

Project 1. Identifying Factors Associated with Hospital and Regional Performance

The CMS measure provides new assays of hospital, and by extension, regional performance. We have developed three aims that characterize performance and its correlates, time trends and the correlates of improvement over time, the inter-relationship of performance across measures and conditions. What is distinctive about this research is the focus on organizational units, hospitals and regions rather than solely on patients. In the first aim we assess the CMS measures that are NQF approved or under review. These measures are focused specifically on a short time period after hospitalization. In the second aim we extend our view to potential future measures that focus more directly on the episode of care over time, following patients after admission for one year. The primary outcome is mortality. We also assess population-based hospitalization rates, rather than assess long-term readmission rates, as they may be a better reflection of preventive quality of care in the community. In the third aim we extend further to incorporate costs and payments into our investigations, as a step towards the concept of value as we assess the joint outcomes of cost and outcomes for hospitals and regions. Together, this portfolio of studies will provide insight into the breadth of performance and the factors that may promote better outcomes and value. This research will build on a massive data warehouse assembled as part of the CMS contract to develop measures and we will follow regulatory protocols to gain access for this grant, as we have done for an on-going AHRQ grant. The spirit of Project 1 is that it will evolve over time with the involvement of our advisors and ESIs. We anticipate that ESIs may propose studies that were not anticipated in the application and we will maintain the flexibility to adjust our study priorities to accommodate outstanding ideas and suggestions. We believe that a Center should have a clear direction and aims, but an important purpose is to serve as a catalyst for intellectual exchange that will continually elevate the quality of the science and its relevance to practice and policy.

A. Specific Aims

Aim 1. To characterize hospital and regional (hospital referral region (HRR)) performance, assess time trends, and determine factors associated with performance and improvement, defined by the CMS publicly reported measures for AMI, HF, PCI and ICD.

Publicly reported performance measures reporting 30-day risk-standardized mortality and readmission rates have illuminated variation in performance at the hospital level for AMI and HF. These measures are based on administrative claims and have been validated with models based on medical record data. These validated NQF measures, and ones that will follow for PCI and ICD, provide useful assays of clinical performance by hospitals and regions. They have also created a strong demand for research that will reveal determinants of variation in performance beyond random variation. We know that hospitals and regions exert strong, independent effects on patient outcomes but the underlying causes are not well understood. We hypothesize that hospital and regional characteristics can explain variation in performance and highlight organizational features that promote high quality care.

Aim 2. To investigate hospital and regional performance using novel measures that focus on a longer episode of care (1 year mortality measures for patients hospitalized with AMI and HF) and population-based hospitalization rates (HRR hospitalization rates for AMI and HF).

The publicly reported measures focus on short-term outcomes (within 30 days of admission). We will develop measures for longer term outcomes (one year risk-standardized mortality for AMI and HF, the clinical conditions of the CMS measures), characterize variation in performance at the hospital and regional level, and investigate hospital and regional characteristics associated with outcomes. In addition, we will partition our investigation by assessing whether performance in the early period after admission (0-30 days) is correlated

with performance in the later period (31 days – 1 year) either at the hospital or regional level. In very preliminary studies, we have observed that performance in the early period after admission is not correlated with performance in the later period either at the hospital or regional level. A patient receiving care at a hospital or region labeled exemplary may do well early, but lose that advantage in the later period. The poor performance in the later period may not directly be related to hospital care, but may have implications for the care patients from that hospital receive in the community after discharge. This perspective is important to patients, who are interested in early and later period outcomes. In addition, as there is a movement toward accountable care organizations and joint accountability for patient outcomes, there is a need for research on performance that moves beyond the early period and more completely captures the episode of care. We hypothesize that hospital and regional characteristics can explain variation in later period (31 days- 1 year) performance. Moreover, we hypothesize that at the regional level, predictors of early performance differ from those in the later period. Finally, we hypothesize that hospital and regional characteristics will be associated with hospitals and regions that are achieving positive deviance in the early and later periods.

Aim 3. To characterize the costs of care for AMI and HF, during the index hospitalization, in the first 30 days and 1 year after admission, and investigate how costs and payments relate to hospital and regional performance (30 day and 1 year risk-standardized mortality and 30-day readmission).

Rising health care costs are placing ever greater emphasis on value in health care; the estimation of what is being achieved for what is being spent. Costs can be understood from the perspective of the resources expended or the payments provided. We will develop measures of cost of care based on resource utilization and derived from Medicare claims, in consultation with our economist experts, and investigate the relationship between costs and performance based on clinical outcomes at the hospital and regional level. Although prior studies have assessed cost-outcome relationships, they have not had the NQF-validated measures or assessed hospitals as well as regions. We will characterize trends in cost for the care of AMI and HF patients across hospitals and regions. We will assess short-term and longer term episodes of care – and then also partition the costs into the early and later periods. We will then identify the hospital and regional characteristics that are associated with costs. Then, we will assess the relationship between costs and the clinical outcomes performance measures. We will identify positive deviants as defined by upper quartile of clinical performance and upper quartile of cost performance. Our hypotheses are that there is marked variation in cost across hospitals and regions, that hospital and regional characteristics explain some of this variation, that there is not a strong association between cost and clinical outcome, and that those institutions with low costs and excellent outcomes can be characterized, revealing insights about what is necessary to achieve such performance, setting up the next steps in the research and preparing for interventions.

Project 2. Translating Outstanding Performance in PCI

A. Specific Aims

The Yale team has developed PCI outcomes-based performance measures of mortality and readmission rates. The development of these measures and the likelihood that they will be publicly reported has created a pressing need for evidence to guide hospital efforts to reduce these rates. As developers of the measures and pioneers of a methodology to identify key determinants of positive deviance, or exemplary performance, we are poised to address this need. This is the first time this methodology has been applied to procedural outcomes. Accordingly, we propose the following specific aims:

Specific Aim 1. To develop hypotheses concerning the hospital organizational strategies (enabling structures, processes, hospital internal environments) associated with exceptionally low risk-standardized 30-day mortality and readmission rates for patients undergoing PCI.

We hypothesize that specific hospital organizational strategies are linked with lower risk-standardized mortality and readmission rates for PCI. We will conduct site visits of hospitals with both low and high risk-standardized PCI outcomes based on most recent data available from Medicare and the ACC NCDR. We will sample high performing hospitals until we reach theoretical saturation, i.e., until no new themes emerge from successive interviews. Based on our prior work, we believe this will require performing interviews at 10-12 high performing PCI hospitals supplemented by visits at 2-3 low performing PCI hospitals. At each site, we will conduct in-depth interviews with 8-10 key informants at each site. We will analyze these qualitative data to identify and classify organizational strategies linked to PCI outcomes.

Specific Aim 2. To survey hospitals in order to test hypotheses about which specific hospital organizational strategies are associated with lower risk-standardized 30-day mortality and readmission rates for patients undergoing PCI.

We hypothesize that certain hospital organizational strategies identified from site visits in Specific Aim 1 will explain differences in hospital risk-standardized mortality and readmission rates in a large cohort of hospitals. We will use a web-based survey and HGLMs to statistically confirm the associations between hospital organizational strategies identified in Aim #1 and risk-standardized outcome rates for Medicare patients undergoing PCI. The survey of hospital organizational strategies will encompass a sample of the more than 1000 hospitals currently participating in the ACC NCDR CathPCI Registry. Based on past experience, we expect that our collaboration with the ACC NCDR will result in a high response rate (75%) to our hospital survey. We will then examine a) how hospital organizational strategies are associated with better and worse performance, b) the extent to which organizational strategies mediate the association between traditionally-measured hospital characteristics (e.g., PCI volume, teaching status) and risk-standardized PCI mortality and readmission rates.

The goal is to produce scholarship that will be suitable for incorporation into quality improvement initiatives.