avoiding the need for hospitalization. Other conditions such as diseases of the skin and injuries due to falls should be more readily avoided in a residential care facility setting. In determining whether an admission is potentially preventable, PPAs apply a broader list of conditions that are considered potentially preventable when a beneficiary is living in a residential care facility. For more detail go to: https://www.3m.com/3M/en_US/health-information-systems-us/drive-value-based-care/patient-classification-methodologies/ppa/
Potentially Preventable Emergency Department Visits (PPVs)

Potentially Preventable ED Visits (PPVs) are ED visits that can often be avoided. There are five broad categories of PPVs:

- ED visits for chronic disease management that could potentially have been managed in the outpatient setting (e.g., asthma)
- ED visits for minor acute conditions that could potentially have been managed in the outpatient setting (e.g., constipation)
- ED visits for signs and symptoms that do not require urgent care (e.g., lumbago)
- ED visits for minor trauma (contusions)
- ED visits that could potentially have been avoided for residents of a residential care facility such as a skilled nursing facility (e.g., trauma due to a fall)

The most prevalent PPVs will be for minor trauma and pain. These hospital emergency department visits may result from lack of access to adequate primary care or inadequate coordination of ambulatory care services. PPVs also include chronic conditions (e.g., hypertension) for which adequate monitoring and follow-up, such as proper medication management, could have avoided the need for an ED visit. A comprehensive evaluation of potentially preventable ED visits can provide a more complete assessment of the continuity of care and of the functioning of the health care delivery. For more detail go to: https://www.3m.com/3M/en_US/health-information-systems-us/drive-value-based-care/patient-classification-methodologies/ppv/

Potentially Preventable Complications (PPCs)

Potentially Preventable Complications (PPCs) are harmful events (accidental laceration during a procedure) or negative outcomes (hospital acquired pneumonia) that may result from the process of care and treatment rather than from a natural progression of underlying disease. There are 57 PPCs that encompass the full range of complications. For each PPC, the patients considered at risk for the PPC and the clinical circumstances under which the PPC could be consider potentially preventable are specified. Any patient who had one or more PPCs during their hospital stay is considered to have a PPC. For more detail go to: https://www.3m.com/3M/en_US/health-information-systems-us/drive-value-based-care/patient-classification-methodologies/ppcs/

Potentially Preventable Readmissions (PPRs)

Potentially Preventable Readmissions (PPRs) are return hospitalizations within 30 days following a prior hospitalization. PPRs may result from deficiencies in the process of care (readmission for a surgical wound infection) or inadequate post-discharge follow-up (prescription not filled) rather than unrelated events that occur post discharge (broken leg due to trauma). Readmissions may result from actions taken or omitted during the initial hospital stay, such as incomplete treatment or poor care of the underlying problem, or from poor coordination of services at the time of discharge and afterwards, such as incomplete discharge planning or inadequate access to care. The admissions considered at risk for a PPR and the clinical circumstances under which a subsequent readmission is considered potentially preventable are specified in the PPR logic. A PPR is assigned to any admission that was followed by one or more potentially preventable readmissions during the 30 days following a hospital discharge. For more detail go to: https://www.3m.com/3M/en_US/health-information-systems-us/drive-value-based-care/patient-classification-methodologies/pprs/
Potentially Preventable Return Emergency Department Visits Following Hospital Discharge (PPRED)

Potentially Preventable Return Emergency Department (ED) Visits Following Hospital Discharge (PPREDs) are return ED visits within 30 days following a prior hospitalization. PPREDs are identified using a modification of the PPR methodology to determine discharges at risk and potentially preventable ED visits. Similar to PPRs, PPREDs may result from deficiencies in the process of care (ED visit for a post-op infection) or inadequate post-discharge follow-up (no primary care follow-up) rather than unrelated events that occur post discharge (trauma). Return ED visits may result from actions taken or omitted during the initial hospital stay, such as incomplete treatment or poor care of the underlying problem, or from poor coordination of services at the time of discharge and afterwards, such as incomplete discharge planning or inadequate access to care. A PPRED is assigned to any patient who had at least one PPRED during the 30 days following a hospital discharge. For more detail go to: https://www.3m.com/3M/en_US/health-information-systems-us/drive-value-based-care/patient-classification-methodologies/pprs/

Surgical Mortality

The surgical mortality measure is based on a 30-day post-procedure time period that includes in-hospital and community deaths. Patients for whom a hospital was not considered reasonably responsible for the patient outcome, such as patients who left against medical advice, were transferred in, were in critical condition at the time of admission (APR DRG admission risk of mortality level 4), were admitted for conditions that inherently have a high risk of mortality (extensive third-degree burns) or had a clinically unrelated readmission (a PPR) during the 30-day post-procedure period were excluded. However, hospitals were considered responsible for mortality during any clinically related readmissions (non PPRs) in the 30-day post-procedure period. Surgical patients who were not excluded are the at-risk population for the 30-day post-procedure measure. For more detail go to: https://multimedia.3m.com/mws/media/2044672O/surgical-mortality-hospital-quality.pdf

Post-Discharge Facility Admission

The Post-discharge Facility Admission measure identifies patients who were admitted to a skilled nursing facility or rehabilitation facility within four days following a hospital discharge. Hospital discharges considered at risk are restricted to discharges for which home care may be a viable alternative to care provided in an institution. Patients for whom the hospital’s intended PAC plan of care is inconsistent with a PAC facility admission (e.g., a patient with a discharge status of hospice) or a patient who has an unanticipated event during the PAC four-day window (e.g., a patient with a discharge status of home but who was admitted to hospice on the second day before being admitted to a PAC facility on the fourth day following hospital discharge) were excluded from the PAC facility admission measure. By eliminating such ambiguous situations, the patients included in the PAC facility admission measure represent patients whose anticipated post-hospital discharge plan of care is consistent with a PAC facility admission. For more detail go to: https://multimedia.3m.com/mws/media/2051382O/report-geographic-variation-in-post-acute-care-facility-admissions.pdf.

Site Neutral Procedures

Site neutral procedures are inpatient surgical cases that could reasonably be performed in an outpatient setting. The procedures considered eligible to be shifted from inpatient to outpatient were required to meet four criteria:

- The procedure is currently performed in both an inpatient and outpatient site of service
- The combined inpatient and outpatient volume of the procedure is substantial
- For inpatients the procedure will cause payment to be increased
- It is possible to identify equivalent procedures using the inpatient and outpatient procedure code sets.

The patients considered eligible to be shifted from inpatient to outpatient were required to meet three criteria:

- For inpatients the procedure must be clinically consistent with the reason for hospital admission
- High severity-of-illness patients at the time of admission are excluded
- Complex patients with multiple distinct procedure are excluded

Patients who meet these criteria and have a procedure that meets the site neutral criteria are considered eligible to be shifted from inpatient to outpatient. The Site Neutral Measure is the fraction of site neutral procedures performed in an inpatient setting. For more detail go to: https://multimedia.3m.com/mws/media/2092871O/the-shift-to-outpatient-surgery-geographic-variation-and-site-neutral-payments.pdf

Hospital Admissions from the Emergency Department

The ED Admit measure identifies hospital admissions that are a low-severity medical admission from the Emergency Department. Patients who died, who were admitted for surgical procedures, who were admitted for conditions that are inherently high risk (e.g., AMI), who were at high severity (admission APR DRG severity of illness 3 or 4), who were covered by medical necessity considerations (e.g., behavioral health) and who had a length of stay of more than three days are excluded from the ED Admit measure. The ED visits that were not excluded are the at-risk-population for the ED Admit measure and represent low-severity medical admissions (chest pain, upper respiratory infections, etc) for which outpatient care may be a viable option. For the at-risk ED visits, the ED Admit rate is the sum of ED visits that were admitted divided by the sum of ED visits that were admitted plus the ED visits that were not admitted.

Physician and Care Management Encounters (PCMEs)

The ambulatory visit measure is the per capita number of physician or care management encounters. The encounters are identified by the reporting of an Evaluation and Management (E&M) code on a professional service fee-for-service claim for services deliver in specific sites of service. Encounters that have a site of service of a residential facility or that do not include care management services were excluded, including hospital inpatient, emergency department, ambulatory surgery center, skilled nursing facility, inpatient rehabilitation facility, ambulance, immunization center and laboratory. Encounters that have a site of service of physician office, hospital outpatient clinic, home, assisted living, nursing home and other clinics and outpatient facilities were included.

Inpatient Length of Stay (LOS)

Patients who died during the hospital stay, were transferred to another acute-care hospital or left a hospital against medical advice were excluded from the LOS measure because they do not represent the full course of treatment. The APR DRGs have low and high LOS outlier values for each APR DRG and severity-of-illness subclass. Patients with LOS below the low LOS outlier value are atypical and usually represent data errors and are excluded. Patients with LOS that exceeds the high LOS outlier are less likely to be data errors and more likely to reflect individual hospital variation. Patients with LOS that exceeds the high LOS outlier value have their LOS truncated and set at the high LOS outlier value. This allows a consistent pattern of long length of stays to contribute to the evaluation of LOS performance without having a small number of patients with an extreme LOS disproportionately impact the evaluation of LOS performance. The LOS measure is the arithmetic mean LOS.
Appendix B: Bibliography of Publicly Available Articles and Reports – PPAs, PPVs, PPCs, PPRs, PPREDs

All articles and reports are publicly available and are listed in chronological order. The opinions and conclusions in these articles and reports are solely those of the authors.

Potentially Preventable Admissions (PPAs)

Articles, Reports, and Book Chapters


Websites


Superior Health Plan. 3M Health Information. Available at https://www.superiorhealthplan.com/content/dam/centene/Superior/Provider/PDFs/SHP_20195046-3M-HIS-Resource-Guide-P-508-03202019.pdf

**Potentially Preventable Emergency Department Visits (PPVs)**

*Articles, Reports, and Book Chapters*


Websites


**Potentially Preventable Complications (PPCs)**

*Articles, Reports, and Book Chapters*


Calikoglu S, Murray R, Feeney D. Hospital pay-for-performance programs in Maryland produced strong results, including reduced hospital-acquired conditions. Health Aff (Millwood). 2012;31(12):2649-2658


Websites

3M Health Information Systems. www.3m.com/his/methodologies. Overview of the 3M patient classification methodologies, with a link to a separate PPC sub-page.


Texas Department of State Health Services. https://www.dshs.texas.gov/thcic/hospitals/Potentially-Preventable-Complications-Reports/. Reports on statewide all-payer PPC incidence.

Potentially Preventable Readmissions (PPRs)

**Articles, Reports, and Book Chapters**


Goldfield N. Strategies to decrease the rate of preventable readmission to hospital. CMAJ. 2010;182(6):538-539.


Goldfield N. How important is it to identify avoidable hospital readmissions with certainty? CMAJ. 2011;183(7):e368-369.


Mississippi Division of Medicaid. DOM to phase in quality incentive payment program (QIPP) for hospitals. MS Medicaid Provider Bulletin. 2019;25(3):pp. 1-2


Websites


Texas Department of State Health Services--readmissions. www.dshs.texas.gov/thcic/hospitals/Potentially-Preventable-Readmission-Reports/. Accessed 2020


**Potentially Preventable Return Visits to the Emergency Department (PPREDs)**

*Articles, Reports, and Book Chapters*


*Websites*

Appendix C: Risk Adjustment Methods

All Patient Refined DRGs (APR DRGs)
All Patient Refined Diagnosis Related Groups (APR DRGs) are a categorical clinical model that is composed of base DRGs that are subdivided into four severity-of-illness levels based on the extent of physiologic decompensation or organ system loss of function and four risk of mortality subclasses. The underlying clinical principles of APR DRGs are that the severity of illness and risk of morality are highly dependent on the patient’s underlying clinical problems, and that patients with high severity of illness and risk of mortality are usually characterized by multiple serious illnesses. In the APR DRGs, the assessment of the severity of illness and risk of mortality of a patient is specific to the base APR-DRG to which a patient is assigned. In other words, the determination of the severity of illness and risk of mortality is disease specific. In APR DRGs, high severity of illness and risk of mortality are primarily determined by the interaction of multiple diseases. Patients with multiple comorbid conditions involving multiple organ systems represent difficult-to-treat patients who tend to have poor outcomes. The APR DRG is computed at the time of admission and at the time of discharge. For more detail go to: https://www.3m.com/3M/en_US/health-information-systems-us/drive-value-based-care/patient-classification-methodologies/apr-drgs/

Clinical Risk Groups (CRGs)
The Clinical Risk Groups (CRGs) are a categorical clinical model that assigns each individual in a population to a single mutually exclusive risk group that relates the clinical and demographic characteristics of an individual to their outcomes and health care resource use. CRGs describe the health status and burden of chronic illness of individuals and are subdivided into up to six severity-of-illness levels. Each CRG and severity subgroup is used to describe the health status of groups of individuals with a similar burden of chronic illness. Individuals with severe chronic disease in multiple organ systems are the patients who are most difficult to treat, experience poorer outcomes, and consume a disproportionate share of health care resources.

The CRGs (Version 2.1) are composed of 332 base CRGs that describe the beneficiary’s most significant chronic conditions and explicit severity levels that distinguish differences in disease burden due to severity of illness resulting in 1,414 individual CRGs. The individual CRGs are aggregated into nine health statuses ranging from catastrophic to healthy.

Status 1 – Healthy
Status 2 – History of Acute Disease e.g., Chest Pain
Status 3 – Single Minor Chronic Disease e.g., Migraine
Status 4 – Minor Chronic Disease in Multiple Organ Systems e.g., Migraine and BPH
Status 5 – Single Dominant or Moderate Chronic Disease e.g., CHF
Status 6 – Dominant or Moderate Chronic Disease in Multiple Organ Systems, e.g., CHF, COPD
Status 7 – Dominant Chronic Disease in Three or More Organ Systems, e.g., CHF, COPD, DM
Status 8 – Malignancy, Under Active Treatment, e.g., Lung Cancer
Status 9 – Catastrophic Conditions, e.g., Major Organ Transplant

Based on the severity levels of the chronic conditions that comprise each status, beneficiaries in the nine statuses are assigned a severity level between one and six resulting in 53 aggregated CRG risk categories. The CRGs are a transparent system with a definition manual available for inspection. For more detail go to: https://www.3m.com/3M/en_US/health-information-systems-us/drive-value-based-care/patient-classification-methodologies/crgs/
Appendix D: Bibliography of Publicly Available Articles and Reports – CRGs, APR DRGs

All articles and reports are publicly available and are listed in chronological order. The opinions and conclusions in these articles and reports are solely those of the authors.

Clinical Risk Groups (CRGs)

Articles, Reports, and Book Chapters


All Patient Refined Diagnosis Related Groups (APR DRGs)

Articles, Reports, and Book Chapters


Goldfield N, Averill R. On "Risk-adjusting acute myocardial infarction mortality: are APR DRGs the right tool?" Health Serv Res. 2000;34(7):1491-1495; discussion 1495-1498.

Romano PS, Chan BK. Risk-adjusting acute myocardial infarction mortality: are APR DRGs the right tool? Health Serv Res. 2000;34(7):1469-1489


Shen Y. Applying the 3M All Patient Refined Diagnosis Related Groups Grouper to measure inpatient severity in the VA. Med Care. 2003;41(6 Suppl):Il103-10


Averill R, Fuller R. Low-cost outliers as alternatives to the two-midnight rule. Healthc Financ Manage. 2014(December)


Averill RF, Fuller RL. Implementing a site-neutral PPS. Healthc Financ Manag. 2016(April).


Fuller R, Hughes J. DNR orders known at the time of admission can improve hospital mortality ratings [abstract]. HSR. 2020;55(51):96
Websites


Indiana Department of Health. Hospital Discharge Data [webpage]. www.in.gov/isdh/20624.htm


Ohio Department of Medicaid Hospital Payment Policy. https://medicaid.ohio.gov/Provider/ProviderTypes/HospitalProviderInformation/HospitalPaymentPolicy. Accessed 2020


Superior Health Plan. 3M Health Information. Available at https://www.superiorhealthplan.com/content/dam/centene/Superior/Provider/PDFs/SHP_20195046-3M-HIS-Resource-Guide-P-508-03202019.pdf
