AHRQ Grant Final Progress Report

Title of Project: Challenges and Innovations in Evaluation of Quality of Care Measures Based on Small Counts

"National Conference on Small Numbers"

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1. STRUCTURED ABSTRACT

a. **Purpose:** The objectives of this 2-day conference were
   i. To discuss the methodological challenges of the low frequency of individual clinical processes and adverse events tracked as quality and safety indicators, and
   ii. To discuss the development of composite quality measures – including a generalizable algorithm into which hospital administrators can input facility-level data to determine an overall quality score.

b. **Scope:** The small number of patients and clinical events in rural and small community hospitals pose a difficult challenge for the computation of accurate quality of care and patient safety indicators on those facilities. There is a need for the development of appropriate measurement tools to overcome this problem.

c. **Methods:** A 2-day conference was organized and held at the Dallas Fort Worth Marriott, in Dallas, TX, on March 28 and 29, 2007. The conference activities included two keynote conferences; four research presentations from scholars working on methods to assess quality of care and patient using data from small community and rural hospitals, including the development of composite measures; presentations from team members of Health Information Technology Projects; and rural hospital administrators addressing the challenges faced by rural facilities.

d. **Results:** The number of conference participants surpassed our proposed target of 100 individuals. The audience was composed of researchers from academic organizations, healthcare services organizations, governmental agencies, hospital administrators and staff, and graduate students from all regions of the United States. The methodological challenges posed by the low frequency of individual clinical processes and the development of composite measures were discussed on day one and continued as one of the main topics within the presentations of the HIT grant projects on day two. The overall message is that there is a need for a review of the current quality of care and patient safety measurement tools in regard to their adequacy to the reality of small number of patients and events in rural and small community hospitals. Composite measures can be very valuable and can be used widely to assess quality of care by aggregating indicators. The use of risk-adjusted rates and/or weighting allows for further refinements in the use and interpretation of composite measures.

e. **Keywords:** Quality-of-care indicators, measurement tools, composite measures, small numbers, rural hospitals.

2. PURPOSE

The purpose of this conference was to address the critical issue of accurately assessing the health status of populations through the measurement of indicators of quality of care and patient safety in small community hospitals and rural facilities that experience small-cell-size issues. In addition to the small numbers, many of the facilities do not collect data on some of the indicators recommended by CMS and AHRQ to measure quality of care and patient safety.

The defined objectives were

    a) To discuss the methodological challenges posed by the low frequency of individual clinical processes and adverse events tracked as quality of care and patient safety indicators of rural and small community hospitals

    b) To discuss the development of composite quality measures, including a generalizable algorithm into which hospitals could input facility-level data in order to determine an overall quality score

3. SCOPE

    a. **Background / Context:** Hospitals in the United States are under increasing pressure from the general public, regulatory agencies, and third-party payers to monitor and report their quality of care and to demonstrate active efforts to maintain or improve it. Rural communities, which account for approximately one-fifth of the US population, differ greatly from urban and suburban communities in terms of their healthcare needs, availability, affordability, and quality. Important factors, such as poor availability of specialists in rural areas and the low volume for certain clinical areas, make rural hospitals unique. The low occupancy rate and the low volume for some clinical areas of rural hospitals make measuring, monitoring, and reporting on quality of care and patient safety extremely complicated.

Typically, quality of care and patient safety indicators are tracked and reported individually or within a clinical area score. Though these methods have the advantage of providing a detailed picture of the quality of care provided by a healthcare facility (thus allowing the identification of specific processes of care or clinical areas to be targeted for improvement), they complicate comparisons of overall quality of care, as varied performance between indicators may appear confusing and contradictory to those providing oversight or trying to make comparisons between providers [1, 2] – particularly members of the general public who are unaware of the high empirical correlation between many quality indicators and do not have the medical knowledge to prioritize between indicators.

One proposed solution might be the use of a composite measure in addition to the individual measures – particularly in the case of rural and small community hospitals where the increased sensitivity of a well-designed composite measure might compensate for the low frequency of individual clinical processes and adverse events tracked as quality and safety indicators. Although various composite quality measures have been proposed and/or are already in use in some aspects of quality measurement and monitoring [3, 4, 5, 6], none of these measures provide a comprehensive tool for monitoring and comparing facilities over time.

A related issue is rooted in the small cell size for reporting comparative performance. When analyses are based on a small number of individuals or events, especially when the data look at a small geographic area (zip codes) or pertain to rare events, population subgroups, provider groups, payers, or other small samples, the results may be altered by random variation, posing a threat to statistical validity and reliability of those results and a risk of misinterpretation [7].

b. **Settings:** The conference was held at the Dallas Fort Worth Marriott, in Dallas, Texas, a large facility that provided all the necessary support for the audience and presenters, including meal services. The conference site was highly regarded by participants in the evaluation form.

c. **Participants:** The target number of conference participants (100) was achieved and surpassed. Presenters were invited based on their expertise in research methods and their ongoing work in the development of composite measures and/or because they were members of a team working on a Health Information Technology Grant project.

The Keynote Speakers were Dr. Nancy Dickey, President of the Texas A&M Health Science Center, and Dr. Jerod Loeb, Executive Vice President, Division of Quality Measurement and Research of The Joint Commission. In addition, the conference held a session with representatives from four Texas rural hospitals.

The audience was composed of researchers from academic and nonacademic organizations, healthcare service personnel, hospital administrators and staff, and graduate students, all of whom traveled to Dallas from all US regions.

4. **METHODS**
    a. **Design / Structure of the Conference:** The conference was designed to provide opportunities for interaction, debate, and discussions through the following agenda:
        i. **Day One:** Two keynote conferences and four research presentations on statistical methods to address the issue of small numbers, including a presentation of various techniques to generate composite measures and indices to assess quality of care. The sessions were designed for all conference participants. There were no concurrent sessions. At the end of the day, a reception was offered to all participants with the intent of promoting and stimulating interaction and networking.

        ii. **Day Two:** The day started with an informal breakfast meeting open to all participants involved in Health Information Technology projects. Next, a session had four presentations from AHRQ-funded Health Information Technology grant projects in CA, WA, MA, and TX. The final session was devoted to presentations from three rural hospital administrators and a clinician from a rural hospital.

    b. **Data Collection:** An evaluation form was included in the binder containing all conference materials to collect feedback information about the accomplishment of the conference goals; presenters' performance; adequacy of the conference venue; and suggestions for improvement.

5. **RESULTS**
    a. **Keynote Speakers:** Opening the conference, Dr. Nancy Dickey, President, Texas A&M Health Science Center and Vice-Chancellor for Academic Affairs, Texas A&M University System, spoke about three important topics related to the challenges posed by small numbers: 1) the "rapidly moving commitment to measurement, and using measurement to enhance performance"; 2) the "position of distrust of the concept of measurement and incentives based upon measurement" among physicians; and 3) the policy implications of the "very real concerns created by very small numbers."

    Dr. Jerod Loeb, Executive Vice President, Division of Research of The Joint Commission, spoke about "Measuring Performance: Challenge and Opportunity," that focused on the "measurement environment" and The Joint Commission requirements for accreditation.

b. Presentations on statistical approaches to small numbers, including the generation of composite measures:

   i. The Summary Quality Index (SQUID) developed by the Medical University of South Carolina was presented by Paul Nietert. It is a very interesting and simple composite measure that could be used widely to assess quality of care at the patient, provider, or facility levels. The SQUID index does not currently utilize different weights for different processes or outcomes, but it could be readily adapted for use with weighting, should it be deemed necessary within the context of certain projects or studies.

   ii. Gulzar Shah from the NAHDO (National Association of Health Data Organizations) presented on several aspects of computation of index measures for quality indicators, including the steps in the construction of a quality composite measure developed by AHRQ, which emphasizes the use of risk-adjusted rates, the use of logistic regression analyses to compute the predicted values, and the selection of weights for the components. He also presented NAHDO's approaches for a composite index, including criteria for the selection of a subset of AHRQ's individual patient safety indicators (PSIs), as well as combining Standardized Incidence Ratios into an index and testing the significance of differences in hospitals' performances based on the composite index.

   iii. Giovanni Filardo and the team of researchers from the Institute for Health Care Research and Improvement of the Baylor Health Care System (Dallas, TX) emphasized that most composite measures currently in use do not offer reliable means of monitoring and comparing the overall quality of care among facilities over time. They presented their approach for the construction of a "Core Measure Composite Score for Small Hospitals." They developed a generalizable composite measure for in-hospital quality of care that takes into account the relative significance of each process measure at the patient level, the order in which processes of care are performed, and the fact that patients may be eligible for processes of care in multiple disease categories that must be prioritized accordingly.

   iv. Robert Baskin, from AHRQ, presented information about the medical expenditure panels, the development of the CAHPS instruments, and the Health Care Utilization Project (H-CUP), emphasizing that, "Small counts impact almost every data set, […] even our national surveys."

c. Presentations of HIT grant projects:

    i. Kiki Nocella, from the University of Southern California, presented a project, "Crossing the Quality Chasm in Rural Kern County," that stressed the importance of collaborative work among different healthcare providers and the community's participation in the decision-making process and implementation of new measures and processes.

    ii. Stephen Porter, from the Children's Hospital Boston, MA, presented the HIT project "*Parent Link*: Better and Safer Emergency Care for Children," which "…promotes a simple concept – 'the history as told by the parent has value' – and demonstrates just how valuable patient-derived data can be for improvements in quality and safety." This project addresses two unsolved aspects of systems-based engineering that relate to quality and safety in healthcare: 1) how to populate a centralized knowledge base with accurate and patient-produced data at the front end of a healthcare visit, and 2) how to integrate these data with evidence-based guidelines to drive safe and effective decision-making.

    iii. Steven Garfinkel, from the American Institutes for Research, presented the HIT project, "A Rural HIT Cooperative to Promote Clinical Improvement." Carried out in the state of Washington, it aimed to design, implement, and evaluate information technology approaches to foster awareness and use of best practice guidelines for acute myocardial infarction and community-acquired pneumonia in Washington states' critical access hospitals. The intervention included an electronic resource center that was available for discussion groups and to answer frequently asked questions; data reporting with a training component; and the use of an evidence-based library in which hospital staff could easily access abstracts and relevant articles.

    iv. Susan McBride, from the Dallas Fort Worth Hospital Council, presented the HIT project, "A Rural Hospital Collaborative for Excellence using IT." The project's aim is the improvement of quality of care and patient safety in 66 rural hospitals in Texas through the implementation of Health Information Technology with training and an additional educational intervention (rapid-cycle improvement – ABC Baylor) to a randomly assigned group. Evaluation of the effects of the HIT implementation and the additional educational intervention will compare selected quality of care and patient

safety indicators pre and post treatments. Preliminary data on patient safety and quality indicators suggest some improvement after IT's implementation, but statistical analyses have not been conducted yet.

d. Presentations from hospital personnel:
   i. Administrators and a clinician from rural Texas hospitals agreed on their message that, although data collection and analyses are paramount in order to know and monitor the reality of the quality of care they provide, there are no current tools to properly measure their indicators because of the very low volume and very small number of events at their rural facilities. They voiced their concerns and frustration because, many times, they are just told their numbers are "not statistically significant."

di. Participants' evaluations: Conference participants were provided with an evaluation form in order to assess the accomplishment of the conference's aims and presentation goals. They were asked to check a response from a scale from 1 to 4 with the following meanings: 1 = Not at all; 2 = Somewhat; 3 = Almost completely; and 4 = Completely. The computation of the responses yielded the following results:
   i. The achievement of the conference's aims was rated by participants as "almost completely." Aim 1 received an average of 3.1; Aim 2 received an average of 3.2.

   ii. The mean of the means of the presentations ratings was 3.3, meaning that, on average, according to participants' perception, the presentations achieved "almost completely" their intended goal.

   iii. The conference venue was highly regarded, receiving an average evaluation of 3.8.

   iv. Most respondents to the evaluation form did not answer if they would do something differently. The responses from those who did answer this question were as follows: "would devote more time for more presentations on methods"; "would provide CDs with the presentations instead of the three-ring binders"; "would include more 'real-world' examples"; and "would not do anything different."

   v. Most attendees heard about the conference through mail and email communication; colleagues or coworkers;

and websites of the partnering organizations, including the AHRQ website.

f. Conclusions:
 i. Although there was no consensus on the ultimate approach for the construction of composite measures, the overall message from the presentations was that there is a need for a review of the current quality of care and patient safety measurement tools in regard to their adequacy for the reality of the small number of patients and events in rural and small community hospitals.

 ii. Composite measures can be very valuable and widely used to assess quality of care by aggregating indicators. The use of risk-adjusted rates and/or weighting allow for further refinements in the use and interpretation of composite measures.

6. LIST OF PUBLICATIONS AND PRODUCTS
a. There are no current publications as a consequence of this conference.

b. A document with the conference proceedings has been prepared. It includes summaries and transcriptions of all presenters and keynote speakers. This document will be submitted for publication and will be made available to AHRQ. It will also be made available for researchers and the general public through the Texas A&M University website and the website of the partnering organizations that collaborated with the conference.

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