

Measure & Instrument Development and Support (MIDS) Contractor: Impact Assessment of CMS Quality and Efficiency Measures

Supporting Statement B: OMB/PRA Submission Material for Hospital National Provider Survey

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SUPPORTING STATEMENT

DATA COLLECTION FOR THE HOSPITAL NATIONAL PROVIDER SURVEY

B. Collection of Information Employing Statistical Methods

B1. Potential Respondent Universe, Sampling, and Respondent Selection

The semi-structured interviews and standardized survey will sample from the universe of hospitals submitting data to the Hospital Inpatient Quality Reporting Program in 2015 to construct the sample frame for data collection. Therefore, the sample frame will consist of a universe of more than 4,000 hospitals. We will pull a sample of 2,045 hospitals from this universe with the goal of achieving 900 responses (assumes a 44% response rate). The sample design will stratify the sample by overall hospital quality performance and bed size, two factors by which survey responses could differ. Stratifying by quality performance is needed to help the Centers for Medicare & Medicaid Services (CMS) understand what differentiates hospitals that are able to achieve high performance from those that achieve low performance. We will categorize hospitals into nine sample strata based on quality performance and bed size (low performance, small size; low performance, medium size; low performance, large size; medium performance, small size; medium performance, medium size; low performance, large size; high performance, small size; high performance, medium size; high performance, large size). Low performance refers to hospitals that are in the bottom 20th percentile of the performance distribution on CMS Hospital Value-Based Purchasing (HVPB) composite quality score, while high refers to hospitals in the top 20th percentile of the distribution. Small size refers to hospitals with <100 beds, medium refers to 101–300 beds, and large refers to >300 beds.

Table 1: Sample Allocation (n=2,045 total) by Strata for Standardized Survey

	Small (1–100 beds)	Medium (101–300 beds)	Large (>300 beds)
Top 20th percentile performance*	227 sampled (100 completes)	227 sampled (100 completes)	227 sampled (100 completes)
Middle of performance distribution (20th–80th percentile)	227 sampled (100 completes)	227 sampled (100 completes)	227 sampled (100 completes)
Bottom 20th percentile performance	227 sampled (100 completes)	227 samples (100 completes)	227 sampled (100 completes)

*Based on CMS HVPB composite quality score.

Table 2: Sample Allocation (n=40 total) by Strata for Semi-structured Interview

	Small (1–100 beds)	Medium (101–300 beds)	Large (>300 beds)
Top 20th percentile performance*	4 completes	5 completes	5 completes
Middle of performance distribution (20th–80th percentile)	4 completes	4 completes	4 completes
Bottom 20th percentile performance	4 completes	5 completes	5 completes

*Based on CMS HVBP composite quality score.

Semi-structured Interview. The semi-structured interview will employ purposive sampling to interview 40 hospital leaders across the nine sample strata. This will result in as few as four and as many as five interviews per stratum. Because these data are qualitative, the goal is not to generalize to the larger population but rather to conduct a sufficient number of interviews per stratum to complement the quantitative data collected in the standardized survey and to provide qualitative details that can help partially explain of what we observed in the quantitative results from the standardized survey. We will release sufficient sample for recruitment and scheduling to achieve the target number of completed interviews.

Standardized Survey. Sample stratification will ensure adequate sample size to examine differences in responses by provider performance (i.e., high, medium, and low) and size. For the hospital setting, we aim to achieve 100 complete survey responses in each of nine strata that represent the combination of performance and size leading to 900 completed survey responses. With this sample design, we will have 80 percent power to detect small differences (Cohen's $d = 0.23$) between low, medium, and high performers and small, medium, and large providers using an $\alpha=0.05$ level two-sided test. In addition, with this sample design we will have 80% power to detect medium differences (Cohen's $d = 0.40$) when comparing the more refined strata, for example, high performance, small size providers compared to high performance, large size providers. Certain survey items will be asked of a portion of respondents due to dependencies, eligibility restrictions, etc. Assuming that 50% to 80% of the sample is eligible to respond to such items, we will have 80% power to detect small-to-medium differences (Cohen's $d = 0.26-0.32$) when comparing the aggregated strata (e.g., small size versus large size).

Within each hospital, the selected respondent will be the hospital quality leader, defined as the senior leader with primary or sole responsibility for hospital quality measurement and reporting.

PLAN FOR TABULATING THE RESULTS

The analysis plan will include: (1) development of sampling weights, (2) response rate/nonresponse analyses, (3) psychometric evaluation of survey items, (4) development of national and subgroup estimates (where possible, such as by level of performance and size of hospital), and (5) analyses of the association between hospital performance

(high/low) and hospital responses and characteristics. All aspects of these analyses will be described in a final project report to CMS.

- (1) **Weighting.** Three types of weights will be considered to allow our analysis of survey responses to appropriately reflect the target populations of interest: sampling weights, nonresponse weights, and post-stratification weights. Sampling weights reflect the probability that each hospital is selected for the survey; nonresponse weights reflect the probability that a sampled hospital responds to the survey; post-stratification weights make the respondent sample's characteristics similar to the population. Sampling weights are readily calculated as the ratio of eligible to sampled hospitals in particular strata (given the proposed stratified sampling design). Complex hospital-level nonresponse or post-stratification weights may be developed using logistic regression and raking/log linear models, respectively, in consultation with CMS.
- (2) **Response Rate/nonresponse analyses.** We will examine response rates overall and within particular strata including by performance on CMS quality and efficiency measures and hospital size (number of beds). Logistic regression analyses will be used to examine the associations between known hospital characteristics and probability of nonresponse. Hospital characteristics to be included in this analysis are size (e.g., number of beds), for-profit/non-profit status, urban/rural, region, socioeconomic characteristics of patient population.
- (3) **Psychometric Evaluation of Survey Items.** We will evaluate missing data, item distribution (including ceiling and floor effects), internal consistency, and reliability. We will compute these statistics overall and by strata.
- (4) **Subgroup Estimates.** We will produce national and subgroup estimates with appropriate adjustment to account for sampling design and nonresponse. The types of subgroups that are of interest include performance strata (low, medium, high), hospital size (e.g., number of beds), socioeconomic status of patients, and urban/rural. The final list will be determined in consultation with CMS.
- (5) **Relationship between survey response patterns and hospital characteristics.** We will provide descriptive analyses of survey findings overall and stratified by hospital characteristics. The descriptive statistics will include the mean and median response, variation in responses, and skewness of responses by item. We will use linear and logistic regressions to examine the association between survey responses and hospital characteristics including hospital performance, size, and region. We aim to develop two main analyses. First, we will use univariate analyses to examine associations between performance and hospital characteristics including characteristics obtained from the survey and characteristics obtained from administrative data sources such as practice size and location/region. Second, multivariate regression analyses will be used to examine associations between performance and unintended consequences, barriers to reporting and improvement (e.g., reporting difficulties with reporting data or EHR use), drivers of improvement and changes to improve care delivery adjusting for potential confounding factors identified in the initial univariate analyses. Results from these analyses will allow us to determine the fraction of variation in performance that can be explained by information obtained from the survey. In

addition, it may be appropriate to treat survey responses as the response variable for certain analyses. For example, increased self-reported overtreatment may be stimulated in environments where high performance is encouraged, making it useful to examine whether high performance is associated with higher rates of unintended consequences. Therefore, in consultation with CMS we will consider such additional analyses that investigate survey responses as the response variable and performance as an independent variable.

B2. Procedures for Data Collection

Semi-structured Interview. Using information provided by Health Services Advisory Group (name, job title, mailing address, email address, and telephone extension of the hospital quality leader), RAND will send the hospital quality leader a letter via email that describes the study and interview and invites the hospital leader or his or her designee to take part in the interview. Responding hospital leaders will be contacted to schedule an interview appointment.

Standardized Survey. Data collection staff will contact each sampled hospital to confirm the name, job title, mailing address, email address, and telephone extension of the hospital quality leader. This will allow us to personalize survey invitations. All hospital leaders will receive a maximum of two invitations to participate in the survey via the web. These invitations will be sent via email one week apart and will contain sufficient information for informed consent as well as a hospital-specific PIN code that allows access to the web survey for that hospital. If no email address is available, the invitations will be sent via first class mail. Four weeks after the initial invitation to the web survey, non-responding hospital leaders will receive a paper version of the survey via first-class mail. Seven weeks after the initial invitation to the web survey, non-responding hospital leaders will be contacted by telephone to prompt completion of the survey via web or return of the mailed survey via fax. We anticipate close of the field after 12 weeks of data collection. All hospital leaders who submit a web survey or return a mailed survey via mail or fax will receive a \$40 post-paid incentive.

Throughout data collection, we will track response and cooperation within each sample stratum and employ additional efforts or sample to achieve sufficient response in each stratum.

We anticipate the procedures outlined above and the goal of 900 completed surveys will result in a response rate of 40% to 60%.

B3. Methods to Maximize Response Rates and Deal with Non-Response

Semi-structured Interview. We will maximize response to the semi-structured interview by conducting the interview at a day and time within the field period that is most convenient for the hospital quality leader. The hospital quality leader may designate another individual within the organization to participate in the interview, which may further maximize participation.

Standardized Survey. Published surveys of hospital leaders conducted in the past 10 years report response rates as low as 20% and as high as 63% (Blendon et al., 2004; Weissman et al., 2005). In addition, surveys of organizations and/or individuals in leadership roles have experienced an overall decline in response rates similar to surveys of general populations (Cycota and Harrison, 2006; Baruch and Holtam, 2008). As described in Section B2 above, we plan to maximize response rates for the standardized survey through:

- Careful identification of the appropriate respondent,
- Use of personalization,
- Multiple attempts,
- Multiple modes of survey administration,
- Alternative modes for non-response contacts, and
- A post-paid incentive (\$40).

We anticipate the data collection procedures will result in a response rate of 40% to 60%, and we will release sufficient sample to achieve 900 completed surveys.

B4. Tests of Procedures or Methods to Be Undertaken

The semi-structured interview and standardized survey were each tested with nine or fewer entities. As part of the testing, a range of hospital types (size, quality performance, and region) were selected to capture variation in the expected range of responses. Testing informed the content of the survey and interview protocol, data collection procedures, and estimated administration time for both components of this data collection. For the standardized survey in particular, testing informed decisions about use of an incentive for the standardized survey to enhance response and distinguish the importance of this data request in contrast to other survey requests.

B5. Statistical and Data Collection Consultants

The survey, sampling approach, and data collection procedures were designed by the RAND Corporation under contract to Health Services Advisory Group under the leadership of:

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Key input to the statistical aspects of the design was received from the following individuals:

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Kanaka Shetty, RAND Co-Project Director

Layla Parast, Statistician
Michael Robbins, Statistician
Marc Elliott, Senior Statistician

The semi-structured interview data will be collected by RAND; the standardized survey data will be collected by a survey vendor.

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