



**To:** Peter Begans, SVP Public & Government Affairs, SCAN Health Plan

**From:** Dianne Munevar, Edward Drozd

**Date:** March 30, 2012

**Re:** Analysis of SCAN Health Plan's Dual Eligible Population: Technical Specifications

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SCAN Health Plan asked Avalere Health ("Avalere") to conduct a study comparing hospitalization and 30-day all-cause readmission rates between SCAN Health Plan's Medicare-Medicaid dual-eligible Medicare Advantage (MA) plan members to similar dual eligibles continuously enrolled in the original Medicare fee-for-service (MFFS) and MediCal in 2009 and 2010. Avalere used 2009 and 2010 claim-level data from SCAN Health Plan's Medicare Advantage (MA) plan and from the Centers for Medicare & Medicaid Services (CMS) to compare rates of potentially preventable hospitalizations and for 30-day all-cause readmissions. The data were drawn from 2009 and 2010 data since these are the latest years for which fee-for-service Medicare data are available. The analyses featured a matched cohort design, where each SCAN Health Plan dual eligible in the analysis was matched to the most similar MFFS dual-eligible beneficiary in California, based on similar risk profiles. Using the matched sample, Avalere also estimated the potential cost-savings that MFFS could achieve if hospitalization and readmission rates for dual-eligible MFFS beneficiaries were the same as the rates for SCAN dual eligibles. Results of the analysis can be found on the Avalere Health website at [www.avalerehealth.net](http://www.avalerehealth.net).

This memo presents details of Avalere's approach to conducting these analyses. The first section describes the data sources. The next four sections describe the technical approach to the matched cohort design, potentially preventable hospitalizations and readmissions, and program cost-savings analyses. The final two sections present the assumptions and limitations behind these analyses and a brief conclusion.

## **Data Sources**

To compute the Medicare outcomes and cost-savings, Avalere used the Medicare five percent Standard Analytical Files (SAFs), a random sample of MFFS beneficiaries, from 2009 and 2010. California MFFS (CA-MFFS) dual eligibles were identified as beneficiaries who were enrolled in MediCal for at least one month in 2010, and were continuously enrolled in MFFS for all of 2009 and 2010, or until death in 2010. Avalere used the 2009 Medicare SAFs as the data source for risk-adjustment purposes. To compute the SCAN Health Plan outcomes, Avalere used all-provider encounter, claim-level data provided by SCAN for 2009 and 2010. The analyses were conducted on dual eligibles that were enrolled in SCAN Health Plan's Medicare-MediCal (Medi-Medi) plan for at least one month in 2010, and were continuously enrolled in SCAN Health Plan for all of 2009 and 2010, or until death in 2010.

To construct the matched cohorts, enrollees in both groups were limited to California residents, age 18 or older, continuously enrolled in either SCAN Health Plan or original Medicare Parts A and B for the full 24 months of 2009 and 2010 (or until death in 2010), and were dual eligible for at least one month in 2010. The resulting sample of SCAN Health Plan's dual eligible enrollees (5,552 members) was compared to a similar size sample of CA-MFFS beneficiaries with similar risk profiles.

## **Matched Cohort Analysis**

The matched cohort analysis used a propensity score matching (PSM) model, a two-step quasi-experimental analysis designed to identify and compare two cohorts, simulating a randomized control trial where one cohort is identified as the "treatment group" and receives the intervention (in this case, "SCAN's management of its dual-eligible population") while the other group is considered the "control group" and does not receive the intervention (in this case, "CA-MFFS").

The first step of the analysis involves a logistic regression which includes all SCAN Health Plan and CA-MFFS dual eligibles satisfying the above criteria. This regression estimates the likelihood of each enrollee being in the SCAN Health Plan group (an indicator for SCAN Health Plan dual eligible was the dependent variable) using the following patient-level characteristics, listed below, as explanatory variables:

- Resident of California

- Age ranges (Under 65, 65-74, 75-84, 85+)
- Dual eligibility duration in 2009 and 2010 (Number of months)
- Gender
- Clinical condition group (see below for detailed information)
- Psychiatric/substance abuse hospitalization in the past year
- Agency for Healthcare Research and Quality (AHRQ) Healthcare Cost and Utilization Project (HCUP) Clinical Classifications Software (CCS) categories
- CMS Hierarchical Condition Categories (HCCs)
- Acute inpatient hospital utilization in 2009
- Post acute care (PAC) utilization in 2009 (limited to skilled nursing facilities and home health agencies, since inpatient rehabilitation facilities are included as acute inpatient hospitals)

Clinical condition groups were created by mapping enrollees' prior year inpatient and outpatient claims (excluding DME and hospice) into AHRQ HCUP CCS Level 3 condition categories and then combining and aggregating up to a total of 23 condition groups. The 23 clinical condition groups used in this analysis are:

- Bacterial infections
- Behavioral health and substance abuse disorders
- Congestive heart failure (CHF)
- Chronic obstructive pulmonary disease (COPD)
- Cancer
- Diabetes
- Gastrointestinal disorders
- Hematologic disorders
- Major acute coronary events (MACE)
- Musculoskeletal disorders
- Neurological disorders
- Other cardiovascular disorders
- Other conditions and factors influencing health care

- Other endocrine, immunity, and metabolic disorders
- Other ill-defined conditions and factors' influencing health care
- Other injuries and poisoning
- Other respiratory disorders
- Pneumonia
- Renal failure
- Skin disorders
- Stroke and transient ischemic attack (TIA)
- Traumatic injury

The second step of the analysis matches each SCAN Health Plan dual eligible with a single CA-MFFS dual eligible who most resembled the SCAN Health Plan dual eligible on these dimensions. This was accomplished using a propensity score generated by the logistic regression. The PSM matching featured a 1:1 match, without replacement, using a caliper (maximum propensity score distance) of 0.3. These criteria excluded 32 SCAN dual eligibles—less than 1 percent of the original SCAN sample—and 43,184 CA-MFFS dual eligibles—89 percent of the original CA-MFFS sample.

### **Potentially Preventable Hospitalizations**

To identify potentially preventable hospitalizations, Avalere used the AHRQ Prevention Quality Indicators (PQI) Overall Composite, which identifies potential issues of access to, and quality of, ambulatory care in a given geographic area, that may have an impact on hospitalizations for particular conditions. The overall composite measure consists of twelve individual PQI measures, each equal to the number of hospitalizations (acute admissions) for a particular ambulatory care-sensitive condition (ACSC) per 100,000 persons. The twelve individual PQI measures are:

- Diabetes Short-Term Complications Admission Rate (PQI 1)
- Diabetes Long-Term Complications Admission Rate (PQI 3)
- Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 5)
- Hypertension Admission Rate (PQI 7)

- Congestive Heart Failure (CHF) Admission Rate (PQI 8)
- Dehydration Admission Rate (PQI 10)
- Bacterial Pneumonia Admission Rate (PQI 11)
- Urinary Tract Infection Admission Rate (PQI 12)
- Angina Without Procedure Admission Rate (PQI 13)
- Uncontrolled Diabetes Admission Rate (PQI 14)
- Asthma in Younger Adults Admission Rate (PQI 15)
- Rate of Lower-Extremity Amputation Among Patients With Diabetes (PQI 16)

Avalere used the Medicare inpatient SAFs and SCAN's all-encounter and claims data, limited to specific types of bill (TOBs) to identify acute inpatient hospital claims. TOBs were limited to inpatient hospitals (11x), religious nonmedical hospitals (41x), and critical access hospitals (85x). For a complete list of administrative specifications, please see AHRQ's website at [http://www.qualityindicators.ahrq.gov/modules/pqi\\_resources.aspx](http://www.qualityindicators.ahrq.gov/modules/pqi_resources.aspx).

### **30-Day Plan All-Cause Hospital Readmissions**

To measure readmissions, Avalere used the Healthcare Effectiveness Data and Information Set (HEDIS) 30-Day Plan All-Cause Readmission (PCR) rate measure, maintained by the National Committee for Quality Assurance (NCQA). The HEDIS 30-day PCR rate estimates the number of acute inpatient stays that were followed by an acute readmission for any diagnosis within 30 days of hospital discharge.

Before estimating the readmission rate, Avalere identified acute inpatient hospital stays using TOBs 11x, 41x, and 85x. Claims were then combined to create a complete acute inpatient stay where overlapping claims had the same admission and discharge dates, including claims for consecutive stays where the patient was not discharged until the last claim. Furthermore, diagnosis and discharge information from hospital-to-hospital transfers was included with the transfer source stay when the discharge date of the transferring hospital was the same as the admission date of the receiving hospital. Index stays were identified as all acute inpatient stays where there were no other acute inpatient discharges in the 30 days prior to the index admission date. Readmissions were identified as any acute inpatient stay for any diagnosis with an admission date within 30 days of a previous index discharge date (excluding transfers).

This measure is risk-adjusted for patient demographics (age and gender), medical severity identified with CMS' Hierarchical Condition Categories (CMS-HCCs), and surgeries that occurred during the index acute inpatient stay. Applying the risk-adjustment methodology, Avalere computed the "average adjusted rate"—the readmission rate expected based on national average readmission patterns and the demographics and case mix severity of the population measured. The lower the observed rate is relative to the expected rate, the better the readmission performance relative to national all-Medicare norms.

For a complete list of administrative specifications, please check NCQA's website at <http://www.ncqa.org/tabid/1250/Default.aspx>.

### **Medicare Program Expenditure Savings**

The Medicare program savings (cost) analyses attempt to measure how much the original MFFS program would save if the PQI hospitalization and HEDIS 30-day all-cause readmission rates were the same as those for SCAN Health Plan. These estimates focus on cost-savings for MFFS dual eligibles who most resemble those identified in the SCAN Health Plan sample for use in this analysis.

For hospitalization savings, Avalere compared the hospitalization rate for each of the twelve PQI measures that comprise the overall composite between the SCAN and CA-MFFS matched cohorts to determine the difference in the number of hospitalizations between the groups and to determine the number of potential hospitalizations saved in each PQI condition. Then, Avalere estimated the Medicare-only average total cost of hospitalizations within each PQI condition, for the CA-MFFS matched cohort using the 2009 and 2010 Medicare SAFs five percent sample. Average total costs include some cases where hospital payments were \$0 and where, in some cases, average payment differences were negative for cases where SCAN Health Plan's dual eligibles had higher hospitalization rates than CA-MFFS for three PQI measures<sup>1</sup>.

The average total cost was multiplied by the number of potentially avoided hospitalizations to estimate the total amount that Medicare could save on the CA-MFFS dual eligibles.

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<sup>1</sup> Angina Without Procedure Admission Rate (PQI 13), Hypertension Admission Rate (PQI 7), and Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 5)

For readmission cost-savings, Avalere first multiplied the HEDIS 30-day PCR rate ratio of the observed readmission rate to the expected ("observed-to-expected") rate for SCAN Health Plan by the expected rate for CA-MFFS dual eligibles in the analysis sample and then subtracted this quantity from the actual observed CA-MFFS rate. To determine the number of potential readmissions saved, Avalere then multiplied the rate difference described above by the number of matched cohort CA-MFFS hospitalizations. Avalere then estimated the Medicare-only average total cost of readmissions for the CA-MFFS matched cohort using the 2009 and 2010 Medicare SAFs. The average total cost was multiplied by the number of potentially avoided readmissions to estimate the total amount that Medicare would save on the CA-MFFS dual eligibles if CA dual eligibles had readmission rates that were equivalent to SCAN's dual eligibles.

Lastly, because Avalere only used a five percent sample of CA-MFFS beneficiaries, Avalere multiplied the total cost-savings estimate for potentially avoided hospitalizations and readmissions by 20 to account for potential annual savings across the California dual eligible population who may have similar risk profiles as the SCAN dual eligibles identified in the analyses.

### **Assumptions and Limitations**

- All analyses used the Medicare five percent SAFs; no state Medicaid data was used for these estimates.
- Since the propensity score match analysis was limited to 1:1 matches and the analysis successfully matched nearly all SCAN dual eligible enrollees to one CA-MFFS dual eligible per SCAN dual, the model may have excluded from consideration some CA-MFFS dual eligibles whose risk profiles were similar to those of the SCAN "treatment group".
- The PQI analysis assumes some of these hospitalizations could have been avoided. Likewise, the analysis is limited to the hospitalizations that occurred within the twelve individual PQI measures, and therefore does not account for other hospitalizations in

other conditions distinct from those conditions included in the twelve individual PQI measures that may have been avoided.

- For the risk-adjustment methodology for the HEDIS PCR rate, Avalere used the "Medicare Advantage and SNP Product Lines" risk-adjustment weights for estimating the expected readmission rate for both samples.
- Estimated costs were based on the total average cost of hospitalizations and readmissions in the CA-MFFS matched sample. Avalere did not model which specific hospitalizations or readmissions, and associated costs, could have been more easily avoided.
- Cost-savings analyses for hospitalizations and readmissions were estimated separately so savings from avoided readmissions in 2010 do not account for reduced hospitalizations.

### **Conclusion**

As stated above, this analysis was conducted to estimate the difference in hospitalization and readmissions rates between SCAN Health Plan's dual eligibles and CA-MFFS dual eligibles. Additionally, SCAN Health Plan asked Avalere to estimate the potential cost-savings if CA-MFFS dual eligibles had the same hospitalization and readmission rates as SCAN's dual eligibles. For detailed findings, please see the presentation titled, "Dual Eligible Population Analysis for SCAN Health Plan: Hospitalizations and Readmissions", located on the Avalere Health website, [www.avalerehealth.net](http://www.avalerehealth.net).