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Supporting Documentation

Methods & Measures Used in the Reporting for Blueprint's Hospital Service Area Profiles

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Summary of Methods

The Vermont Blueprint for Health's Hospital Service Area (HSA) Profiles were commissioned by the Department of Vermont Health Access (DVHA), Blueprint's parent agency, to provide policymakers, community health teams, providers, and other stakeholders with information on expenditures, utilization, effective and preventive care, Accountable Care Organization (ACO), and behavioral risk measures at the HSA level.

This new update of the HSA Profiles significantly expands the scope of selected measures performed by Onpoint and for the first time combines data from all major payer types (i.e., commercial, Medicaid, and Medicare); adds ACO payment and reporting measures; links and uses clinical information from Vermont's clinical registry, DocSite; and adds behavioral measures based on the Behavioral Risk Factor Surveillance System (BRFSS).

Each member's data was assigned to one of Vermont's 13 HSAs based on the location of the Blueprint primary care practice to which they were attributed. These profiles, therefore, represent information about Vermont residents that received their primary care at Blueprint participating practices. The profiles make use of the same data structure as the adult Blueprint Practice Profiles, completed in September 2014, which included data for Vermont residents, ages 18 years and older, who were attributed to a Blueprint practice and enrolled in commercial health plans, Medicaid enrollees for whom Medicaid was the primary payer, and Medicare enrollees for whom Medicare was the primary payer . Each HSA was compared to the statewide average for all Blueprint practices.

Two types of HSA profiles were generated: adult (ages 18 years and older) and pediatric (ages 1–17 years). The adult profiles included members with commercial payer as primary (ages 18–64 years), members with Medicaid as primary (ages 18–64 years), and members with Medicare as primary (ages 18 years and older). The pediatric profiles included members with commercial payers as primary (ages 1–17 years) and members with Medicaid as primary (ages 1–17 years).

Rates of expenditure and utilization were adjusted for differences in population risk between HSAs. These adjustments were based on demographic and health status indicators. Additional enhancements were made in the risk-adjustment for the Medicaid and Medicare populations within each practice. Expenditure and utilization measures were capped for outliers in the data using the 99th percentile for each measure. This capping was done at the statewide level, not at the individual HSA level.

Expenditures were measured based on the allowed amount on claims, which includes both the plan payments and the member's out-of-pocket payments (i.e., deductible, coinsurance, and copayments). Because pricing may vary in Vermont, a standardized cost measure — HealthPartners' total relative Resource Use Index (RUI) — was included to measure aggregate resource consumption across all components of care (i.e., inpatient, outpatient facility, professional, and pharmacy). The RUI was risk-adjusted for each practice to the statewide rate of total utilization (i.e., an RUI of 1.00 would indicate total utilization the same as the statewide

average, an RUI of 1.06 would indicate total utilization 6 percent higher than statewide average, and an RUI of 0.94 would indicate total utilization 6 percent lower than the statewide average).

Effective and preventive care measures were developed by Onpoint based on Healthcare Effectiveness Data and Information Set (HEDIS®) specifications from the National Committee for Quality Assurance (NCQA).[1] These measures were selected carefully in consultation with Blueprint leadership to ensure that HSAs would have a sufficient sample size for statistical reliability.

For the ACO measures that have been added, measures were reported as both combined and stratified by payer type (e.g., commercial, Medicaid, Medicare).

A few of the ACO measures that were based on the clinical linked data had insufficient population sizes to allow reporting for all HSAs but were retained in the profiles nonetheless to identify and guide efforts to improve the collection of clinical data in Vermont's DocSite registry. Similarly, a statewide evaluation of outcomes for diabetic members who had a hemoglobin A1c test during the measurement year — a measure enabled by the linkage of claims and clinical data — was included in the profiles to demonstrate the usefulness of the linked clinical data source.

Data Sources

The Blueprint HSA Profiles consist of population-based reporting and use eligibility and claims data supplied to the state's all-payer claims database, the Vermont Health Care Uniform Reporting and Evaluation System (VHCURES). These reports include data for Vermont residents enrolled in commercial health plans, Medicaid enrollees for whom Medicaid was the primary payer (i.e., they exclude those with dual eligibility for Medicare), and Medicare enrollees for whom Medicare was the primary payer. Data included all commercial health plans in Vermont supplying data to VHCURES and were not restricted to the three health plans currently participating in Blueprint: Blue Cross & Blue Shield of Vermont, Cigna HealthCare, and MVP Health Care.

For Blueprint practices using the DocSite registry, VHCURES data also were linked to clinical data. This linkage was accomplished using fields available in both data sets (i.e., ZIP code of residence, first name, last name, date of birth, and gender). Approximately 82% of VHCURES members were matched to the clinical database. (Note that out-of-state residents and uninsured residents could not be linked between the two data sets). The linked data was used

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[1] HEDIS® is a registered trademark of the National Committee for Quality Assurance (NCQA).

to calculate those measures that required both claims data and clinical outcomes data, such as HbA1c control for patients with diabetes or blood pressure control for patients with hypertension.

Data from 2011 and 2012 from the Vermont Behavioral Risk Factor Surveillance System (BRFSS), a telephone survey conducted annually by the Vermont Department of Health, also were compiled at the HSA level to provide some context around key behavioral risk factors in the state.

Attribution of Members to Hospital Service Areas (HSAs)

Attribution of members was made at the practice level initially. The VHCURES data contain information on individual practitioners but do not contain practice-level identifiers. Rosters of primary care physicians, physician assistants, and nurse practitioners for each Blueprint practice active practice were used to crosswalk to the VHCURES practitioner-specific identifiers.

A standard attribution method was used to assign each member in the VHCURES data to a primary care practice. This was based on a 24-month look-back using Evaluation and Management (E&M) visit codes defined by the U.S. Centers for Medicare & Medicaid Services (CMS) (see Table 1 for further detail). The member was assigned to a primary care practice based on:

- The most number of visits
  - If the same visit count, the most recent visit date
    - » If the same visit date, the largest dollar value
      - If the same visit date and dollar value, then the lowest Blueprint practice number

Table 1. E&M Codes Used to Identify Primary Care Visits from Commercial and Medicaid VHCURES

Visit Type	Codes Used to Identify
Professional Claims, CPT-4 Code Description Summary	
Evaluation and Management – Office or Other Outpatient Services	• New Patient: 99201-99205 • Established Patient: 99211-99215 • Clinic visit used by FQHC & RHC: T1015
Consultations – Office or Other Outpatient Consultations	New or Established Patient: 99241-99245
Nursing Facility Services	• E & M New/Established patient: 99304-99306 • Subsequent Nursing Facility Care: 99307-99310
Domiciliary, Rest Home (e.g., Boarding Home), or Custodial Care Service	• Domiciliary or Rest Home Visit New Patient: 99324-99328 • Domiciliary or Rest Home Visit Established Patient: 99334-99337

Visit Type	Codes Used to Identify
Professional Claims, CPT-4 Code Description Summary	
Home Services	• New Patient: 99341-99345 • Established Patient: 99347-99350
Prolonged Services – Prolonged Physician Service With Direct (Face-to-Face) Patient Contact	99354 and 99355
Prolonged Services – Prolonged Physician Service Without Direct (Face-to-Face) Patient Contact	99358 and 99359
Preventive Medicine Services	• New Patient: 99381–99387 • Established Patient: 99391–99397
Medicare Covered Wellness Visits	• G0402 – Initial Preventive Physical Exam ("Welcome To Medicare" Visit) • G0438 – Annual Wellness Visit, First Visit • G0439 – Annual Wellness Visit, Subsequent Visit
Counseling Risk Factor Reduction and Behavior Change Intervention	• New or Established Patient Preventive Medicine, Individual Counseling: 99401–99404 • New or Established Patient Behavior Change Interventions, Individual: 99406-99409 • New or Established Patient Preventive Medicine, Group Counseling: 99411–99412
Other Preventive Medicine Services – Administration and Interpretation	99420
Other Preventive Medicine Services – Unlisted Preventive	99429
Newborn Care Services	• Initial and subsequent care for evaluation and management of normal newborn infant: 99460-99463 • Attendance at delivery (when requested by the delivering physician) and initial stabilization of newborn: 99464 • Delivery/birthing room resuscitation: 99465
Additional codes for visits billed on facility claims	
Federally Qualified Health Center (FQHC) and Rural Health Centers (RHCs)	Bill Types: 71,73,77 Revenue Codes: • 0521 = Clinic visit by member to RHC/FQHC • 0522 = Home visit by RHC/FQHC practitioner • 0525 = Nursing home visit by RHC/FQHC practitioner
Critical Access Hospitals (CAHs) Professional Services	Bill Type: 85 Revenue Codes: 0960-0989 Professional Services

Notes: (1) Professional claims in VHCURES were determined as those having a valid Service Site (Professional) (MC037) reported in the medical claims (i.e., SVC_SITE_TYPE ≠ -1 [payer supplied no value] or -2 [payer supplied an incorrect or invalid value]); (2) HCPCS code T1015 (i.e., clinic visit/encounter) was not included in the original attribution specifications for Blueprint but was determined to be widely used by some FQHCs and RHCs in the absence of other codes to identify visits; (3) primary care practitioner visits billed on facility claims were identified as those with a reported Type of Bill (Institutional) code of 71,73,77,85; (4) for facility claims with a reported Type of Bill (Institutional) code of 85, Revenue Codes for professional services (i.e., 0960–0989) were included; (5) for commercial, Medicaid, and Medicare data, the VHCURES field of rendering provider was used to identify the practitioner; (7) for Medicare facility claims, the VHCURES field of Attending Provider NPI was used; when the attending provider information was not provided, the rendering provider was used instead; (8) for Medicaid facility claims, when VHCURES attending provider information was not provided, rendering provider was used.

For the Blueprint HSA Profiles, data from the practices were aggregated at the Hospital Service Area. Members were attributed to HSAs based on the ZIP code of the practice to which they were attributed, according to address data provided to Onpoint by Blueprint. Table 2 identifies the practices included in each HSA.

Table 2. Practices Reported in Each HSA

HSA	Practice Names	
Barre	• Associates in Pediatrics (Associates in Pedi • Barre Internal Medicine • Barre Pediatrics (Associates in Pediatrics) • Berlin Family Health Center • Central Vermont Primary Care • Gifford Health Center at Berlin	• Green Mountain Family Practice • The Health Center • Mad River Family Practice • Montpelier Integrative Family Health • Mountain View Medical • Waterbury Medical Associates
Bennington	• Avery Wood; MD • Battenkill Valley Health Center • Bennington Family Practice • Brookside Pediatrics and Adolescent Medicine • Eric Seyferth; MD	• Green Mountain Pediatrics • Mount Anthony Primary Care • SVMC Deerfield Valley Campus • SVMC Northshire Campus • Keith Michl; MD
Brattleboro	• Brattleboro Family Medicine • Brattleboro Primary Care • Grace Cottage Family Health	• HeartSong Health: Ani Hawkinson • Just So Pediatrics • Putney Family Healthcare
Burlington	• Aesculapius Medical Center • Alder Brook Family Health • Burlington Primary Care • Charlotte Health Center • Colchester Family Practice • Community Health Center of Burlington • Dr. Frank Landry • Dr. Hebert • Essex Pediatrics • Evergreen Family Health • Family Practice Associates • Gene Moore • Given Health Care Center - Burlington • Given Health Care Essex • Given Health Care Williston	• Good Health • Hagan and Rinehart Pediatrics • Hinesburg Family Health • Milton Family Practice • Mousetrap Pediatrics - Milton • Paul Rogers • Richmond Family Medicine • South Burlington Family Practice • Thomas Chittenden Health Care (TCHC) • Timber Lane North Pediatrics • Timber Lane Pediatrics • University Pediatrics 1 UHC Campus • University Pediatrics Williston • Winooski Family Health
Middlebury	• Addison Family Medicine • Bristol Internal Medicine • Little City Family Practice • Middlebury Family Health Center	• Middlebury Pediatric and Adolescent Medicine • Mountain Health Center • Porter Internal Medicine • Rainbow Pediatrics
Morrisville	• Hardwick Area Health Center • Morrisville Family Practice	• Stowe Family Practice • Stowe Natural Family Wellness
Newport	• The Barton Clinic • Community Medical Associates (Internal Medicine) • Family Practice of Newport (Family Medicine)	• Island Pond Health Center • Newport Pediatrics and Adolescent Medicine • Orleans Family Medicine
Randolph	• Bethel Health Center	• Gifford Primary Care

HSA	Practice Names	
	• Chelsea Health Center	• Rochester Health Center
Rutland	• Beverly Roseberry; MD • Brandon Medical Center • Castleton Family Medical Center • Drs. Peter and Lisa Hogenkamp • Marble Valley HealthWorks	• Mettowee Valley Family Medical Center • Neshobe Family Health • Pediatric Associates • Rutland Community Health Center
Springfield	• Charlestown Family • Chester Family Practice • Cornerstone Pediatrics	• Ludlow Health Center • Rockingham Medical Group • Springfield Health Center
St. Albans	• Alburg Health Center • Cold Hollow Family Practice • Enosburg Health Center • Franklin County Pediatrics - St. Albans • Mara Vijups • Mousetrap Pediatrics - Enosburg Falls • Mousetrap Pediatrics - St. Albans	• NMC - Northwestern Primary Care • Northwestern Georgia Health Center • Richford Health Center • St. Albans Primary Care • St. Albans Health Center • Swanton Health Center
St. Johnsbury	• Concord Health Center • Corner Medical Internal Medicine • Danville Health Center	• Kingdom Internal Medicine • St. Johnsbury Family Health Center • St. Johnsbury Pediatrics
White River Junction	• Bradford • East Corinth • Mt. Ascutney Hospital Physician Practice • Newbury Health Clinic • Ottauquechee Health Center	• South Royalton Health Center Upper Valley Pediatrics • Wells River • White River Family Practice • Windham Family Practice

Demographics, Health Status, & Adjustment of Rates for Risk

Demographic and health status information derived from the VHCURES claims data served as the primary ingredients for the risk-adjustment methods used for the Blueprint HSA Profiles. Utilized components included age, gender, presence of a Blueprint-selected chronic condition, health status as measured by 3M™ Clinical Risk Groups (CRGs), and (for adult profiles) the occurrence of a maternity diagnosis. (Further detail on Blueprint's selected chronic conditions and 3M CRGs is provided in the narrative below.)

Adjustments also were made for the partial length of enrollment reported for some members during the measurement year. Average members — i.e., cumulative member months divided by 12 — were reported for each HSA.

For the purposes of risk adjustment, members were also stratified by age group:

- Pediatric Profiles: 1–4 years, 5–11 years, and 12–17 years
- Adult Profiles: 18–34 years, 35–44 years, 45–54 years, 55–64 years, 65–74 years, 75–84 years, and 85 years and older

Due to the potential for interaction effects of age and gender, the adjustment models used for the Blueprint HSA Profiles combined age and gender into groupings (e.g., males aged 18–34 years, females aged 18–34 years, etc.)

Blueprint-Selected Chronic Diseases

Blueprint-selected chronic diseases were identified from the VHCURES claims data using diagnosis coding in medical claims and were based on nationally accepted definitions (e.g., NCQA HEDIS). The algorithm employed to determine Blueprint-selected chronic diseases was based on the following criteria: one or more inpatient visits, one or more outpatient emergency department visits, or two or more non-hospital outpatient visits. For identifying members with diabetes and asthma, at least two pharmacy prescriptions also were required as part of the algorithm (see Table 3). For the pediatric population, the chronic variable included attention deficit disorder (ADD).

Table 3. Selected Chronic Disease Definitions

Chronic Disease	Medical Claim ICD-9 Diagnosis Code (Include 4th & 5th Digits) *	Pharmacy	Source from Which ICD-9 Codes were Determined
Asthma	493	NCQA NDC List	HEDIS Use of Appropriate Medication for People with Asthma Measure
Attention deficit disorder (ADD) (pediatric only)	31400, 31401	N/A	American Academy of Pediatrics and National Initiative for Children's Healthcare Quality
Chronic obstructive pulmonary disorder (COPD)	491, 492, 496	N/A	HEDIS Use of Spirometry Testing in the Assessment and Diagnosis of COPD Measure
Congestive heart failure (CHF)	428	N/A	Council of State and Territorial Epidemiologists (CSTE) Indicator #37
Coronary heart disease	410–414	N/A	Council of State and Territorial Epidemiologists (CSTE) Indicator #36
Depression	296.2, 296.3, 300.4, 309.1, 311	N/A	HEDIS Antidepression Medication Management Measure
Diabetes	250, 357.2, 362.0, 366.41, 648.0	NCQA NDC List	HEDIS Comprehensive Diabetes Care Measure
Hypertension (essential)	401	N/A	HEDIS Controlling High Blood Pressure Measure

* Includes principal diagnosis and any secondary diagnosis code reported on the claim.

Clinical Risk Groups

CRGs were applied to the VHCURES claims data to determine each member's health status. CRGs are a product of 3M™ Health Information Systems and are used throughout the United States as a method of risk-adjusting populations. The grouper first classifies each member into one of 1,080 distinct clinical groups based on the diagnoses reported on claims and then further aggregates these clinical groupings into nine major clinical CRG statuses. Due to small numbers in some categories used for the Blueprint HSA Profiles' risk-adjustment regression model, these nine categories were combined further into *Healthy*, *Acute or Minor Chronic*, *Moderate Chronic*, *Significant Chronic*, and *Cancer or Catastrophic*. identifies both the nine principal CRG categories (Column 1) as well as the aggregated categories used in the Blueprint profiles (Column 3).

Table 4. CRG Health Status

CRG Major Categories	Aggregation for Regression Model
1 - Healthy	Healthy (reference group)
2 - History of Significant Acute Disease	Acute or Minor Chronic (e.g., acute ear nose, or throat illness)
3 - Single Minor Chronic Disease	Acute or Minor Chronic (e.g., minor chronic joint)
4 - Minor chronic disease in multiple organ systems	Moderate Chronic (e.g., minor chronic joint and migraine)
5 - Single dominant or moderate chronic disease	Moderate Chronic (e.g., diabetes)
6 - Significant chronic disease in multiple organ systems	Significant Chronic (e.g., diabetes and hypertension)
7 - Dominant chronic disease in 3 or more organ systems	Significant Chronic (e.g., CHF, diabetes, and COPD)
8 - Dominant , metastatic, and complicated malignancies	Cancer or Catastrophic (e.g., malignant breast cancer)
9 - Catastrophic conditions	Cancer or Catastrophic (e.g., HIV, cystic fibrosis, muscular dystrophy, quadriplegia)

It should be noted that CRGs do not include pregnancy and child birth in clinical classification. Since pregnant women, women delivering, and newborns contribute to utilization and expenditures, members who had claims for any of these diagnoses were flagged for the risk-adjustment model. The following ICD-9 diagnosis coding was used for this purpose:

- Pregnancy and child birth: 630–677 (and all 3rd and 4th digits)

- Conditions in perinatal period: 760–779 (and all 3rd and 4th digits)

- Supervision of pregnancy: V22, V23, V24, V27 (and all 3rd and 4th digits)

- Live-born infants: V3 (and all 3rd and 4th digits)

Adjustment for Medicaid Population

These profiles combine three populations that have significant differences in demographics, socioeconomic status, health status, provider reimbursement structures, and services covered and used. For these profiles, risk-adjustment models were further enhanced to include three adjustments for Medicaid. As in the previous version of HSA profiles, Medicaid was adjusted at the individual member level (commercial = 0, Medicaid = 1).

Further examination indicated that members who received Special Medicaid Services (SMS) may have had a level of disability not adjusted for through the CRGs. Examples of Special Medicaid Services include members receiving day treatment, residential treatment, case management services, and special school services covered by the Department of Education. These types of services can contribute significantly to a member's total expenditures. After evaluation of statistical distributions for these services, members with more than the median (50th percentile) of expenditures for these services were flagged and adjusted for in the risk-adjustment model.

Evaluation of the risk-adjustment model also indicated that a practice's percentage of total members that were Medicaid (i.e., percent Medicaid) was a statistically significant predictor of total expenditures. Practices in Vermont varied significantly regarding the percentage of members who were Medicaid. The range for practices in the adult profiles was 2.1% – 50.9%, while the range for practices in the pediatric profiles was 2.1% – 84.3%. The risk-adjustment model included a new variable for each member that was their practice's percent Medicaid. This variable adjusts for Medicaid practice-level effects at the person level, which were then rolled up to the HSA level. Additionally, to account for differences in maternity between the major insurers, an interaction term was added between Medicaid and maternity.

Adjustment for Medicare Population

Due to intrinsic demographic and health status differences between the Medicare, Medicaid, and commercial populations, additional adjustment was made for an HSA's Medicare population. For these profiles, risk-adjustment models were further enhanced to include a variety of adjustments for Medicare. First, Medicare was adjusted based on an individual's eligibility status (commercial = 0, Medicaid = 0, Medicare = 1). Second, to account for differences in practice case mix, the Medicare proportion of a practice's total attributed members was included as an adjustor. The range for practices in the adult profiles was 11.8% – 55.3%. As with the Medicaid adjustment described above, this variable first adjusted for Medicare practice-level effects at the person level and then rolled up to the HSA level. Medicare was not included in pediatric profiling. Finally, using Medicare-specific eligibility elements, binary flags were developed to identify disability, end-stage renal disease (ESRD), and an individual's death during the measurement year and added to the risk-adjustment model.

Risk Adjustment

Risk adjustment for reporting was implemented in SAS (Version 9.3) using regression methods. For utilization measures, a Poisson distribution was assumed. Models included age/gender stratification groups, Blueprint-selected chronic conditions, CRG classification, maternity, and the additional Medicaid and Medicare adjustments described above. Adjusted rates were produced by summing the differences between each member's actual value and their predicted measurement from the model. Rates were adjusted (i.e., weighted) for partial lengths of enrollment.

To calculate the adjusted rate, adjusted values were computed for each member by adding model residuals (e) to the population grand mean ($\bar{y}$). To report the overall adjusted rate for each practice, the mean of the adjusted values for the members in each HSA ($\bar{y}_{hsa}$) and statewide ($\bar{y}_{statewide}$) were computed. The following equations represent the models for the adult and pediatric HSA Profiles.[2]

Adult Model

$$y = \alpha + (F\_AGE1834)\beta_1 + (F\_AGE3544)\beta_2 + (F\_AGE4554)\beta_3 + (F\_AGE5564)\beta_4 + (M\_AGE3544)\beta_5 + (M\_AGE4554)\beta_6 + (M\_AGE5564)\beta_7 + (M\_AGE6574)\beta_8 + (M\_AGE7584)\beta_9 + (M\_AGE85PLUS)\beta_{10} + (MEDICAID)\beta_{11} + (MEDICARE)\beta_{12} + (DUAL\ ELIGIBILITY)\beta_{13} + (SMS)\beta_{14} + (practice\_percENT\_MEDI)\beta_{15} + (PRACTICE\_PERCENTMCARE)\beta_{16} + (DISABLED)\beta_{17} + (ESRD)\beta_{18} + (DIED\_DURING\_YEAR)\beta_{19} + (CHRONIC)\beta_{20} + (CRG\_ACUTE\_MINOR)\beta_{22} + (CRG\_CHRONIC)\beta_{23} + (CRG\_SIGNIFICANT\_CHRONIC)\beta_{24} + (CRG\_CANCER\_CATASTROPHIC)\beta_{25} + (MATERNITY)\beta_{26} + (MATERNITY * MEDICAID)\beta_{27} + \varepsilon$$

Pediatric Model

$$y = \alpha + (F\_AGE0104)\beta_1 + (M\_AGE0511)\beta_2 + (F\_AGE0511)\beta_3 + (F\_AGE1217)\beta_4 + (M\_AGE1217)\beta_5 + (MEDICAID)\beta_6 + (SMS)\beta_7 + (PRACTICE\_PERCENT\_MEDI)\beta_8 + (CHRONIC\_PED)\beta_9 + (CRG\_ACUTE\_MINOR)\beta_{10} + (CRG\_CHRONIC)\beta_{11} + (CRG\_SIGNIFICANT\_CHRONIC)\beta_{12} + (CRG\_CANCER\_CATASTROPHIC)\beta_{13} + \varepsilon$$

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[2] For the adult model, males, ages 18–34 years, and "healthy" individuals (from the 3M CRG categories) served as the reference group and therefore do not appear in the model statement. For the pediatric model, males, ages 5–11 years, and "healthy" individuals (from the 3M CRG categories) served as the reference group and therefore do not appear in the model statement.

$$\bar{y} = \left(\frac{\sum y_i}{MMA} \right)$$

$$y_{\text{adj}} = \bar{y} + e$$

$$e = y - \hat{y}$$

$$\bar{y}_{\text{hsa}} = \left(\frac{\sum y_{adj_i}}{\sum MMA_i} \right) \text{ for the practices in each HSA}$$

$$\bar{y}_{\text{statewide}} = \left(\frac{\sum y_{adj_i}}{\sum MMA_i} \right) \text{ for all members (equals the grand mean)}$$

Where:

- α is the intercept
- ε is the error term
- $\hat{y}$ is the predicted value from the regression model for each member
- e is the residual
- MMA is the average enrollment for each participant (i.e., the cumulative member months of enrollment during the year divided by 12)
- Subscript i indicates a value for an individual member

Measurement of Expenditures

Expenditures were measured based on the allowed amount on claims, which includes both the plan payments and the member's out-of-pocket payments (i.e., deductible, coinsurance, and copayments). For each member, total expenditures were determined for the measurement year. In addition, expenditures by major and selected service categories were determined. Each detailed expenditure category was capped separately at the 99th percentile of the statewide study population to reduce the distorting influence of extreme outlier cases.

Expenditures rates were computed as an annualized adjusted rate using the risk-adjustment methods described previously. Lower and upper confidence intervals of 95 percent were also included.

The major and detailed expenditure categories (see Table 5) were based on type of claim, primary diagnosis codes, revenue codes, site of service codes, provider taxonomy codes, and pharmacy therapeutic groupings based on assignment of National Drug Codes (NDCs) using Red Book®. The reporting was hierarchical and rolled service-line claim payments to the header

claim level. For example, if an outpatient hospital claim contained a primary diagnosis of mental health or substance abuse (i.e., ICD-9 codes 290–316), then the entire claim, regardless of the specific services performed, was assigned to the category of outpatient hospital mental health / substance abuse.

Table 5. Expenditure Reporting Category Definitions

Description	Major Category	Detail Category
Hospital Inpatient	Claim Type = 1 (whole claim is assigned hierarchically in order below based on the diagnosis or revenue code)	
Mental/Substance Inpatient		1. Primary diagnosis code 290–316
Maternity-Related and Newborns		2. Primary diagnosis code 630–677, 760–779, V30–V39, V22–V24, V27
Surgical		3. Revenue code 0360–0369 (operating room service) within the claim
Medical		4. All others
Hospital Outpatient	Claim Type = 2 (whole claim is assigned hierarchically in order below based on the diagnosis or revenue code)	
Hospital Mental Health / Substance Abuse		1. Primary diagnosis code 290–316
Emergency Room		3. Revenue code 0450–0459
Outpatient Surgery		4. Revenue code 0360–0369 (operating room services)
Outpatient Radiology		5. Revenue code 0320–0359, 0610–0619
Outpatient Lab		6. Revenue code 0300–0319
Hospital-Dispensed Pharmacy		7. Revenue code 0250–0259
Professional Total	Claim Type = 4	
Physician Services	Claim Type = 4 and primary diagnosis code not 290–316	Provider taxonomy coding indicates provider specialty is a physician (excluding psychiatrist).
Physician Inpatient Setting		With Service Site (Professional) = 21
Physician Outpatient Setting		With Service Site (Professional) = 22
Physician Office Setting		With Service Site (Professional) = 11
Professional Non-Physician		Provider taxonomy coding indicates nurse practitioner, physician assistant, physical therapist, chiropractor, podiatrist, speech therapist, occupational therapist, optometrist/optician, respiratory therapist .
Professional Mental Health Provider	Claim Type = 4 and primary diagnosis code 290–316	Provider taxonomy coding indicates psychiatrist, psychologist, MSW, LICSW, LCSW, or claims from other providers with a principal diagnosis of mental health or substance abuse.
Pharmacy	From pharmacy claims and medical claims paid to pharmacies	
Pharmacy Mental		Red Book classification used to determine therapeutic CNS medications based on NDC codes.
Special Medicaid Services	From Category of Service and Fund Source Coding as identified in consultation with Vermont Medicaid staff.	Examples include day treatment, residential care, school-based services, dental services, transportation, and case-management.

Major Category & Specifications	Detail Category & Specifications	Detail Category
Hospital Inpatient:	Mental/Substance Inpatient	Primary diagnosis code 290–316

Major Category & Specifications	Detail Category & Specifications	Detail Category
Claim Type = 1 (whole claim is assigned hierarchically in order below based on finding the diagnosis or revenue code)	Maternity-Related and Newborns	Primary diagnosis code 630–677, 760–779, V30–V39, V22–V24, V27
	Surgical	Revenue code 0360–0369 (operating room service) within the claim
	Medical	All others
Hospital Outpatient: Claim Type = 2 (whole claim is assigned hierarchically in order below based on finding the diagnosis or revenue code)	Hospital Mental Health / Substance Abuse	Primary diagnosis code 290–316
	Emergency Room	Revenue code 0450–0459
	Outpatient Surgery	Revenue code 0360–0369 (operating room services)
	Outpatient Radiology	Revenue code 0320–0359, 0610–0619
	Outpatient Lab	Revenue code 0300–0319
	Hospital-Dispensed Pharmacy	Revenue code 0250–0259
Professional Total	Claim Type = 4	
Physician Services	Claim Type = 4 and primary diagnosis code not 290–316	Provider taxonomy coding indicates provider specialty is a physician (excluding psychiatrist).
Physician Inpatient Setting		With Service Site (Professional) = 21
Physician Outpatient Setting		With Service Site (Professional) = 22
Physician Office Setting		With Service Site (Professional) = 11
Professional Non-Physician		Provider taxonomy coding indicates nurse practitioner, physician assistant, physical therapist, chiropractor, podiatrist, speech therapist, occupational therapist, optometrist/optician, respiratory therapist.
Professional Mental Health Provider	Claim Type = 4 and primary diagnosis code 290–316	Provider taxonomy coding indicates psychiatrist, psychologist, MSW, LICSW, LCSW, or claims from other providers with a principal diagnosis of mental health or substance abuse.
Pharmacy	From pharmacy claims and medical claims paid to pharmacies	
Pharmacy Mental		Red Book classification used to determine therapeutic CNS medications based on NDC codes.
Special Medicaid Services	From Category of Service and Fund Source coding as identified in consultation with Vermont Medicaid staff	Examples include day treatment, residential care, school-based services, dental services, transportation, and case-management.

Measurement of Resource Use

Expenditures were measured based on the allowed amount on claims, which includes both the plan payments and the member's out-of-pocket payments (i.e., deductible, coinsurance, and copayments). Because pricing and reimbursement can vary, the expenditure measure does not provide a measure of cost based on actual consumption of resources — that is, the frequency and intensity of all services used.

In order to address this issue, the Onpoint profiles include an additional measure of overall cost: the total relative Resource Use Index (RUI). This measure is based on software developed by HealthPartners as part of their Total Cost of Care (TCOC) measurement system, which has been endorsed by the National Quality Forum (NQF).[3]

For Blueprint HSA Profiles, the TCOC software was applied to the VHCURES claims data. The software standardizes resource use for different components of care using nationally accepted weighting methods (i.e., Medicare Severity Diagnosis Related Groups (MS-DRGs) for inpatient services, Current Procedural Terminology codes (CPTs) and associated Ambulatory Payment Classifications (APCs) for outpatient facility services, and CPTs and associated Resource-Based Relative Value Scale (RBRVS) relative weights for professional services) to measure the relative intensity of services. For pharmacy services, HealthPartners relies on a national pharmacy data source (i.e., Massachusetts-based PharMetrics, Inc.) to develop and maintain the relative weights. The Total Care Relative Resource Values (TCRRVs) are supplied as part of the HealthPartners software. Once the TCRRVs are determined for each care setting, adjustment factors are applied to calibrate the TCRRVs to the paid amount distributions between settings (i.e., inpatient, outpatient facility, professional, and pharmacy).

The Blueprint HSA Profiles report both the total Resource Use Index and the resource use for each component part of care. The RUI for each Hospital Service Area were computed by dividing the HSA's adjusted TCRRV rate by the statewide TCRRV rate.

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3   See: http://www.healthpartners.com/public/tcoc/

Measurement of Utilization

Selected utilization measures were determined from the claims data using the definitions outlined in Table 6. The diagnostic testing and non-hospital outpatient visit measures were based on CPT coding linked to the Berenson-Eggers Type of Service (BETOS) classification system developed by CMS.[4] Utilization rates were computed as an annualized adjusted rate per 1,000 members using the risk-adjustment methods described previously. Lower and upper confidence intervals of 95 percent also have been included.

Table 6. Methods & Coding for the Utilization by Type of Service Section

Category/Measure	Methods/Coding
Inpatient Hospital	
Discharges	Count of IP discharges
Inpatient Days	Last date of service minus first date of service. If inpatient days > 90, inpatient days were capped at 90.
Readmissions within 30 Days	Using IPDISCHARGEs, records were sorted within MEMBERID by first and last service date. If a member had more than one hospitalization and the first service date of the next hospitalization minus the last service date of the previous hospitalization was <30, the record was flagged as a readmission.
Admissions for Ambulatory Care Sensitive Conditions	Agency for Healthcare Research and Quality (AHRQ) Ambulatory Care Sensitive Definitions. Detailed coding criteria found online here: http://archive.ahrq.gov/data/safetynet/billappb.htm
Outpatient Service Encounters	
Emergency Department Visits	Claim Type = 2 and (CPT 99281–99285 or UB revenue codes 450–459, 981)
Potentially Avoidable Emergency Department Visits	Claim Type = 2 and (CPT 99281–99285 or UB revenue codes 450–459, 981) and ICD-9 primary diagnosis codes: 034.0 – sore throat, strep 079.99 – viral infection, unspecified 300.00, 300.02 – anxiety, unspecified or generalized 372.00, 372.30 – conjunctivitis, acute or unspecified 380.10, 381.01, 381.4, 382.00, 382.9 – external & middle ear infections, acute or unspecified 461.9, 473.9, 462, 465.9 – upper respiratory infections, acute or unspecified 466.0, 786.2, 490 – bronchitis, acute or unspecified, or cough 493 – asthma 691.0, 691.8, 692.6, 692.9, 782.1 – dermatitis and rash 719.4 – joint pain 724.2, 724.5 – lower/unspecified back pain 729.1, 729.5 – muscle/soft tissue limb pain 780.79 – fatigue 784.0 – headache
Diagnostic Testing	

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4   See: http://www.cms.gov/Medicare/Coding/HCPCSReleaseCodeSets/BETOS.html

Category/Measure	Methods/Coding
Standard Imaging	Berenson-Eggers Type of Service (BETOS) I1A–I1F
Advanced Imaging	BETOS I2A–I2D
Echography	BETOS I3A–I3F
Colonoscopy	BETOS P8D
Non-Hospital Outpatient Visits	Measure defined by Dartmouth Institute: BETOS M1A, M1B, M4A, M4B, M5A, M5C, M5D, M6
Professional Encounters	
Primary Care	Claim Type = 4 and provider specialty based on taxonomy coding is pediatrics, internal medicine, family practice, nurse practitioner, or physician assistant
Medical Specialist	Claim Type = 4 and provider specialty coding based on taxonomy coding is allergy/immunology, cardiology, critical care, dermatology, endocrinology, gastroenterology, geriatric medicine, hematology/oncology, infectious disease, neurology, nephrology, pulmonary medicine, rheumatology, anesthesiology, emergency medicine, pathology, radiology
Surgical Specialist	Claim Type = 4 and provider specialty coding based on taxonomy coding is the following surgical specialty types: general surgery, cardio-thoracic, ENT, hand, neurological, plastic/reconstructive, OB/GYN, ophthalmology, orthopedic, pediatric, urology, vascular

Measurement of Effective & Preventive Care

Twenty primary measures were selected for inclusion in the adult Blueprint HSA Profiles and five for inclusion for the pediatric HSA profiles. While it is beyond the scope of this document to provide all of the detailed specifications for each effective and preventive care measure, the denominator and numerator for each are summarized below. Since health plans may supplement claims data with medical chart reviews, he effective and preventive care measures reported in the Blueprint HSA Profiles are not directly comparable to summary HEDIS rates reported by NCQA or health plans.

Comprehensive Diabetes Care

HEDIS Measure

These measures assess the percentage of members, ages 18–75 years, with diabetes who had HbA1c testing, LDL-C screening, eye screening, and nephropathy monitoring. This is a claims-based measure.

The denominator for these measures consists of members, ages 18–75 years, who were identified with diabetes who had one or more inpatient visits, one or more outpatient emergency department visits, or two or more non-hospital outpatient visits with ICD-9 diagnosis codes of 250, 357.2, 362.0, 366.41, or 648.0, or who were dispensed insulin oral hypoglycemics/antihyperglycemics during the measurement year or the prior year. The denominator also requires the member to be continuously enrolled during the measurement year.

The numerators for these measures were identified using specific CPT and other coding as defined in the NCQA HEDIS specification manual for HbA1c testing, LDL-C screening, eye screening, and nephropathy monitoring. The numerator indicates that the test or screening took place during the measurement year.

Breast Cancer Screening

Core-11, MSSP-20, NQF #0031, HEDIS Measure

This measure assesses the percentage of women, ages 52–74 years, who had a mammogram to screen for breast cancer during the measurement year or the prior year. For the Blueprint HSA Profiles, the measure was stratified further, differentiating between ages 52–64 years and ages 65–74 years. This is a claims-based measure.

The denominator requires continuous enrollment during the two-year period. Women with evidence of bilateral mastectomy are excluded. The numerator is based on identification of CPT, HCPCS, ICD-9, and UB revenue codes in the claims data that indicated a mammogram.

Cervical Cancer Screening

Core-30, NQF #0032, HEDIS Measure

This measure assesses the percentage of women, ages 21–64 years, who received one or more Pap tests to screen for cervical cancer during the measurement year or the two years prior to the measurement year. This is a claims-based measure.

The denominator requires continuous enrollment during the three-year period. Women with evidence of a hysterectomy are excluded. The numerator is based on identification of CPT, HCPCS, ICD-9, and UB revenue codes in the claims data that indicate a Pap test.

Use of Imaging Studies for Low Back Pain

HEDIS Measure

This measure assesses the percentage of members, ages 18–50 years, with a primary diagnosis of low back pain who did not have an imaging study (e.g., plain X-ray, MRI, CT scan) within 28 days of diagnosis. A higher percentage indicates appropriate treatment (i.e., the proportion for whom imaging was not performed). This is a claims-based measure.

The denominator requires members to have an outpatient or ED visit with a principal diagnosis of low back pain (ICD-9 codes: 721.3, 722.10, 722.32, 722.52, 722.93, 724.02, 724.2, 724.3, 724.5, 724.6, 724.7, 738.5, 739.3, 739.4, 846, 847.2). Members are included if they had a 180-day negative diagnosis history. Members with a history of cancer, recent trauma, intravenous drug use, or neurological impairment are excluded. Members must be continuously enrolled during the 208-day period (i.e., the required 180-day history plus 28 days post diagnosis). Imaging studies are identified using CPT and UB revenue codes.

Chlamydia Screening

Core-7, NQF #0033, HEDIS Measure

This measure assesses the percentage of female members, ages 16–24 years, identified as sexually active and who had at least one test for chlamydia in the measurement year. This is a claims-based measure.

The denominator requires 11 months of enrollment during the measurement year and sexual activity as determined by pharmacy data (e.g. dispensed contraceptives) or claims or encounters indicating sexual activity (e.g., pregnancy, pregnancy tests, chlamydia tests, or other sexual activity claims).

The chlamydia measure has been included for ages 16–24 years in both the adult and pediatric HSA profiles.

Plan All-Cause Readmissions

Core-1, NQF #1768, HEDIS Measure

This measure is for members, ages 18 years and older, and represents a comparison of the rate of continuously enrolled members, ages 18 years and older, that had an inpatient stay that was followed by an acute readmission for any diagnosis within 30 days during the measurement year to the expected rate of readmissions given risk factors of the patient (presence of surgeries, discharge condition, comorbidity, age, and gender). The rate is expressed as a ratio of the observed to expected readmissions where the expected number of readmissions has been risk adjusted.

Because the risk probabilities for this measure come from NCQA, the statewide ratio, and indeed national ratios, are not 1.0. The ratio should be used to compare the relative difference between HSAs.

Follow-Up After Hospitalization for Mental Illness

Core-4, NQF #0576, HEDIS Measure

This measure assesses the percentage of discharges for members, ages 6 years and older, who were hospitalized for treatment of selected mental health diagnoses and who had an outpatient visit, an intensive outpatient encounter, or a partial hospitalization with a mental health provider in which the member received a follow-up within seven days of discharge. This is a claims-based measure.

The denominator is based on discharges, not members. For inclusion, individuals must be discharged alive from an acute inpatient setting (including an acute care psychiatric facility) with a principal diagnosis of mental illness on or between January 1 and December 1 of the measurement year. Members must be continuously enrolled for inclusion. Follow-up criteria may include a visit with a mental health practitioner, a visit to a behavioral healthcare facility, a visit to a non-behavioral healthcare facility with a mental health provider, and/or a visit to a non-behavioral healthcare facility with a diagnosis of mental illness.

Initiation of Alcohol/Drug Treatment

Core-5a, NQF #0004, HEDIS Measure

This measure assesses the percentage of adult members, ages 18 years and older, with a new episode of alcohol or other drug (AOD) dependence who initiated treatment through an inpatient AOD admission, outpatient visit, intensive outpatient encounter, or partial hospitalization within 14 days of the diagnosis. This is a claims-based measure.

The denominator or index episode could be an outpatient visit or partial hospitalization with a diagnosis of AOD dependence, a detoxification visit, an ED visit with a diagnosis of AOD, or an inpatient discharge with a diagnosis of AOD. Members must be continuously enrolled without any gaps from two months before the index episode through 44 days after. The adolescent measure included fewer than 30 members in the denominator, which does not align with NCQA HEDIS guidelines. Therefore, rates for the adolescent population were not incorporated into the Blueprint HSA Profiles.

If the index episode is an inpatient discharge, the member is considered compliant. Otherwise, if the index episode is an outpatient, intensive outpatient, partial hospitalization, detoxification, or ED visit, the member must have an inpatient admission, outpatient visit, intensive outpatient encounter or partial hospitalization with a diagnosis of AOD dependence within 14 days of the index episode.

Engagement of Alcohol/Drug Treatment

Core-5b, NQF #0004, HEDIS Measure

This measure assesses the percentage of adult members, ages 18 years and older, with a new episode of alcohol or other drug (AOD) dependence who initiated treatment and who had two or more additional services with a diagnosis of AOD within 30 days of the initiation visit. This is a claims-based measure.

The denominator or index episode could be an outpatient visit or partial hospitalization with a diagnosis of AOD dependence, a detoxification visit, an ED visit with a diagnosis of AOD, or an inpatient discharge with a diagnosis of AOD. Members must be continuously enrolled without any gaps two months before the index episode through 44 days after. The adolescent measure included fewer than 30 members in the denominator, which does not align with NCQA HEDIS guidelines. Therefore, rates for the adolescent population were not incorporated into the Blueprint HSA Profiles.

Engagement is measured as initiation of AOD treatment and two or more inpatient admissions, outpatient visits, intensive outpatient encounters, and/or partial hospitalizations with any AOD dependence diagnosis within 30 days after the date of the initiation encounter (inclusive).

Cholesterol Management, Cardiac

Core-3, MSSP-29, NQF #0075, HEDIS Measure

This measure assesses the percentage of members, ages 18–75 years, who were discharged alive for acute myocardial infarction (AMI), coronary artery bypass graft (CABG), or percutaneous coronary interventions (PCI) in the year prior to the measurement year, or who had a diagnosis of ischemic vascular disease (IVD) during the measurement year and the year

prior to the measurement year, who had LDL-C screening during the measurement year. This is a claims-based measure.

The denominator requires no more than one gap of enrollment of as many as 45 days during the measurement year. The denominator includes (1) members discharged alive during the measurement year from an acute inpatient setting with an AMI as identified by facility and professional claims, (2) members discharged alive during the measurement year from an acute inpatient setting with a CABG as identified by facility and professional claims, (3) members who had a PCI in any setting during the measurement year, and (4) members who, in the measurement year <u>and</u> year prior, had at least one outpatient visit or acute inpatient encounter with diagnosis of IVD.

LDL-C tests had to be performed during the measurement year as identified by claim/encounter data or automated laboratory data.

Avoidance of Antibiotic Treatment, Acute Bronchitis

Core-6, NQF #0058, HEDIS Measure

This measure assesses the percentage of members, ages 18–64 years, with a diagnosis of acute bronchitis who were not dispensed an antibiotic prescription. A higher rate indicates appropriate treatment for acute bronchitis (i.e., the proportion for whom antibiotics were not prescribed). This is a claims-based measure.

The denominator for this measure is based on episodes of acute bronchitis. For inclusion, members had to have continuous enrollment from one year prior to the episode date to seven days after the episode date. Episodes included any outpatient visit, observation visit, or ED visit with a diagnosis of acute bronchitis during the measurement year. Exclusions were made for ED visits that resulted in an inpatient admission for certain comorbid conditions, including HIV, malignant neoplasms, emphysema, COPD, and cystic fibrosis. Members who were on antibiotics prior to the episode or who had competing diagnoses (e.g., pharyngitis) also were excluded.

Influenza Vaccination

Core-35, MSSP-14, NQF #0041, AMA-PCPI

This measure assesses the percentage of members, ages 18 years and older, who received an influenza immunization from October 1 of the prior year through March 31 of the measurement year (i.e., the most recent flu season). Immunizations were identified using both claims data and DocSite clinical data.

The denominator included members who had been seen for a visit in the office setting during that same flu season period (October 1 to March 31). Office visits were identified using the claims data CPTs for office visits.

The numerator for this measure was determined using two parts:

- Claims data: Individuals who had evidence in claims data of receipt of the flu vaccination in any setting were determined to be in compliance with this measure.

- Clinical DocSite data: For each individual who met the denominator criteria and whose VHCURES member ID was linked to a DocSite ID, the measures table of the DocSite data extract was searched to determine if there was any evidence during the flu season that the provider had reported that the patient received a vaccination . This second step was intended to capture patients who may have reported to their provider that they received the vaccine but who received it in a setting (e.g., flu clinic, drug store) where it was not billed to medical claims.

Pneumonia Vaccination

Core-48, MSSP-15, NQF #0043

Pneumonia vaccination rates are one of the measures used by Accountable Care Organizations. However, the data on pneumonia vaccinations coming from claims data are not reliable because the measure asks if the patient has *ever* had a pneumonia vaccination. Thus, these are not highly traceable by medical claims, as patients may have had the vaccination before VHCURES began collecting data. Vermont, however, does collect data on pneumonia vaccinations using the Behavioral Risk Factor Surveillance System (BRFSS). Vermont adults, ages 65 years and older, were asked if they had ever received a pneumococcal vaccine. It is important to note that previously vaccinated subjects were not asked to specify when they had received the vaccine. BRFSS data for 2011–2012 were aggregated at the HSA level and presented for the over 65 population to explore variation between HSAs in this preventive behavior. These data do not reflect specifically on the Blueprint practices, however, as they are a general population indicator.

ACS Admissions: COPD and Asthma

Core-10, MSSP-9, NQF, AHRQ Prevention Quality Indicator #5

The ambulatory care sensitive (ACS) conditions inpatient measures were derived by the application of the Prevention Quality Indicator (PQI) software from the Agency for Healthcare Research and Quality (AHRQ) to the Vermont Blueprint data. These are conditions for which quality outpatient care can potentially prevent the need for hospitalization or for which early intervention can prevent complications or more severe disease.

This measure assesses the observed rate of ambulatory care sensitive (ACS) admissions with a principal diagnosis of chronic obstructive pulmonary disorder (COPD) or asthma per 1,000 members, ages 40 years and older. The specified diagnosis codes can be found on the AHRQ website. This is a claims-based measure.

For the numerator, observed discharges from an acute care hospital with a principal diagnosis of COPD or asthma were included. Exclusions were made for the following: (1) transfers from a hospital, skilled nursing facility, intermediate care facility; (2) members with a diagnosis of cystic fibrosis and anomalies of the respiratory system; and (3) members with missing data for gender, age, or principal diagnosis.

Note: When comparing to AHRQ's national benchmarks for the observed rate, it is important to keep in mind that AHRQ guidelines suggest including the entire population for the specified area in the denominator. The rates provided in the Blueprint HSA Profiles are based on members attributed to Blueprint participating practices for which the denominator is the sum of average members for the specified area.

ACS Admissions: Heart Failure

MSSP-10, NQF #0277, AHRQ Prevention Quality Indicator #8

This measure assesses the observed rate of ambulatory care sensitive (ACS) admissions with a principal diagnosis of heart failure per 1,000 members, ages 18 years and older. The specified diagnosis codes can be found on the AHRQ website. This is a claims-based measure.

For the numerator, observed discharges from an acute care hospital with a principal diagnosis of heart failure were included. Exclusions were made for the following: (1) transfers from a hospital, skilled nursing facility, or intermediate care facility; (2) members with an ICD-9-CM procedure code for a cardiac procedure; and (3) members with missing data for gender, age, or principal diagnosis.

Note: When comparing to AHRQ's national benchmarks for the observed rate, it is important to keep in mind that AHRQ guidelines suggest including the entire population for the specified area in the denominator. The rates provided in the Blueprint HSA Profiles are based on members attributed to Blueprint participating practices for which the denominator is the sum of average members for the specified area.

PQI Composite (Chronic): Rate of Hospitalization for ACS Conditions

Core-12, NQF, AHRQ Prevention Quality Indicator (Chronic Composite)

This measure assesses the observed rate of ambulatory care sensitive (ACS) admissions for the composite of chronic conditions per 1,000 members, ages 18 years and older. The measure

includes admissions for at least one of the following conditions: diabetes with short-term complications, diabetes with long-term complications, uncontrolled diabetes without complications, diabetes with lower-extremity amputations, COPD, asthma, hypertension, heart failure, and angina without a cardiac procedure. The specified diagnosis codes for these conditions can be found on the AHRQ website. This is a claims-based measure.

Observed discharges from an acute care hospital that meet the inclusion and exclusion criteria for the numerator for any of the above conditions were included. Exclusions were made for the following: (1) transfers from a hospital, skilled nursing facility, or intermediate care facility; and (2) members with missing data for gender, age, or principal diagnosis.

Note: When comparing to AHRQ's national benchmarks for the observed rate, it is important to keep in mind that AHRQ guidelines suggest including the entire population for the specified area in the denominator. The rates provided in the Blueprint HSA Profiles are based on members attributed to Blueprint participating practices for which the denominator is the sum of average members for the specified area.

Diabetes Outcome Measures

Core-16; MSSP-22, -23, -24, -25; NQF #0729 (composite)

These measures assess the percentage of members, ages 18–75 years, with diabetes who were in control for various diabetes outcome measurements (HbA1c, LDL-C, blood pressure, and tobacco non-use).

The denominator for these outcome measures consists of the members, ages 18–75 years, who were identified with diabetes who had one or more inpatient visits, one or more outpatient emergency department visits, or two or more non-hospital outpatient visits with ICD-9 diagnosis codes of 250, 357.2, 362.0, 366.41, or 648.0 or who were dispensed insulin oral hypoglycemics/antihyperglycemics during the measurement year or the year prior to the measurement year. The denominator also requires the member to be continuously enrolled during the measurement year. Additionally, members must be linked to the DocSite clinical database and have at least one measurement in the database for the measure in question (e.g., to be included in the HbA1c in control measure, a member would have to be identified as having diabetes by the claims, be linked to DocSite data, *and* have a valid HbA1c measurement in DocSite during the measurement year). Because of these criteria, there are fewer members with diabetes for these measures than for the comprehensive diabetes care measures described above.

Key information specific to each of the diabetes measures is described here:

- HbA1c in control (MSSP-22): To be included in the denominator for HbA1c in control, members identified in claims as having diabetes had to be linked to DocSite and have a valid HbA1c measurement in the measurement year. The numerator was based on the

most recent HbA1c measurement in the measurement year. If the HbA1c was less than 8%, the member was considered "in control."

- Diabetes in poor control (Core-17, MSSP-27, NQF #0059): To be included in the denominator for diabetes in poor control, members identified in claims as having diabetes had to be linked to DocSite and have a valid HbA1c measurement in the measurement year. The numerator was based on the most recent HbA1c measurement in the measurement year. If the HbA1c was greater than 9%, the member was considered "out of control." This measure is presented as an inverse measure. Areas with poor control had a higher rate for this measure than areas with good control.

- LDL-C in control (MSSP-23): To be included in the denominator for LDL-C in control, members identified in claims as having diabetes had to be linked to DocSite and have a valid LDL measurement in the measurement year. If the LDL-C was less than 100 mg/dL, the member was considered "in control."

- Blood pressure in control (MSSP-24): To be included in the denominator for blood pressure in control, members identified in claims as having diabetes had to be linked to DocSite and have a valid blood pressure measurement in the measurement year. The lowest blood pressure at the most recent visit was examined for the numerator. If the systolic blood pressure was less than 140 and the diastolic blood pressure was less than 90, the member was considered "in control."

- Tobacco Non-Use (MSSP-25): To be included in the denominator for the tobacco non-use measure, members identified in claims as having diabetes had to be linked to DocSite and have a valid indicator of tobacco non-use. If, at any time during the year, the individual was marked as a tobacco user, they were considered "out of control" for this measure. Those who were consistently non-users were considered "in control."

- Diabetes Composite (MSSP 22-25): To be included in the denominator for the diabetes composite measure, members identified in claims as having diabetes had to be linked to DocSite and have measurements recorded for HbA1c, LDL-C, blood pressure, and tobacco status during the measurement year. If one or more of the denominators was missing, the composite could not be calculated. For the numerator, only members who were in control for all of the above measurements (i.e., HbA1c <8.0%, LDL-C <100mg/dL, blood pressure <140/90 mmHg, and non-user of tobacco were considered "in control."

For some HSAs, the volume of linked clinical data was insufficient to report the measure. This was particularly true for the diabetes composite measure, which required

The standard for this measure includes use of aspirin as a component. The reporting of aspirin in the linked DocSite clinical data, however, was low and, therefore, was not used in the numerator for this measure. Most HSAs had insufficient data to report this measure, but the measure was retained in the profiles nevertheless to identify and guide efforts to improve the collection of clinical data in the statewide registry.

Comparison of Patients by HbA1c Control Status

An additional analysis was conducted to examine the effect of diabetes control on expenditures and utilization. For the measurement year, Blueprint-attributed members with HbA1c in control (<9%) were identified. This group was compared to members with HbA1c out of control l (>9%) Adjusting for differences in age, gender, and health status between the two groups, rates of expenditures per person (and associated 95% confidence intervals) were calculated for both groups. Also, the mean adjusted rates of inpatient hospitalizations, inpatient days, and outpatient ED visits were calculated the measurement year and presented side by side with 95 percent confidence intervals to see if the two groups had different patterns of use and cost. Results of this analysis are presented in Table 2, showing that, after adjustment for age, gender and other risk factors, members with HbA1c in control had lower cost and utilization than those whose HbA1c measurement was not in control.

Hypertension: Blood Pressure in Control

Core-39, MSSP-28, NQF #0018, HEDIS Measure

This measure assesses the percentage of members, ages 18–85 years, with hypertension whose last recorded blood pressure measurement in claims and the DocSite clinical database was in control (<140/90 mmHg).

The denominator for this measure consists of the members, ages 18–85 years, who had at least one outpatient visit with a diagnosis of hypertension during the first six months of the measurement year. The denominator also requires the member to be continuously enrolled during the measurement year and to be linked to the DocSite database. In addition, patients must have at least one valid blood pressure measurement in the DocSite database to be included.

The numerator is based on the most recent visit during which a measurement was taken. The lowest valid blood pressure measurement during the most recent visit was examined. If the systolic blood pressure less than 140 and the diastolic blood pressure was less than 90, the member was considered "in control." If one of the components (i.e., systolic or diastolic) was not in control, the individual was considered to be noncompliant.

Behavioral Risk Factor Surveillance System (BRFSS) Measures

Additional measures based on data from the Behavioral Risk Factor Surveillance System (BRFSS) were added to the HSA profiles to provide context regarding key risk factors that contribute to health. These risk factors included: households with income <$25,000 annually, cigarette smoking, no leisure-time physical activity/exercise, and meets fruit and vegetable recommendations. Estimates of these risk factors were reported at the HSA level with 95% confidence intervals. See figures 35–38 in the adult profiles for further detail on these BRFSS-

based measures. For more information on BRFSS methods, please see the Vermont Department of Health BRFSS page (http://healthvermont.gov/research/brfss/brfss.aspx) and the CDC's website on BRFSS (http://www.cdc.gov/brfss/).

Pediatric Measure – Well-Child Visits in the 3rd to 6th Year of Life

HEDIS Measure

This measure assesses the percentage of members, ages 3–6 years, who received one or more well-child visits during the measurement year. This is a claims-based measure.

The denominator includes only those members who are continuously enrolled during the year. The numerator includes children with at least one visit to a primary care physician during the measurement year. Well-child visits are identified with preventive visit CPT codes or ICD-9 V codes. Primary care practitioners are identified through taxonomy codes indicating that the rendering provider was a pediatrician, family practitioner, internal medicine physician, nurse practitioner, or physician assistant.

Pediatric Measure – Adolescent Well-Care Visits

Core-2, HEDIS Measure

This measure assesses the percentage of members, ages 12–21 years, who had at least one well-care visit with a primary care practitioner or OB/GYN during the measurement year. This is a claims-based measure.

The denominator includes only members who are continuously enrolled during the year. Well-care visits are identified with preventive visit CPT codes or ICD-9 V codes. Practitioners are identified through taxonomy codes indicating the rendering provider was a pediatrician, family practitioner, internal medicine physician, nurse practitioner, physician assistant, or OB/GYN.

Pediatric Measure – Appropriate Testing for Children with Pharyngitis

Core-13, NQF #0002

This measure assesses the percentage of children, ages 2–18 years, who were diagnosed with pharyngitis, dispensed an antibiotic, and received a group A streptococcus (strep) test for the episode. A higher rate represents appropriate testing for children with pharyngitis. This is a claims-based measure.

The denominator includes members with an outpatient or ED visit with only a diagnosis of pharyngitis (ICD-9 codes: 462, 463, 034.0). Claims/encounters with more than one diagnosis are

excluded. Members with episodes linked to a dispensed antibiotic prescription are included in the denominator if there is a negative medication history (i.e., no antibiotic prescriptions filled within the prior 30 days). Numerator is a streptococcus test (identified through CPT codes) during the seven-day period (i.e., three days prior and three days after the prescription date).

Pediatric Measure – Appropriate Treatment for Children with Upper Respiratory Infection

HEDIS Measure

This measure assesses the percentage of children, ages 1–17 years, who were diagnosed with upper respiratory infection (URI) and were not dispensed an antibiotic prescription. A higher rate indicates appropriate treatment of children with URI (i.e., the proportion for whom antibiotics were not prescribed). This is a claims-based measure.

The denominator consists of members with an outpatient or ED visit with a diagnosis of URI (ICD-9 codes: 460 and 465). Claims/encounters with more than one diagnosis are excluded. Members also are excluded if there is a competing diagnosis within three days of the initial diagnosis or if they had a medication history (i.e., members could not have an antibiotic prescription filled within the prior 30 days). The numerator consists of members who were prescribed an antibiotic either on the same day as or during the three days after the diagnosis date. The measure is expressed as the percentage who received appropriate care (were not dispensed an antibiotic).

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