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# Care Coordination Quality Measure for Primary Care (CCQM-PC)

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*Development and Pilot Test of the CCQM-PC v 1.0;  
Guidance for Use of CCQM-PC v 2.0*



## Overview of the Care Coordination Quality Measure for Primary Care

The Care Coordination Quality Measure for Primary Care (CCQM-PC) was designed to assess the care coordination experiences of adults in primary care settings. The measure is intended to fill a gap in the care coordination measurement field by providing a patient assessment of the quality of care coordination, as experienced through the care received from the primary care practice. Building on previous work by the Agency for Healthcare Research and Quality (AHRQ) to develop a conceptual framework for care coordination (<http://www.ahrq.gov/professionals/prevention-chronic-care/improve/coordination/index.html>), and on new primary research with patients and families to refine that framework, a patient experience of care survey was developed, cognitively tested, and piloted with patients from a diverse set of 13 primary care practices to comprehensively assess patient perceptions of the quality of their care coordination experiences.

**NOTE:** The CCQM-PC is not a CAHPS survey and has not gone through the CAHPS trademark process. However, in the interest of rigor and consistency with other patient experience of care measures, the survey's development was closely aligned with CAHPS principles.

Survey development, as well as field operations for the pilot administration of the CCQM-PC, followed principles consistent with the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) (<http://www.ahrq.gov/cahps/about-cahps/index.html>) family of measures. Although its development closely aligns with CAHPS principles, the survey was initially envisioned as a research tool that will help build the evidence base to understand the relationship between care coordination and health outcomes, as well as the features of well-coordinated care and its effects on health care quality. In a climate where care coordination is essential to the success of innovative care delivery and payment models developed to achieve better care and better health at lower cost, the tool is a critical step toward developing measures of care coordination in primary care that can ultimately be used for accountability purposes.

This document summarizes the development of the CCQM-PC and provides guidance for administration, data preparation, composite scoring, analysis, and reporting.

## Development of the Care Coordination Quality Measure for Primary Care

Foundational work: AHRQ's Care Coordination Measures Atlas (Atlas). AHRQ defines care coordination as follows:

*Care coordination is the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient's care to facilitate the appropriate delivery of health care services. Organizing care involves the marshalling of personnel and other resources needed to carry out all required patient care activities and is often managed by the exchange of information among participants responsible for different aspects of care.*

AHRQ's Care Coordination Measures Atlas ([primarycaremeasures.ahrq.gov/care-coordination](http://primarycaremeasures.ahrq.gov/care-coordination)) provides an underlying conceptual framework for care coordination that aligns with this comprehensive definition and includes a compendium of indexed extant care coordination assessments suited to ambulatory care and other care settings. Subsequent work identified several extant assessments that were deemed to be potentially well suited to measuring aspects of care coordination for accountability purposes in primary care. The assessments included in the Atlas cover a variety of data sources including patients, caregivers, health care professionals, and health system managers.

**Literature Review and Environmental Scan.** The Atlas was updated through a new literature review and environmental scan, with a special emphasis on identifying measures applicable to primary care and

suited to assessing the care coordination experiences of adult patients. Ultimately, across the original 2010 Atlas and its 2013 update, 41 extant measures provided source items or other inspiration for the CCQM-PC's initial item set.

**Stakeholder Input.**<sup>1</sup> Stakeholder input was incorporated at key stages of the measure development process, as provided by a standing panel representing diverse perspectives.

**Interview and Focus Group Input.** The American Institutes for Research (AIR) conducted formative research with patients and caregivers to—

- Understand how people experience, think about, and talk about care coordination in their own words
- Assess the salience of care coordination concepts and experiences to patients having a range of health status complexities
- Confirm the relevance, content, and priority of domains included in the care coordination conceptual framework as articulated in the Atlas
- Identify additional domains, if any, requiring development of new survey item content

Nine interviews with individuals of varying health status (and resultant needs for and experiences with care coordination) were completed in March 2013. Participants were recruited nationally, and the interviews were conducted remotely by trained interviewers.

After the completion of the interviews, six focus groups were held in April 2013 in Chapel Hill, NC, and San Mateo, CA, with three different audiences:

- Patients with a varying complexity of health issues who varied from each other in their likely needs for care coordination (i.e., some with routine health needs, some with more complicated acute injuries or chronic illness experiences)
- Caregivers of adults needing health care assistance
- Individuals with complex or chronic conditions that are likely to result in high care coordination needs

The interview and focus group findings raised important considerations for item content selection, item writing, and the organization of the CCQM-PC survey. Notably, information from the interviews and focus groups suggested slight alterations to the conceptual framework to better reflect how patients and families think about care planning, transitions of care, and information sharing.

**Item Gathering, Classification, and Winnowing Process.** More than 900 unique survey questions and response scales were identified from 41 different extant care coordination measures. Items had been previously mapped to one or more domains in the Atlas conceptual framework. Through an independent content analysis, items were newly classified into 43 discrete content themes (i.e., “bins”). Bins were prioritized for further consideration based on two factors:

- The level of agreement among the project team about the relevance of a bin to a given domain
- The characterization by at least one project team member that a bin represented “quality care” versus “quality care coordination”

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<sup>1</sup> Appropriate Institutional Review Board (IRB) review and approval was obtained for the key informant, cognitive testing, and pilot study protocols, as well as for obtaining stakeholder input.

Highest priority for further development and revision of items was given to bins that had high relevance to a domain, unanimous team belief that the bin represented care coordination, and showed resonance for patients and caregivers as reflected in themes from the interviews and focus groups.

**Item Specification and Draft Item Set.** The team developed a standard format for items to reduce respondent cognitive burden and facilitate question and answer comprehension. The team implemented the following guidelines in revising extant items and developing new item content for the CCQM-PC:

- Item contexts were kept short, incorporated into question stems where possible, and made generally consistent across all revised items.
- Items adhered to a recall period of 12 months with a referent implying the primary care practice (e.g., “your primary care provider or other primary care professionals in this office;” “your primary care provider’s office”) and adherence to good practices for item writing (e.g., avoiding double-barreled questions, appropriate comprehension level). Variations in the referent were included for cognitive testing.
- Items confirming respondent eligibility for the survey and asking descriptive information used response scales consistent with national experience of care, patient-reported outcome, or health surveys (e.g., CAHPS, PROMIS). Questions included to describe the respondent sample were placed at the end of the survey.
- Assessment items were written with a four-point frequency response scale (wherever possible): never, sometimes, usually, and always. To reduce cognitive burden of complicated skip logic, where applicable, a “not applicable” response option was included, tailored to the stem of the question where appropriate.

A draft survey consisting of 107 survey items was developed in accordance with these specifications.

**Cognitive Testing.** AIR conducted a total of 16 cognitive interviews in Silver Spring, MD, and Chicago, IL, between December 2013 and February 2014. Participants were recruited to represent a variety of health status complexities and experiences with different delivery system structures (e.g., integrated care and dispersed care). The purpose of cognitive testing was to—

1. Ensure that items were understood as intended, noting any needs and recommendations for alternate phrasing
2. Determine whether response options were applicable to the survey items
3. Understand how participants make judgments about the way their experiences fit with the items and the response options
4. Determine whether participants can recall the information in relation to the survey’s 12-month recall period timeframe

Testing was conducted in two rounds to allow for revisions to the survey between rounds. Each round consisted of four cognitive interviews in each location, with each participant reviewing one of two survey forms containing approximately half of the total items. The CCQM-PC was revised again and finalized after the second round of cognitive interviews as version 1.0 for pilot testing.

**Pilot Testing.** The pilot study protocol was submitted to the Office of Management and Budget (OMB), revised, and received OMB approval with change on January 16, 2015 (OMB Control Number 0935-0227).

The AIR team implemented a pilot test of the survey (v 1.0) with patients from a diverse set of 13 primary care practices in 10 States. Participating practices included a mix of ownership types (physician-

owned versus part of an integrated delivery system), specializations (primary care only versus primary care plus other specialties), and practice structures (one site versus multiple physical sites). The eligible patient sampling frame was defined through a query of electronic medical records of adult patients who had a primary care office visit in the 4 months prior to the survey, at least two office visits for primary care in the 12 months prior to the survey, and met one of three mutually exclusive health status profiles approximating health care complexity in the last year: chronic/complex health issues, acute health issues requiring episodic followup, and routine health care needs. The survey was sent by U.S. mail, with followup by phone interview for nonrespondents.

**Psychometric Analysis.** Between February and April 2016, the team analyzed the data collected during the pilot test to determine the psychometric properties of the survey items. This analysis informed a final version (v 2.0) of the CCQM-PC.

**Public Release.** In mid-2016, AHRQ will release the final preassembled 43-item CCQM-PC v 2.0 survey on the AHRQ Web site.

### **Administering the Care Coordination Quality Measure for Primary Care**

This section gives instructions for how to field the CCQM-PC and gather the data needed for analysis and reporting. These instructions are based on the procedures utilized for CAHPS surveys, which have been tested and refined for more than a decade and draw heavily upon recommendations made in “Fielding the CAHPS Clinician & Group Surveys” (<http://www.ahrq.gov/cahps/surveys-guidance/cg/instructions/downloadsurvey3.0.html>). **Although the CCQM-PC is not part of the CAHPS family of surveys, the measure development process was closely aligned with CAHPS principles.**

**Sampling Guidelines.** In CAHPS surveys, it is essential to define the site of care or “unit” that patients will think of when responding to the survey. This is the entity from which patients are sampled and for which the survey’s composite scores are calculated and reported. For the CCQM-PC, the salient site of care for respondents is the primary care practice.

The sample will be drawn from a list of individuals, ages 18 and older, who have received care from a given primary care practice during a specified time interval. The list is called a sample frame. Because the survey was developed to obtain responses from adults, children are excluded from the sampling frame. In the survey’s pilot test, the sampling frame further excluded individuals diagnosed with Alzheimer’s disease, senile dementia, or related disorders within the 3 years prior to the survey and those living in an institutionalized setting. Because no alternate form of the survey has been developed to date for proxy respondents such as caregivers, it is recommended that patient groups who cannot answer the survey questions on their own be excluded from the sampling frame.

Please review these additional guidelines for determining whom to include in the sampling frame:

- Include only patients who have had an office visit in the last 4 months. This helps ensure that respondents have recent experience with the primary care practice to draw on when responding to the survey’s questions.
- Include only patients who have had at least two primary care office visits to the selected practice in the 12-month target timeframe. The target timeframe is the look-back window around which the survey questions are framed (e.g., “In the last 12 months...”). For the CCQM-PC, this look-back window is 12 months. Having a minimum of two office visits in this timeframe helps ensure that there is opportunity for patients and their primary care professionals to engage in ways addressed by the survey’s questions. If the selected PCP specializes in other areas in addition to primary care, ensure that these visits have been with a primary care professional. Most electronic medical record systems include a field for the encounter type and department. One way to identify eligible

patients who meet this criterion is to identify patients with two encounter types in the 12-month target timeframe that are face-to-face office visits associated with departments with the following primary care specialties:<sup>2</sup>

- Family Medicine
  - Internal Medicine
  - Internal Medicine/Pediatrics
  - Pediatrics
  - Nursing
  - Obstetrics and Gynecology (and related codes for OB/GYN)
- As noted above, include all adults 18 years old or older unless institutionalized or having an Alzheimer’s, senile dementia, or related disorder.
  - Include all patients meeting the requirements of the above sampling criteria even if they are no longer patients at the selected primary care practice.
  - To determine the look-back period for the sampling frame, identify the latest date by which a primary care practice will prepare the list of eligible patients; the look-back period is 12 months prior to that date.
  - All items in the CCQM-PC have been designed for the general population, but the pilot test indicates that some items seem to be more relevant for patients with chronic illness and other conditions that tend to require followup care or services from multiple health care professionals. The survey includes appropriate screening items and “not applicable” response options for questions designed to assess a specific experience, so it is not necessary to limit the sample to a specific subgroup. It is recommended that subgroups be oversampled if their experiences are of particular interest to the study.

### **Recommended Data Elements for Sampling or Fielding by an External Party**

For studies in which the data owner(s) (presumably the selected primary care practices) will enter into agreements (e.g., data use agreements) with an external party to draw the final patient sample and/or field the survey, data files containing information about the practice’s eligible patients may need to be shared—with appropriate agreements in place to ensure compliance with all Federal, State, local, and any other regulations governing the sharing of personally identifiable patient health information by a primary care practice. It is recommended that primary care practices anticipate sharing the following minimum information when an entity other than the primary care practice will be drawing a sample of patients from the practice’s eligible sampling frame:

#### **Clinic/Primary Care Practice Information:**

- **A unique, study-specific clinic identifier.** Including the unique, study-specific clinic ID on each record in the eligible patient sampling frame enables sampled patient records to be identified as belonging to a given primary care practice. Typically, more than one primary care practice participates in a survey administration. In such cases, a study sponsor or survey vendor will assign a unique identifier number to each participating clinic or primary care practice.

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<sup>2</sup> If the practice is solely a primary care practice, office visits would not need to be limited by department or specialty code.

### **Patient Information:**

- **A unique, study-specific identifier for each eligible patient.** Creating a new, unique patient identifier that is used solely for the primary care practice's involvement with the CCQM-PC survey administration will prevent the practice from needing to share its own internal patient medical record numbers with external parties and will allow the practice to link a patient's survey data back to his or her medical record. The practice should maintain a key that maps the practice's own internal unique patient identifier (e.g., medical record numbers) to the study-specific patient identifier assigned to each eligible patient in the sampling frame.

**Special considerations:** When the purpose or goals of the survey involve key research questions or analyses that require the inclusion of specific patient populations, primary care practices using a third-party vendor to draw the patient sample may need to share additional patient demographic, clinical, or service utilization data to support stratified sampling approaches. If you anticipate you will not get a sufficient number of responses for a subgroup of interest, oversample that group.

The CCQM-PC is designed for data collection through mailed paper surveys with followup by phone interview with nonrespondents to the mail survey. Thus, if a third party will be fielding the survey on behalf of the practice (e.g., a survey vendor), then the practice will need to share, at a minimum, the full names, mailing addresses, and phone numbers of all patients included in their final patient sample.

### **Recommended Number of Completes**

Exhibit 1 lists the titles and measurement properties of nine composite measures and two summary composite measures derived from 43 items retained in CCQM-PC v 2.0 to assess patient experiences of care coordination in primary care settings.<sup>3</sup> Findings are based on the CCQM-PC pilot study, where 869 completed surveys were received from patients in 13 participating practices.

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<sup>3</sup> Twenty-nine assessment items from CCQM-PC v 1.0 were recommended for deletion based on the collective findings of the pilot study.

**Exhibit 1.** Measurement Properties of Scores for CCQM-PC Composites and Summary Composites

TITLE OF SUMMARY COMPOSITE/Title of Composite	k	Internal Consistency Reliability	Primary Care Practice-Level Reliability (IUR)	ESS for IUR=0.70
<b>COMMUNICATION AND INFORMATION SHARING</b>	<b>17</b>	<b>0.92</b>	<b>0.72</b>	<b>62</b>
Knowing Who Does What	3	0.75	—	—
Communicating With Health Care Providers	10	0.90	0.72	61
Sharing Health Information	4	0.86	0.69	69
<b>PERSON-CENTERED CARE</b>	<b>26</b>	<b>0.96</b>	<b>0.58</b>	<b>113</b>
Care Plan: Assessing Your Needs/Goals	4	0.86	0.70	68
Care Plan: Collaboration on Design of Care	4	0.88	0.66	80
Care Plan: Creating the Plan	5	0.93	—	—
Care Plan: Following Up: Identifying Problems/Making Adjustments	4	0.88	0.51	150
Connecting You With Other Sources of Care	5	0.86	0.67	76
Helping You Take Care of Yourself	4	0.87	0.52	143

Notes: k=the number of items in each composite or summary composite.

Primary care practice-level reliability=reliability at the level of the reporting unit, based on the pilot survey administration. For the CCQM-PC, the reporting unit is the primary care practice.

IUR=Interunit Reliability, a more generic label for primary care practice-level reliability. IUR cannot be calculated when reporting units to not differ in their scores. In the CCQM-PC pilot study, primary care practices did not differ on two of the composite scores.

ESS=effective sample size (i.e., the number of completed surveys per unit needed to achieve IUR=0.70)

A dash (—) denotes composites where IUR and ESS could not be calculated.

As shown in the exhibit, summary composite “Communication and Information Sharing” includes three composite measures: “Knowing Who Does What,” “Communicating With Health Care Providers,” and “Sharing Health Information.” Summary composite “Person-Centered Care” includes six composite measures: “Assessing Your Needs and Goals;” “Collaboration on the Design of Care;” “Creating a Health Care Plan of Action;” “Following Up: Identifying Problems and Making Adjustments;” “Connecting You With Other Sources of Care;” and “Helping You Take Care of Yourself.” Each has good internal consistency reliability ( $\alpha > 0.70$ ).

Survey sponsors, researchers, and other survey users will need to consider the number of completed CCQM-PC questionnaires required in their study to achieve sufficient statistical power for all planned analyses. The number of needed completes is an important factor in determining how many patients to sample from each participating primary care practice. This decision will vary based on the study’s purpose, aims, or research questions. For example, a focus of the study may be to examine variation in patient experiences of care coordination for specific subgroups (e.g., persons who have been referred to a specialist in the past 12 months versus those who have not).

When a survey sponsor wants to use the CCQM-PC to describe differences across primary care practices, an important consideration is the interunit reliability (IUR) of the composite measures and summary composites. The IUR is derived using statistics produced by an analysis of variance (ANOVA) model and is, thus, influenced by sample size such that IUR will increase with an increasing number of respondents per unit. For the CCQM-PC, the “unit” is the primary care practice, thus, Exhibit 1 labels IUR more specifically as “Primary care practice-level reliability”. As shown in the exhibit, the primary care practice-



level reliabilities for most of the composite scores did not achieve a threshold of 0.70<sup>4</sup>. The last column of Exhibit 1, Effective Sample Size (ESS), shows the number of completed surveys that would be required per primary care practice to achieve a practice-level reliability of 0.70 for each composite and summary composite. Although further research is needed, the ESSs of the two summary composites and six of the nine composites suggest that obtaining completed surveys from 150 patients per practice should yield acceptable practice-level reliabilities.

Primary care practice-level reliability for a particular score will be indeterminate or 0 when there are no, or very small, differences among primary care practices. In the pilot study, scores for “Knowing Who Does What” and “Care Plan: Creating the Plan” showed close to no variability across primary care practices and so it was not possible to estimate the primary care practice-level reliability of these scores based on the pilot sample. Given its emphasis as primarily a research tool in the near term, it was of higher importance to represent the content of these two composites in CCQM-PC v 2.0 based on the overall fit of the model than it was to exclude them due to their poor ability to discriminate among primary care practices. When CCQM-PC scores are used in research, the relevance of primary care practice-level reliability depends on the nature of the research questions being asked. Similarly, for quality improvement (QI) applications, primary care practice-level reliability is not relevant unless the comparisons among primary care practice-level scores are used to drive QI.

## Sample Size

Once you have established the number of completed surveys you need to support all planned analyses, consider the likely response rate among your target population. Response rates can be affected by poor-quality patient contact information, resulting in missed opportunities to reach the intended survey recipients. Response rates can also be impacted by factors such as whether your sample knows in advance that they will be asked to complete a survey (and why they are being asked), the timing of the data collection, and the quality of the data source/information used to determine eligible patients. Based on experiences across a number of their field tests, the CAHPS consortium recommends a goal of a 40 percent response rate, with lower response rates resulting in less confidence that the sample is representative of the underlying population. If this target is feasible for the circumstances of your study, applying a 40 percent response rate target to the earlier suggested goal of 150 completed surveys per practice suggests a starting sample of 375 patients per practice ( $150/0.40=375$ ). If a more conservative response rate is anticipated, the initial sample size should be increased accordingly.

In the pilot test analysis, response rates were calculated based on the number of completed surveys received (further discussed below) and were low overall (an average of 17.8 percent per primary care practice). The CCQM-PC v 2.0 dramatically reduces the survey length compared to the piloted survey version, with length of the CCQM-PC v 1.0 having been a factor in the low response rate during the pilot.

## Data Collection Procedures

- The survey is designed to be conducted by mail with phone followup for nonrespondents. Although it is not a CAHPS measure, in administering the CCQM-PC, we recommend using the following standard CAHPS practices for survey operations:
  - Establish a help desk with a toll-free number for respondents to call if they have questions about the survey.

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<sup>4</sup> Unit-level reliability of 0.70 is a widely accepted coefficient that is adopted by CAHPS as an adequate threshold and is recommended where measures will be used for “high stakes” purposes such as public reporting or payment incentives.

- The help desk must be open during the entire survey fielding period.
- Answer incoming calls live during business hours with an answering machine for after-hours calls.
- Mail the questionnaire package, including a personalized letter introducing the study and explaining the respondent’s rights as a research participant.
  - Include the help desk number on the personalized letter.
  - Include a postage-paid envelope to encourage participation.
- Send a postcard reminder, including the help desk number, to nonrespondents 10 days after sending the questionnaire.
- Send a second questionnaire with a reminder letter to nonrespondents 30 days after the first mailing.
- Begin followup by telephone with nonrespondents 3 weeks after sending the second questionnaire.
  - Use national lookup service to verify telephone numbers for sample respondents prior to calling and obtain telephone numbers that are missing.
  - Restrict telephone followup attempts to a maximum of nine calls to avoid over burdening respondents.

An example survey cover letter and reminder letter for nonrespondents are published on the AHRQ Web site, along with information that was reviewed by the pilot study sample as part of consent procedures.

### Calculating Response Rate

To encourage consistency and comparability of new CCQM-PC findings with the pilot survey analysis, the industry standard response rate calculation for mailed surveys, as defined by the American Association for Public Opinion Research (AAPOR), Response Rate 1 (RR1), is provided below as the recommended approach to determine the response rate for the CCQM-PC. Survey sponsors or vendors can consult AAPOR’s *Standard Definitions*<sup>i</sup> and Response Rate Calculator<sup>ii</sup> for more guidance on determining the correct response rate to use for a given survey and instructions for calculating each. The calculation for RR1 is as follows:

$$RR1 = \frac{I}{(I + P) + (R + NC + O) + (UH + UO)}$$

Where:

I = Complete interview (answered at least 50% of composite items and single-item measures)

P = Partial interview (answered less than 50% of composite items and single-item measures)

R = Refusal and breakoff (refused to take the survey after contact)

NC = Non-contact (in the sample, but was never contacted)

O = Other (non-response for reasons other than refusal or non-contact)

UH = Unknown if household/occupied housing unit (unknown if survey reached intended address)

UO = Unknown, other (survey reached intended address, but unknown if survey reached intended subject or if subject was eligible)

Thus, Response Rate 1 (RR1), or the minimum response rate, is the number of complete interviews divided by the number of interviews (complete plus partial) plus the number of non-interviews (refusal and breakoff plus non-contacts plus others) plus all cases of unknown eligibility (unknown if housing unit, plus unknown, other).

## Preparing the Care Coordination Quality Measure for Primary Care Survey for Analysis

Procedures below are provided to aide survey sponsors or vendors in preparing the data for analysis.

### Step 1: Code and Enter Data

The exact level of coding required will depend on the how data were collected. Users contracting with survey vending firms may be able to skip this step entirely. Users preparing the data files themselves should ensure that each response—even for items that were not answered—has a corresponding code. Include separate codes for items that are appropriately skipped, items that show multiple marks when only one response is appropriate, and items that were left blank but should not have been skipped. After the initial data file has been created, prepare or generate a codebook that provides each code’s meaning.

### Step 2: Clean the Data

**Inappropriate Responses.** Check for instances of inappropriate responses (e.g., a value of 2 for a question with response choices of 0 or 1, or a negative integer value indicating a *Don’t Know* or *Refused* response). If an inappropriate response is identified, review the questionnaire to verify that the response does not match the response options listed and revise the data as necessary. These revisions often involve changing the inappropriate response to “missing,” which drops the response from the data analysis.

**Skip Pattern Issues.** Next, check for skip pattern problems. If the response to a screener question is valid, but the respondent violated the skip instructions by answering survey items that should have been skipped, keep the response to the screener and set the response to the followup as missing. If a screener question is blank but the followup question was answered, keep the original response to the followup.

**Incomplete Cases.** Identify any cases in which fewer than half of the key survey questions (items included in the composites and single-item measures) were answered. These cases are not appropriate for analysis and should be removed from the dataset.

**Check for Duplicates.** Ensure that each record in the data file corresponds to a unique participant. If a duplicate participant is identified, keep the responses corresponding to the first questionnaire that was received.

**Check for Coding Consistency.** Data collected from multiple sources or prepared by multiple persons may include variables with responses that are in different formats (e.g., numbers written out versus in numerical form; upper versus lower case text). Ensure that coding for all variables is consistent across all cases.

## Analyzing the Care Coordination Quality Measure for Primary Care Survey Data

### Determination of Composite and Single-Item Scores

Items assigned to factors based on the results of factor analyses of the pilot survey data comprise multi-item composite measures. In calculating composite scores for the pilot survey, we used the CAHPS Analysis Program,<sup>iii</sup> and provide an example for use in subsequent studies using the CCQM-PC.

Although the CCQM-PC is not a CAHPS measure, we chose to follow the CAHPS Analysis Program because it provides a standardized way to—

- Construct composite scores out of individual items
- Adjust for case-mix

- Estimate unit scores—for the CCQM-PC, unit scores are composite scores for each PCP
- Test the significance of unit rankings
- Apply sampling weights
- Report unit-level quality results—in the case of the CCQM-PC, this is the quality of care coordination perceived by patients within practices

The CAHPS Analysis Program generates output that can be used to calculate the performance of each practice and, where appropriate, shows how a practice's performance compares to the overall performance of other practices.

**CAHPS Macro Call Example:** Additional examples are listed in the *Instructions for Analyzing Data from CAHPS Surveys*.<sup>iv</sup>

**\*Creates a macro variable specifying the clinic/practice.**

```
%let unit = clinic;
```

**\*Creates SAS data file for use in the analysis.**

```
data &unit.;
    set in.ccqm_pc_completes;
if complete=1;
```

**\* The CAHPS macro requires the variable PLAN be created. PLAN may be any entity, such as a hospital, clinic, state, gender, or whatever unit needs to be compared. The text output and variable names will still use the label PLAN, but you will know exactly what it is from this data step.;**

```
plan = clinic;
```

**\*Recodes categorical variables into dummy variables. GHR and MHR are global health and mental health ratings;**

```
educ=q91;
age=q89;
ghr=q80;
mhr=q81;
```

```
array dum educ_1-educ_6;
array dum2 age_1-age_7;
array dum3 ghr_1-ghr_5;
array dum4 mhr_1-mhr_5;
do over dum;
    if educ ne . then dum=0;
end;
do over dum2;
    if age ne . then dum2=0;
end;
do over dum3;
    if ghr ne . then dum3=0;
end;
do over dum4;
    if mhr ne . then dum4=0;
end;
```

```
if educ=1 then educ_1=1;
if educ=2 then educ_2=1;
if educ=3 then educ_3=1;
if educ=4 then educ_4=1;
if educ=5 then educ_5=1;
if educ=6 then educ_6=1;
```

```
if age=1 then age_1=1;
if age=2 then age_2=1;
```

```

if age=3 then age_3=1;
if age=4 then age_4=1;
if age=5 then age_5=1;
if age=6 then age_6=1;
if age=7 then age_7=1;

```

```

if ghr=1 then ghr_1=1;
if ghr=2 then ghr_2=1;
if ghr=3 then ghr_3=1;
if ghr=4 then ghr_4=1;
if ghr=5 then ghr_5=1;

```

```

if mhr=1 then mhr_1=1;
if mhr=2 then mhr_2=1;
if mhr=3 then mhr_3=1;
if mhr=4 then mhr_4=1;
if mhr=5 then mhr_5=1;

```

```
run;
```

**\* Run measures through the CAHPS macro for a composite;  
\*Example: Knowing Who Does What Composite**

```

%cahps(var      = q5 q6 q9,
      vartype   = 3,
      name      = knowingwhodoeswhat,
      adjuster  = &_alall,
      adj_bars  = 1,
      bar_stat  = 1,
      impute    = 1,
      adultkid  = 3,
      dataset   = &unit.,
      outname   = knowingwhodoeswhat_&unit.) ;

```

**\*/ Run measures through the CAHPS macro for a single item;  
\*Example: Item Q5 within the Knowing Who Does What Composite**

```

%cahps(var      = q5,
      vartype   = 3,
      name      = AspectsOfCareResponsibleFor,
      adjuster  = &_alall,
      adj_bars  = 1,
      bar_stat  = 1,
      impute    = 1,
      adultkid  = 3,
      dataset   = &unit.,
      outname   = q5_&unit.) ;

```

## Reporting Scores for Care Coordination Quality Measure for Primary Care

The CAHPS Analysis Program will generate a distribution of survey results for each of the composite and single-item measures. That is, for each primary care practice, you can see the percentage of patients who fall into each of the response categories for a given measure. The section that follows outlines a recommended approach for reporting CCQM-PC scoring data.

### Presentation of Data

The score for each composite measure at each practice is calculated in three steps. First, the response for each item is put on a 0 to 100 scale by transforming the never/sometimes/usually/always response categories to 0/33/66/100, respectively. Second, the average, or mean, of each of the questions

included in the composite measure is calculated across all respondents who provide a usable response to the question. Third, the average of those means is calculated to get the composite score. The composite scoring includes any respondent who has a non-missing response for any question within a composite in the calculation of the score; the total “N” in the results tables will reflect this count of respondents.

For some items and composites, the response options are collapsed prior to displaying the frequency distribution across responses. For questions on a “how often” scale (never, sometimes, usually, always), and any composites comprised of such questions, the “never” and “sometimes” responses are combined.<sup>5</sup>

### Comparison Data

Each table to be included in the envisioned report should individually show the score for a composite or single-survey item. Every table is envisioned as presenting two scores: one for the practice for whom the findings are reported (i.e., “your practice”) and an average score across all practices whose patients are surveyed in the fielding period of your study. An example table for presenting a composite score in a report to a participating practice is provided in Exhibit 2.

**Exhibit 2.** Reporting Example in a Tailored Report for Composite “Knowing Who Does What”

	N	% Always	% Usually	% Sometimes or Never	Average (0–100)	How Does Your Practice Compare to All Practices?
All Practices	1,350	78%	19%	3%	91.4	
Your Practice	349	74%	22%	4%	90.0	Your score is below the average

### Testing For Statistical Significance

For every measure presented, test the statistical significance of the difference between the practice’s score and overall average score across all participating practices. If a difference is statistically significant, one would expect to see that large a difference occur by chance less than five out of 100 times. Please note that a statistically significant difference does not necessarily indicate a substantively meaningful difference. When there are a large number of observations, even trivial differences can be statistically significant. Conversely, when there are a small number of observations, what appear to be large differences may not be statistically significant.

For all measures, as shown in Exhibit 1, each table is envisioned to include one of the following statements comparing the practice’s score to the score of the other participating practices:

**“Your score is above the average,”** meaning the practice’s results are higher than the results for all practices combined, and the difference is statistically significant at a  $p < 0.05$  level.

**“Your score is at the average,”** meaning the practice’s results are not significantly different from the results for all practices combined.

**“Your score is below the average,”** meaning the practice’s results are lower than the results for all practices combined, and this difference is statistically significant at a  $p < 0.05$  level.

<sup>5</sup> Detailed information on scoring CAHPS measures can be found in the document, “Instructions for Analyzing Data from CAHPS Surveys: Using the CAHPS Analysis Program Version 4.1,” which can be accessed here: <http://www.ahrq.gov/cahps/surveys-guidance/cg/instructions/downloadsurvey3.0.html>

**Case-Mix Adjustment.** To make a fair comparison between a practice’s scores and those of other practices, scores may need to be adjusted for differences in select respondent characteristics across practices. In the pilot test, these characteristics—education, chronic pain condition, self-rated physical health, and age—qualified as case-mix adjusters for one or more composite scores and were applied to our analyses for reporting to the practices in the CCQM-PC pilot. Further, self-rated mental health has qualified as a case-mix adjuster for a subset of CAHPS surveys. These and other respondent characteristics are retained in the CCQM-PC v 2.0. Survey sponsors and analysts are encouraged to confirm the findings from the pilot test’s identified case-mix adjusters in future data collections. By exploring and reporting adjusted scores, tests of significance findings are those we would expect for each practice if they had similar respondents.

**Special consideration.** When the number of observations for a practice is small (<10), case-mix adjustment can result in seemingly paradoxical or extreme results, such as a dramatic mismatch between the response distribution and the practice’s mean score for a measure, or practice scores that differ from the overall mean by a very large margin.

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<sup>i</sup> The American Association for Public Opinion Research. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*. 8th ed. Oakbrook Terrace, IL: AAPOR; 2015.

<sup>ii</sup> Accessible at: [http://www.aapor.org/AAPOR\\_Main/media/MainSiteFiles/ResponseRateCalculatorVer3-1\\_11\\_22\\_10.xls](http://www.aapor.org/AAPOR_Main/media/MainSiteFiles/ResponseRateCalculatorVer3-1_11_22_10.xls)

<sup>iii</sup> Comprehensive instructions for using the CAHPS analysis program are provided in *Instructions for Analyzing CAHPS Data* (Document No. 15), which is included in the *CAHPS Survey and Reporting Kit*. CAHPS Reporting Kit materials are available at: <http://www.ahrq.gov/cahps/surveys-guidance/cg/instructions/downloadsurvey3.0.html>

<sup>iv</sup> Comprehensive instructions for using the CAHPS analysis program are provided in *Instructions for Analyzing CAHPS Data* (Document No. 15), which is included in the *CAHPS Survey and Reporting Kit*. CAHPS Reporting Kit materials are available at: <http://www.ahrq.gov/cahps/surveys-guidance/cg/instructions/downloadsurvey3.0.html>

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