Measuring the Value-Functions of Primary Care: Continuity of Care
NQF#3617
National Quality Strategy Domain: Person and Family Centered Care
Meaningful Measure Area: Appropriate Use of Healthcare
Measure Steward: American Board of Family Medicine

MEASURE TYPE:
Process

DESCRIPTION:
This is a measure evaluating primary care physicians (PCPs); for each PCP, the denominator is all patients seen during the evaluation period who had at least 2 PCP visits. The numerator is the number of those patients whose Bice-Boxerman Continuity of Care Index is >= 0.7. The Bice-Boxerman index is a validated measure of patient-level care continuity that ranges from 0 to 1; 0 reflects completely disjointed care and 1 reflects complete continuity with the same PCP for all visits. Compared to lower scores (e.g., 0.6 or lower), continuity index scores of 0.7 or higher have been associated with significantly lower Medicare expenditures and significantly lower odds of hospitalization (1).

1. Higher Primary Care Physician Continuity is Associated with Lower Costs and Hospitalizations. Bazemore et al. Annals of Family Medicine. 2018. 16, 492-497.

DENOMINATOR:
The denominator is the total number of patients with at least 2 visits to any PCPs during the measurement period. For each physician, the denominator is calculated by summing the total number of patients with two or more primary care visits who had at least one of those visits with that physician. This means that if a patient saw more than one PCP, they would be in the denominator for each of those PCPs.

> ***DENOMINATOR NOTE:*** The requirement of at least 2 visits is necessary to calculate a Continuity of Care index.
>
> **Denominator Criteria (Eligible Cases):** The denominator is the total number of patients with continuous enrollment with at least 2 visits to any primary care physicians in the measurement period.

NUMERATOR:
The numerator is the number of patients with a continuity index of at least 0.7.

For each patient, the continuity index score is calculated using the Bice-Boxerman Continuity of Care calculated as follows: Bice Boxerman-Continuity of Care Patient =(∑__(i=1)^k n_i^2)-N/(N(N-1)) where k is the number of PCPs, n_i is the number of visits to PCP i and N is the total number of visits.

> ***NUMERATOR NOTE****:* The index can range from 0 to 1, the higher the number the greater the Continuity of Care. If someone has all their visits with a single PCP, their index will equal 1; while someone who saw a different PCP for each visit (e.g., 1 visit each to 2 or more PCPs) would have an index of 0. A patient who saw one PCP 5 times and a second PCP 1 time would have an index equal to 0.67

DEFINITIONS:

Primary care visit	Any visit with a primary care clinician. This is done using the health care services categorization code of 01 to identify primary care physicians, and the place of service codes 01,02,03,04,11,12,13,14,15,16,17,41,42,49,50,53,57,60, or 71.
Primary care clinician	Physicians with a health care services categorization code of 01. Does not include nurse practitioners or physician assistants.

Measurement year 12-month period between January 1 and December 31 of the calendar year of interest

Bice-Boxerman Continuity of Care (CoC) index The Bice-Boxerman index is a validated measure of patient-level care continuity that ranges from 0 to 1; 0 reflects completely disjointed care (a different provider for each visit) and 1 reflects complete continuity with the same provider for all visits. Bice-Boxerman-Continuity of Care=(∑_(i=1)^k n_i^2) -N/(N(N-1)) Where k is the number of providers, n_i is the number of visits to provider i, and N is the total number of visits.

CALCULATION ALGORITHM

Step 1: Identify all patients with at least 2 visits to a Primary Care Provider in either the office or outpatient setting. This is done using the health care services categorization code (HCCC) 01 to identify primary care physicians, and the place of service codes (POS) 01,02,03,04,11,12,13,14,15,16,17,41,42,49,50,53,57,60, or 71.

Step 2: Retain the unique physician identifier (NPI) associated with each visit for the patients in step 1. A patient will appear in the denominator for each physician they see during the measurement year (i.e., if someone sees Dr. "A" once and Dr. "B" three times, that patient will appear in the denominator for Dr. A and the denominator for Dr. B).

Step3: Calculate patient continuity index score using the Bice-Boxerman calculation as follows:

Bice-Boxerman-Continuity of Care Patient =(∑_(i=1)^k n_i^2) -N/(N(N-1)) Where k is the number of providers, n_i is the number of visits to provider i, and N is the total number of visits. Note that it is necessary that the patient has at least two visits.

Step 4: Determine if the patient level continuity has Met or Not Met the 0.7 threshold. For each patient, if their index is >=0.7 then they are included in the numerator.

Step 5: Divide the numerator by the denominator. This reflects the proportion of patients that provider saw who have a Continuity of Care index of at least 0.7.

DATA DICTIONARY

variable name	description	values used
patid	patient unique id	all
gdr_cd	gender	all (female, male, unknown)
yrdob	birth year	all
d_race_code	race	all (white, black, asian, hispanic, unknown)
prov	provider id	all
hccc	health care services categorization code	primary care physician (01)

DATA CROSSWALK:

Data Element	Private payer (Optum)	Medicare Data
Primary Care Health services categorization code or provider specialty code (PCP)	HCCC=01	PRVDR_SPCLTY = 01, 08, 11, or 38)
Primary Care Service Codes	POS= 01,02,03,04,11,12 ,13,14,15,16,17, 41,42,49,50,53,57	HCPCS_CD = 99201-99205, 99211-99215, 99304-99310, 99315, 99318, 99324-99328, 99334-99337, 99339-99340, 99341-99345, 99347-99350, 99354-99355, 96160-96161, 99484, 99487, 99489, 99490, 99492-99498, G0402, G0438-G0439, or G0442-G0444

	,60, or 71	LINE_PLACE_OF_SRVC_CD = 20, 21, 23, 31, 51, or 61
Patient Unique Identifier	Patient ID	BENE_ID
National Provider Identifier (physician unique ID)	NPI	NPI (PRF_PHYSN_NPI)

RATIONALE:

Continuity of Care is defined as seeing the same PCP over time and remains one of the pillars of a high functioning health care system. The motivation behind this physician-level measure is to be able to assess the level to which physicians serve as the primary physician to their patients. High care continuity is shown to improve patient outcomes and physician well-being; is associated with decreased health care costs including total costs, ED costs, inpatient costs, primary care costs, and costs for specific conditions or treatments; and health care utilization such as ED visits and hospitalizations (Bazemore A, Petterson S, Peterson LE, Bruno R, Chung Y, Phillips RL. Higher Primary Care Physician Continuity is Associated with Lower Costs and Hospitalizations. Ann Fam Med. 2018;16(6):492-497). Since Continuity of Care is typically thought of as a characteristic of a patient's experience, this measure first calculates Continuity of Care for each patient using a previously validated index (the Bice-Boxerman index), where patients who have most of their primary care visits to the same PCP or a small number of PCPs have higher Continuity of Care scores closer to 1.0, while those who see a larger number of different PCPs have lower Continuity of Care scores closer to 0.0. The measure evaluates physicians based on the percent of their patients who have a care continuity index of at least 0.7, which was identified as a threshold associated with good outcomes and was established based on published literature (Bazemore A, Petterson S, Peterson LE, Bruno R, Chung Y, Phillips RL. Higher Primary Care Physician Continuity is Associated with Lower Costs and Hospitalizations. Ann Fam Med. 2018;16(6):492-497). The Continuity of Care quality measure reflects quality of primary care from the patient perspective, allowing for comparisons of individual physician's performance to others in their practice or more broadly. In order to help support our discussion around Continuity of Care's value, we have developed a Continuity of Care bibliography that was completed in June 2021. In summary, the bibliography demonstrates that Continuity of Care has been researched as far back as 1927 and has been heavily researched throughout the past two decades. The findings of these studies overwhelmingly indicate that primary care continuity should be promoted. While more research should continue to be conducted to improve our understanding of primary care continuity, the existing evidence has proven to be sufficient to indicate that future policy should promote primary care continuity and build on prior efforts (Merenstein, Z. (2021). *Continuity of Care Bibliography*. The Center for Professionalism and Value in Health Care. American Board of Family Medicine. https://y7i6a8f8.rocketcdn.me/wp-content/uploads/2021/07/Continuity_of_Care_Bibliography.pdf).

CLINICAL RECOMMENDATION STATEMENT:

The Institute of Medicine labeled continuity of care a defining characteristic of primary care (PC), one that Starfield and others demonstrated as essential to PC's positive impact on health equity, cost reduction, and improved quality of care (1-4). Described as "an implicit contract between physician and patient in which the physician assumes ongoing responsibility for the patient" (5) continuity frames the personal nature of medical care, in contrast to the dehumanizing nature of disjointed care (6). Building on "knowledge, trust, and respect that have developed between the patient and physician over time allowing for better interaction and communication," continuity at the patient level is associated with a host of benefits (7-9). More recent studies of the high-value functions of primary care, such as continuity and comprehensiveness, continue to demonstrate weaknesses in existing attempts both to measure primary care effectively, and to reach measurement targets associated with high quality (10-12).

References:

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