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"Adding Clinical Data to Statewide Administrative Data: Pilot Projects"

FINAL REPORT

Minnesota Hospital Association
with
Michael Pine & Associates

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Adding Clinical Data to Statewide Administrative Data: The Minnesota Hospital Association Experience

Executive Summary

This final report details the processes of recruiting hospitals, normalizing laboratory terminology, extracting and submitting data, linking clinical and administrative datasets, and producing value-added reports for hospitals. We ultimately hope to assess the added value in the use of clinical data to determine the quality of patient care within the hospitals in the pilot project.

The Minnesota Hospital Association (MHA) was awarded a contract from the Agency for Healthcare Research and Quality (AHRQ) for a pilot project to study new ways to enhance hospital quality measures. The contract ran from October 2007 through September 2009. MHA contracted with Michael Pine and Associates (MPA) to provide the technical and analytical expertise, and also with Cardinal Health for their technical expertise in risk adjustment and experience with hybrid data sets.

The goals of the project were:

- to prove the feasibility of statewide data organizations creating cost-effective hybrid hospital administrative-clinical databases from electronic data submitted by hospitals that will improve the measurement of risk-adjusted hospital performance;
- to identify and document best practices for data capture, transmission, integration, validation, and utilization for organizations with different information capabilities;
- to engage multiple stakeholders and peer-group organizations to share and disseminate information and stimulate and support efforts to create and utilize hybrid hospital administrative-clinical databases, and;
- to set the stage for enrichment of these hybrid databases as improved health information technology becomes more widely available.

In addition, an outcome of our pilot, as AHRQ project management would attest, was to provide a roadmap of sorts for other states to use as basis for developing similar clinical data linkages.

MHA notified all of its hospital members of the AHRQ pilot opportunity. Though over thirty showed initial interest, thirteen hospitals ultimately followed-through with all the steps required to participate[A] in the pilot. MHA developed a Data Sharing Agreement with the participating hospitals to support acquisition of clinical data for linkage to existing administrative data. Acting as a conduit, MHA worked with its consultants and the participating hospitals to facilitate mapping of hospitals' laboratory values to standardized Logical Observation Identifiers Names and Codes (LOINC) terminology.

MPA worked with MHA and the pilot hospitals to develop a common format that could be extracted from each hospital's internal clinical information systems. Many of the hospitals were not using LOINC codes in their internal systems, but most had the capability of mapping their data to the LOINC standard. Once the format was standardized, the pilot hospitals sent the lab files to MHA. A secure web portal (https:// site) was utilized to move files from hospitals to MHA and on to MPA. Both the laboratory data and the administrative data containing Present on Admission (POA) indicators were sent to MPA for data integrity checks, linkage and analysis. The two data streams included common key elements in order to perform the linkage. We focused our efforts on collecting laboratory data and POA for calendar year 2008 discharges.

One of the critical success factors in our pilot was hosting a kick-off event and subsequent meetings and conference calls with the participating hospitals and our consultants. The kick-off event was attended by quality managers, lab information systems staff, and general information services staff as a way to get educated and up-to-speed with the goals of the pilot. Subsequent meetings were held to discuss any issues that had arisen and to agree on formats for data submission.

Challenges encountered along the way included: acquiring the lab data, enhancing our data handling structure to support larger file sizes, education on the use of LOINC to crosswalk lab data and our attempt to use HL7 standards for the lab data structure. All of these issues were resolved during the course of the pilot though the outcome became a downstream loss of time in our budgeted timeline.

It becomes clear that for any state contemplating initiation of a similar project would benefit from having a dedicated staff point person with team support, and a detailed project plan including the lessons learned and outlined in the pilot state reports such as ours or any of our colleagues (Virginia, Florida, Washington) who had similar projects.

A website containing reference materials and presentations from this pilot project is available at: http://www.mnhospitals.org/index/ahrq-project

NOTE: References to appendix materials are superscripted with the associated appendix reference letter throughout this report.

Project overview

The Minnesota Hospital Association is a trade association representing 148 hospitals in Minnesota. Our association has a long track record of collecting data and information to support advocacy efforts, inform public health and provide mission-critical reports to support hospitals' operational needs. MHA is the sole source for hospital administrative data (based on patient billing data) in Minnesota. Hospitals have voluntarily participated in the UB Data Project in some cases dating back to the 1980s. MHA provides the administrative data to the state of Minnesota to support its policy, epidemiology and public health needs. MHA has also been a Health Care Utilization Project (HCUP) partner since 2000.

MHA was fortunate to be awarded one of the two-year contracts to add clinical data to administrative data. The rational for Minnesota Hospital Association's (MHA) participation in the AHRQ lab project were multi-faceted with two key objectives: One, to improve on the current limitations in the existing administrative data for quality reporting, and two to enhance the future benefit of administrative data by linking it to other clinically rich data sets. More specifically, MHA with its partners had the following key objectives:

- Prove the feasibility of statewide data organizations creating cost-effective hybrid hospital administrative-clinical databases from electronic data submitted by hospitals that will improve the measurement of risk-adjusted hospital performance,
- Identify and document best practices for data capture, transmission, integration, validation, and utilization for organizations with different information capabilities,
- Engage multiple stakeholders and peer-group organizations to share and disseminate information and stimulate and support efforts to create and utilize hybrid hospital administrative-clinical databases, and
- Set the stage for enrichment of these hybrid databases as improved health information technology becomes more widely available.

Our goal was to create a roadmap that other states could follow in the development of their own clinical data sets. By learning from both the successes and the challenges of our experience, we hope other states would have a more efficient development cycle for similar hybrid data base development.

Stakeholders and their roles

MHA's role was primarily focused on project coordination, hospital recruitment, communications, meeting coordination, data collection and technical assistance. MHA's experience administering several data projects including the UB data project provided an avenue for an additive process rather than a start-up. Having several executive level contact points at hospitals (CEOs, CFOs, Quality managers, IT)

provided a good basis for finding the right connections for adding the lab data. In addition, MHA has a long track record of facilitating meetings, education events and communications to its membership.

Key project staff:
- Mark Sonneborn, Vice President, MHA – Project Director
- Joe Schindler, Senior Director of Data and Finance Policy, MHA – Project Manager
- Jaclyn Roland, Data Manager, MHA
- Neil Negstad, Programmer, MHA

Michael Pines & Associates' (MPA) role was overall project design, technical consultation, presentations of research findings, data linkage development, QI measure refinement and comparative reports. Michael Pine's experience working in research and development of risk-adjusted quality measures specifically in the AHRQ domain created a natural fit for working with MHA.

Key project staff:
- Michael Pine, MD, MBA, President, Michael Pine & Associates, (MPA)
- Barbara Jones, Data Manager, MPA
- Donald Fry, MD, Executive Vice President, Clinical Research Expert, MPA
- Roger Meimban, PhD, SAS Analyst, MPA

Cardinal Health provided technical expertise, research presentations and comparative data to support the project. Specifically, Dr. Richard Johannes' research with PH4 in Pennsylvania provided data and insights on the value of pursuing this electronic hybrid approach.

Key project staff:
- Richard Johannes, MD, MS, Vice President, Cardinal Health
- Linda Hyde, RHAI, Director Research Operations and Epidemiology, Cardinal Health

Pilot hospitals were recruited with their primary role being data submission of the lab data (and POA if not already in), analysis of Present on Admission (POA) feedback reports and analysis of selected QI reports. While the initial recruitment was targeted at the CEO level, much of the hospital internal process was spearheaded by a combination of quality managers, lab managers and information technology personnel.

Local state leaders in the quality measurement area from Minnesota Department of Health, StratisHealth (QIO), and Minnesota Community Measurement were informed of the project to provide feedback on potential for comparative public reporting.

Given our existing workload of data collection and reporting activities, MHA's primary needs for consultants were in the areas of data set linkages, data integrity analytic reports and severity-adjusted quality reports. Utilizing its experience with AHRQ quality indicator measurement research and development refinements, Michael Pine & Associates was well-positioned to lend its expertise to support the project. We were also able to tap both the expertise and some comparative data from Cardinal Health's Dr. Johannes and Linda Hyde.

Project Planning

In our evaluation phase, the key issues for MHA were: how to get hospitals to voluntarily commit time and resources to a pilot program with somewhat undefined operational benefit; whether MHA staff and resources could commit to maintaining a long-term pilot; and whether the necessary support systems (eg. consultants and peers) would be available to create a positive outcome for our pilot hospitals.

Minnesota does not have a targeted state mandate for participation in MHA's UB administrative data project; it has been driven by voluntary participation. The downside is that it took many years to gain statewide participation from 1995 to 2000. Since then, a couple of reporting mandates have necessitated hospitals' participation in the UB administrative data project. In particular, a price transparency mandate to show hospitals' average charges for the top 50 DRGs and top 25 ambulatory surgeries.

Getting hospitals to commit resources to new data projects gets tougher all the time. With increasing demands by payers, employer groups and government entities, hospitals face an overwhelming task of managing the massive data collection demands placed on them by outside sources. And internally, there is increasing demand to internal data to support executive decision making.

This pilot was a little challenging to "sell" because there was not a tangible report we could show as the intended outcome. What we were "selling" was as concept that if clinical data sets could be linked with administrative data sets, identified AHRQ inpatient quality indicator (IQI) measures could be refined to a higher level of validity. The potential impact for hospitals is to have more actionable data at a lower cost. The hope is the emergence of clinically-enhanced hybrid data sets could eliminate the need for labor-intensive medical record data abstraction for quality reporting and research.

There was some concern over whether we had enough personnel to work through the details of the project. Certainly, MHA realized immediately that the project could not be done on its own given the technical and clinical nature of QI measure development. When Michael Pine approached MHA with the idea that his group could facilitate the technical details, it became clear that a synergy of MHA's data

collection experience and hospital contacts could be leveraged with MPA's technical expertise to create a pilot project of value.

One of the first projects after the contract award was to develop the implementation plan after consultation with the AHRQ contract project directors. MHA coordinated with MPA to develop a timeline and assignments within each deliverable between our organizations. This process provided us with good reference material that we could share with the pilot hospitals so they could have the details of the timeline and plan for their understanding and support. The pilot project timeline[C] and project implementation details[E] were distributed to hospitals.

Some of the reference articles reviewed by MHA to gain understanding of the value of adding POA and lab data were as follows:

Enhancement of Claims Data to Improve Risk Adjustment of Hospital Mortality by Michael Pine, MD, MBA; Harmon S. Jordan, ScD; Anne Elixhauser, PhD; Donald E. Fry, MD; David C. Hoaglin, PhD; Barbara Jones, MA; Roger Meimban, PhD; David Warner, MS; Junius Gonzales, MD, MBA , *JAMA.*, 2007; 297:71-76.
http://jama.ama-assn.org/cgi/content/full/297/1/71

Book purchased from American Health Information Management Association (AHIMA) entitled, "Present on Admission" by Gail Garrett, RHIT

Article from *Medical Care* • Volume 46, Number 3, March 2008
"Risk-Adjusting Hospital Inpatient Mortality Using Automated Inpatient, Outpatient, and Laboratory Databases"
Gabriel J. Escobar, MD,† John D. Greene, MA,* Peter Scheirer, MA,*§ Marla N. Gardner, BA,*David Draper, PhD,‡ and Patricia Kipnis, PhD*§*

Editorial from *Medical Care* • Volume 46, Number 3, March 2008
"Access to Clinically-Detailed Patient Information: *A Fundamental Element for Improving the Efficiency and Quality of Healthcare" by* Rodney A. Hayward, MD

Targeted data

All standard administrative data elements were collected including admission and discharge dates, admission source, discharge type, age, sex, ICD-9-CM diagnosis codes with present-on-admission modifiers, and ICD-9-CM procedure codes with dates procedures performed.

Selected numerical chemistry, blood gas, and hematology test results were added to this data set. Adding bacteriology findings and vital signs was considered, but collection of these elements was not attempted after discussions during the hospital orientation session revealed that their electronic collection and transmission would be

difficult for many hospitals. The *initial* list of numerical data elements hospitals were asked to collect and transmit were as follows: CHEMISTRY – (1) AST, (2) Albumin, (3) Alkaline Phosphatase, (4) Amylase, (5) Bicarbonate, (6) Bilirubin (total), (7) BNP, (8) Calcium, (9), C-Reactive Protein, (10) Creatine Kinase (CPK), (11) Creatine Kinase MB (CPK-MB), (12) Creatinine, (13) Glucose, (14) Lactic Acid, (15) Potassium, (16) Pro-BNP, (17) Sodium, (18) Troponin I, (19) Troponin T, (20) Urea Nitrogen (BUN); BLOOD GAS – (1) Arterial O_2 Saturation, (2) Arterial pCO_2, (3) Arterial pH, (4) Arterial pO_2, (5) Base Excess, (6) Bicarbonate, (7) FIO_2 (if available electronically); HEMATOLOGY – (1) Hemoglobin, (2) INR, (3) Neutrophil Bands, (4) Partial Thromboplastin Time (PTT), (5) Platelet Count, (6) Prothrombin Time, and (7) White Blood Count (WBC).

The numerical laboratory results included in this initial list either had been found to be valuable in risk-adjusting IQIs and patient safety indicators (PSIs) in previous research by MPA and or were judged by Dr. Pine and Dr. Fry of MPA and Dr. Johannes of Cardinal Health to be readily available and potentially useful analytically based on these investigators clinical judgment and analytic experience.

The choice of initial clinical data elements to incorporate into the data collection protocol for this project was based primarily on MPA's and Cardinal Health's extensive experience in enhancing administrative claims data sets with limited amounts of clinical data. Both organizations have been analyzing clinical performance using claims and clinical data for more than two decades and both have performed important recent research to assess the cost-effectiveness of alternative data collection strategies.

Discussions with potential hospital participants confirmed MPA's belief that vital signs, while potentially useful, would be extremely difficult to obtain reliably from many Minnesota hospitals. Therefore, initial clinical data elements included numerical laboratory values that were found to be important predictors of adverse outcomes in previous research. These data elements were supplemented with several other numerical laboratory values that were not routinely available for other studies but were considered by clinical consultants to be relatively easy to collect and potentially useful in future comparative performance assessments.

Project Initiation

For MHA to consider adding this type of pilot project to its scope of work, we had to find out what the interest would be for participation. Being a member-driven organization, our work is geared towards issues of value to hospitals. If the value of the pilot could be conveyed to member hospitals adequately, it was assumed hospitals would respond affirmatively.

MHA contacted all Minnesota hospitals during the time we were developing our AHRQ proposal to gauge interest. The following e-mail was sent to all CEOs and quality manager contacts from Mark Sonneborn, MHA's VP of information services:

> "The Agency for Healthcare Research and Quality (AHRQ) is currently requesting proposals for a contract for a pilot project to enhance administrative databases (i.e. UB-92 claims data) with clinical data, and MHA is making a proposal. The primary purpose behind this project is for AHRQ to enhance its quality and safety indicators, and to demonstrate that it can be done cost-effectively.
>
> We need 10-15 hospitals that would like to volunteer to be a part of this. The primary benefits of participating are that you will get access to a richer clinical database for performance benchmarking purposes, and, you will have a good coding quality tool for looking at whether conditions should be coded present on admission or not. The 'ask' is for a "data dump" of your clinical lab value data on a quarterly basis. We have an experienced consultant for this project who will then marry the lab data with administrative data. The limited number of hospitals I've already spoken to tell me this is very possible as long as they 1) don't have to manipulate the data too much, and 2) have enough lead time. We will have all the proper HIPAA privacy and security agreements and safeguards in place.
>
> Our proposal must leave our doors on July 18, so we need your indication that you are interested in serving as one of the pilot participants by this **Friday, July 13** in order to be included in the proposal. We know this is an incredibly short notice, but this is a good opportunity -- all you need to do is say "yes, we're interested". Our proposal will be greatly strengthened by a show of willingness of our hospitals to voluntarily participate. We will take your responses after the deadline, but keep in mind that a) we may not get the contract, and b) we may already be at capacity. The start date for the contract is Sept. 30 and it runs two years."

Around 30 hospitals of varying size and geographic location expressed interest prior to the contract being awarded. We were quite pleased with the positive feedback. Since we had good representation of different hospitals from across the state, we did not feel the need recruit additional participation or to limit participation for the pilot in any way.

The critical incentive hospitals in the pilot were offered was access to severity-adjusted AHRQ quality indicators. But a secondary, and potentially long-term benefit, was identified as the potential for elimination of some current labor-intensive and costly, medical records abstraction. No direct financial incentives were entertained to entice participation. The conceptual model that MHA was working with some of the top national experts in quality indicator refinement enticed many

hospitals to participate. An additional incentive was to have some evaluation of their POA data accuracy relative to benchmark hospitals.

After the contract was awarded, we held a kickoff meeting. The e-mail invitation[F] was sent not only to hospitals that had expressed previous interest, but all hospitals. This communication was sent to CEOs, quality contacts, information technology professionals, medical records coders, and our administrative data submission contacts.

Some of the original interested hospitals decided not to participate, but others joined. The most cited reason for declining to participate was competing information technology priorities, such as the implementation of an electronic health record. Some of the smaller hospitals cited lack of staff and resources to support a more complex project than they had envisioned.

As a part of the kick-off event, the presentations describing both the planned project framework and details of the data methods were made available to the pilot participants. A web page [H] was established to provide ready access to these materials for anyone involved with the pilot. The presentations are not included in this report, but are available to any interested parties on MHA's web site as noted in the executive summary section.

As the pilot progressed additional materials were developed to assist with the data file specifications. Instructions for both the Logical Observation Identifier Name and Codes (LOINC) code mapping [K] and Health Level Seven (HL7) formatting [L] were sent when the request for lab data files was implemented. It became clear that many of the IT people working on the project were unfamiliar with its intents and purposes, so we developed a one-page project description [D] summary document. We included a graphic of data flow adapted from a graphic our colleagues at Virginia Health Information had developed. This was seen as helpful for conceptualizing the project.

Assessing hospitals' readiness

Prior to being granted the AHRQ contract, MHA contacted member hospital CEOs and quality managers as noted earlier to gauge their interest in participating in a pilot project as outlined to link administrative data with laboratory data. Hospital leaders showed high interest in the pilot's aim to produce refined QI measures using existing streams of data. A total of around fifteen organizations representing close to 30 hospitals responded affirmatively.

Once the contract was granted and the implementation plan was developed, a kick-off event was planned for January, 2008 as noted earlier. The primary target audience subject matter experts from hospitals were quality managers, lab managers and information technology (IT) personnel. Since most of the hospitals showing interest were located near the Minneapolis/St. Paul area, the kick-off event was held there.

Our contractors, including Dr. Michael Pine, Dr. Richard Johannes and Linda Hyde, were our featured content experts with Mark Sonneborn and Joe Schindler providing a description of MHA's overall objectives and project plan.

In an effort to ensure front-lines coding professionals were getting our messages about the need for accurate POA coding and the pilot project, presentations were made at the Minnesota chapter of the American Academy of Professional Coders (AAPC) and the Medical Account Managers Association meetings. Dr. Pine conducted a breakout session at the AAPC meeting held in Rochester Minnesota pertaining specifically to POA coding history, definitions and case study scenarios.

As a follow-up to the kick-off event, MHA developed a survey to gauge the data formats and system capabilities of hospitals. Since our colleagues at Virginia Health Information (VHi) had already conducted a readiness survey that contained similar questions to assess hospital data capabilities, we were able to formulate a similar survey[G].

The survey[G-1] and outcomes[G-9] are attached. We segmented our questions into two primary sections: billing/administrative data systems and lab data systems details. Our main objective was to gauge how complete the data would be and determine capabilities of linking the two data sets.

In the billing system questions, our main finding was that we were not be receiving complete diagnosis (beyond 9) and procedure codes (beyond 6) which could have some impact on severity adjustment methods. Hospitals have been encouraged to update their data submission programs to accommodate sending more complete data sets.

We were pleased to learn that all the pilot hospitals were coding all claims with POA – not just Medicare. Furthermore, the CMS standard was being utilized by all pilot hospitals.

The lab system questions offered a variety of responses, but the major learning was that most were not familiar or utilizing the LOINC standard for lab values and the HL7 format, while utilized for internal (some limited external), real-time clinical data transactions, was not preferred the preferred method for this pilot project. Despite these concerns, we felt it would be necessary to attempt usage of both of these national standards to test what would happen and report successes, lessons learned and recommendations for other states.

Administrative hurdles

The MHA has existing business associate agreements with all of our hospitals in order to comply with HIPAA for our existing UB administrative data project. However, it was determined that an addendum [B] was needed from the participating

hospitals. Therefore, we obtained signatures and executed agreements in order to move forward with the project. The addendum gave MHA permission to share record-level data pertaining to the pilot with its subcontractors for linking and analysis.

The most difficult challenge encountered in this pilot project related to acquiring the required data from the information services departments at the pilot hospitals. The submission of the lab data is not a process that the information services departments at the hospitals are routinely asked to run. Therefore, our project sometimes became a lower priority and delayed the hospitals' submission of the data. Once we can make the data request a routine process for hospitals and automate the submission process, this should be less of an issue.

Our efforts to understand and implement the HL7 and LOINC standards posed some of the more significant challenges. It is imperative as data collectors that we know and understand the rationale for the standards so we could properly convey their usage to hospitals. We relied on our subcontractor, Michael Pine to develop the plan for obtaining LOINC codes and/or LOINC code cross-walk maps to each hospital's lab system. Though many hospitals indicated in our readiness survey that they were unfamiliar with this standard, participants who followed through were able to map their internal lab codes to LOINC. The LOINC maps were collected by MHA and passed-through to Michael Pine for review and comment. Through this process there were modifications that were necessitated with each map schema submitted.

The HL7 schema instructions were designed by MPA staff to help guide hospital's programming for lab data files. The HL7 framework was delayed in its development, in part waiting for education sessions with Ed Hammond and also for clarification on some of the details involved. Once the HL7 instructions [L] were developed, MHA sent these to hospitals. Receiving lab files back in the HL7 format revealed some variances in data file outputs.

Keeping hospitals engaged in a pilot program takes constant communication. Since this project did not have a high priority for hospitals' day-to-day operations, hospital managers had difficulties getting IT support under the timeline we had established. Informing hospital staff unfamiliar with the project or its intended outcomes was also a challenge. MHA tried to mitigate this somewhat by creating a summary graphic[D] depicting the data and information flow with a high level description of the pilot and intended outcomes.

MHA IT staff experience a certain balancing of project priorities over the course of the pilot. The ongoing data collection and reporting programs and attendant issues continue while also trying to understand and implement a new data collection function. To date, MHA IT staff has been more or less a pass-through conduit for data files, but eventually will be trained to utilize the methods for record linking and

report development that is developed by our subcontractor, Michael Pine & Associates.

Unplanned changes

During the implementation phase, it became clear that programming to the HL7 standard was creating unnecessary administrative burden for hospital programmers. We did receive files from two hospitals systems in the HL7 format. Upon review of the file structures, it became clear there were some problems including interpretation of how to loop the data. In other words, we received two differing interpretations of how to send the data which caused some concern for automation purposes. In addition, one hospital was attempting to create a real-time HL7 download of the lab data for us, however a couple of problems occurred. One, there was lack of understanding that this was a retrospective data review, so real-time data would not help us for the pilot. Secondly, despite several conference calls it never got completed.

The lack of understanding and confusion over why it was being used created a situation of paralysis whereby MHA was not hearing from hospitals moving forward with the pilot. In an adjustment seen as necessary to get more hospitals to program and send their lab data, MHA, on the advice of Michael Pine, decided to offer VHi's ASCII text file structure as an alternative to HL7. Several hospital IT staff were relieved by the move and MHA was able to collect lab files from additional hospitals in the end.

Project Implementation

As mentioned, recruiting hospitals for participation in the pilot produced more interest than expected. MHA's goal was to recruit a cross-section of hospitals to include both large urban and small rural, system-affiliated and stand-alone hospitals. Minnesota has 151 hospitals including two Veteran's Administration Medical Centers, two Indian Health System hospitals and eleven state operating facilities primarily focused on community behavior health. Among its general acute care hospitals, Minnesota has 79 critical access hospitals (CAH), 22 rural PPS (prospective payment system – for Medicare) hospitals and 33 hospitals located in large, urban metropolitan statistical areas. A little more than half of Minnesota's hospitals are affiliated with hospital systems. There are seventeen single or multi-hospital health systems that own 55 hospitals and provide management services to another 17 hospitals.

There were 34 hospitals initially showing interest in the pilot project [A]. There was a good mix of urban and rural, system-affiliated and independent, CAH and PPS. As the project progressed, not all of the interested hospitals stayed on. Some cited lack of resources to commit to the pilot. Others, though intending to follow-through, were

unable to get data files produced within the timeline of the pilot project. The thirteen hospitals who did participate represented approximately 26% of the general, acute care discharges in Minnesota.

Hospitals encountered several types of problems complying with our pilot project requests. Probably the biggest obstacle was hospital's internal communication of the project's aims and importance. Those who attended the kick-off event had the benefit of first-hand learning about the project. However, other staff (eg. IT or lab staff) who had to write code or interpret lab values into LOINC were not as engaged and we believe this lead to some of the deterioration of participation. MHA takes some blame in that we probably needed to keep up a more steady drumbeat of communications about the project to keep all parties engaged. We did develop a one-pager to help convey the principals of the project so that it could be more easily understood.

The use of the LOINC codes for lab and HL7 for the data format turned out to be a significant challenge over a more targeted approach. The LOINC issue was dealt with by asking hospitals to do a preliminary step to map their existing coding system to LOINC for the lab values being collected. Simplifying the data file layout from HL7 to and ASCII file layout assisted in the convincing of some hospitals to follow-through on the IT side.

The key to success with obtaining data from hospitals were as follows: Having a champion at the hospital to follow-through with the operational aspects of obtaining the data and also the analytics to ensure the reports are utilized; engaging the IT folks to help them understand the high-level need to create data feeds to support risk-adjusted quality measures; being flexible to adjust requirements and timelines where necessary to ensure maintenance of hospital participation.

Issues encountered with standardized data protocols

Some of the key challenges of the pilot were in the area of data standardization. Not for lack of available standards to use. The LOINC standards for lab values were not readily recognized by hospital lab managers. According to our survey, only about half those responding said their lab system had an option in their lab system for reporting in the LOINC

LOINC codes for test results of interest were identified. A grid[K] and an instruction sheet were prepared to assist hospitals in linking appropriate LOINC codes to their current identification codes. This material also is included in appendix K.

Each participating hospital provided a spreadsheet that related its laboratory reporting system to the MHA reference data transmission format[K]. The MHA format provided fields required to ensure that data were in the expected format. All laboratory data were transformed into reference units. Most laboratory data were available in

standard reference units or could be readily transformed using simple arithmetic calculations. In some cases (e.g., blood and plasma glucose), transformation required a clinical assumption about relative equivalences. In other cases (e.g., pO_2 and O_2 saturation), transformation required analyses of the relation between measured laboratory results and clinical outcomes of interest.

Median values and ranges for standardized laboratory results among participating hospitals were compared. Even when stated normal ranges differed somewhat, there was no evidence of substantial differences in distributions of test results that would require further adjustment of reported values to ensure comparability among hospitals.

No problems were encountered in using LOINC codes to identify laboratory test results for the analysis piece.

LOINC codes are relatively easy to relate to most hospitals' laboratory reporting systems. It is important to identify and isolate the small percentage of these codes that relate to the data elements of interest. Use of a template such as is shown in appendix K allows hospital personnel to do most of their own mapping in a cost-effective manner. Inaccuracies and inconsistencies can be detected easily by a knowledgeable reviewer who can resolve most problems rapid by email or by phone.

Potentially useful fields from the HL-7 format were identified and incorporated into an instruction sheet[L] for HL-7 transmission. For facilities who's IT staff were familiar and have used the HL-7 format, data transmission was relatively easy. However, it is important to confirm where and how data are being stored and transmitted within this relational format. Alternative fields may provide equivalent data and different facilities using standard HL-7 may routinely populate different alternative fields as mentioned earlier.

For many facilities' internal IT staff unfamiliar with the use of HL-7, the seeming complexity of its relational structure may prove relatively daunting. Using a flat file format that retains HL-7 definitions but is limited to only fields required to augment administrative claims data proved to be a good approach to retain the advantages of HL-7 without over-burdening hospitals.

The HL7 format also took some time for MHA staff to understand. It turns out hospitals' use HL7 is primarily for certain real-time transactions and communication of clinical data mostly internally, but in some cases externally (eg. eligibility verification). However, hospital IT staff seemed unfamiliar with coding to the HL7 format for retrospective data downloads.

Full HL-7 formats proved to be overly complex for some hospitals. Therefore, the full HL-7 transmission format was collapsed into a flat file format that used HL-7 definitions of data field but lacked the relational features of the HL-7 data format.

This simplified format mirrored the data transmission format developed by the Virginia Health Information for their AHRQ pilot project.

The advice we would give other states is to first, understand the current context and current use for both of these standards. The LOINC standard, though not well integrated currently, represents a data format standard necessary to measure across hospitals. It does require a mapping process to ensure hospitals are translating data values from their lab system into the only common format across systems, the LOINC standard. The HL7 protocol, while heavily used in hospital real-time transactions, may be overly complex for a periodic data collection program.

Communications

Our main communication tool used was email. This enabled MHA to ask for volunteer hospitals, identify key staff to contact, push out updates, follow-up on questions and send reports. An example of our first solicitation email sent prior to receiving the contract is shown in the answer to number 19 from July, 2007 email.

A web page was established on the MHA web site so that emails would not have to contain common reference materials.

An in-person kick-off meeting was held in the beginning of the project to introduce people and get them in contact with the key partners in the project (details of this meeting outlined earlier). The kick-off information flyer is shown in appendix F. Additional meetings were held both in-person and via conference call during the project as a progress check-in and to handle questions that hospitals had.

As one of several grantees involved with the project, MHA participated on a monthly basis with its colleagues from Virginia, Florida, Washington, California, the Veterans Administration, Michael Pine & Associates, Cardinal Health and AHRQ. These monthly meetings were coordinated by the National Academy for State Health Policy (NASHP). Meeting with our colleagues on a monthly basis was invaluable for sharing ideas and best practices. As mentioned throughout this report, we were able to utilize materials initiated by other organizations as well as share our resources with others.

A secure Wiki web site [N] was established by Thomson Reuters to serve as a centralized site for meeting agendas, minutes, progress reports and other tangible documents that were shared among the partner organizations. This proved be a very useful tool to support the information sharing and for finding reference materials. We would suggest relevant documents from the Wiki be moved to a dedicated AHRQ HCUP web page for those interested in establishing a clinical lab data collection effort.

Direct phone calls with individual pilot hospital sites were needed in situations where it was determined that lack of response to other modes meant the project either was not a priority or, more often than not, was not well understood. Several conference calls were held between MHA staff and individual hospital staff to orient everyone to the overall project goals down to details of the specific data file layout and transfer protocols.

Process for hospitals to transmit data

MHA utilized its secure https:// web portal to transmit and receive data files. This method is similar to that used in online banking—the data being sent is encrypted when it leaves one site and enters the end site. A private key is used on both ends (sender and receiver) to encrypt and de-encrypt data. Data was stored on one of MHA's limited-access, local area networks (LAN) dedicated specifically for the administrative and lab data. With the secure portal the MHA data staff receive an alert email that data has been received. A confirmation email is then forwarded to hospital. Only staff working with these data have access to the data. Long term backup and storage of the data is with Iron Mountain's secure LiveVault.

An alternative method for data transfers used by some hospitals was SFTP[I] (secure file transfer protocol). The main advantage of SFTP is unlimited file sizes can be pushed through. Also, a confirmation email indicating file size is automatically sent to hospital and to two MHA data staff.

The size of files became one problem MHA encountered trying to receive large lab data files greater than 25mb. Part of this issue was due to our request for a full one-year's worth of lab data for all inpatients discharged in calendar year 2008. The adjustment to accept larger file sizes was a fairly simple one in that our IT staff simply opened up or expanded the maximum file size and lengthened the timeframe that the connection to the port could be open. Requesting the data in smaller timeframe increments would also have helped mitigate this issue would likely be the scenario for a long-term program to collect the lab data.

Data Analysis

Linkages & data integrity screens

Administrative and clinical data had unique case-specific identifiers that permitted easy linkage of data sets. Common data elements were compared to ensure that accurate matching had been achieved. Rates of missing laboratory determinations for live discharges hospitalized for more than two days with serious medical conditions was computed for each hospital to assess the completeness of submission and linkage of laboratory data for hospitalized patients.

Distributions of administrative data elements (e.g., age) were examined to establish face validity. Fifteen screens for coding of complications and accuracy of present-on-admission (POA) modifiers were applied to data from each hospital to assess the quality of ICD-9-CM diagnosis coding. Appendix J includes a published manuscript describing 12 of these screens; an additional three screens were added to assess adherence to new CMS POA coding guidelines pertaining to exempt codes and principal diagnoses. Results of screens for 14 Minnesota hospitals also are included in Appendix J-8.

The ***final*** list[O] of numerical data elements that met criteria for consistency of reporting and completeness were: CHEMISTRY – (1) AST, (2) Albumin, (3) Alkaline Phosphatase, (4) Amylase, (5) Bicarbonate (when combined with bicarbonate computed from blood gas analyses), (6) Bilirubin (total), (7) Calcium, (8) Creatine Kinase (CPK), (11) Creatine Kinase MB (CPK-MB), (9) Creatinine, (10) Glucose, (11) Potassium, (12) Sodium, (13) Troponin I, (14) Urea Nitrogen (BUN); BLOOD GAS – (1) Arterial O_2 Saturation (when combined with Arterial pO_2, (2) Arterial pCO_2, (3) Arterial pH, (4) Arterial pO_2 (when combined with Arterial O_2 Saturation), (5) Base Excess, (6) Bicarbonate (when combined with bicarbonate measured in chemistry laboratories), (7) FIO_2 (not consistently documented, but usable when available in combination with pO_2 and O_2 saturations); HEMATOLOGY – (1) Hemoglobin, (2) INR (when combined with Prothrombin Time), (3) Partial Thromboplastin Time (PTT), (4) Platelet Count, (5) Prothrombin Time (when combined with INR), and (6) White Blood Count (WBC).

Absolute and relative range cut-offs were established for each of the 27 final laboratory tests[O] (see appendix O). These were applied to assess the quality of laboratory data received from individual hospitals. Values outside of absolute bounds were set to missing or replaced with another qualifying value if one was available. Values within absolute bounds but outside of relative bounds were noted and rates of occurrence of absolute and relative bound outliers were computed for each hospital. Laboratory data from hospitals with unusually high rates of absolute and/or relative bound outliers were considered suspect. If identified data problems could not be corrected, data from problematic sources were excluded from data sets used to develop risk-adjustment models and set performance standards.

Initial efforts to use numerical laboratory data to validate POA coding included the use of admission levels of: (1) amylase as a check for acute pancreatitis on admission, (2) CPK-MB as a check for acute myocardial infarction on admission, (3) creatinine as a check for renal failure on admission, (4) arterial O_2 saturation and arterial pO_2 as a check for respiratory failure on admission, (5) arterial pH as a check for acidosis or alkalosis on admission, (6) hemoglobin as a check for anemia on admission, (7) platelet count as a check for thrombocytopenia on admission, and (8) white blood count as a check for sepsis on admission. Detailed analyses of the relation between diagnosis codes and admission laboratory results are planned to develop a more sophisticated set of screens to ensure that conditions coded as present on admission

actually were present on admission and to confirm that conditions that were coded as hospital-acquired were not present on admission.

Methods and modeling

ICD-9-CM diagnosis codes for conditions and procedures of interest (i.e., acute myocardial infarction[P], congestive heart failure, gastrointestinal hemorrhage, pneumonia, and cerebrovascular accident, coronary artery bypass graft surgery, and percutaneous transluminal coronary angioplasty) were evaluated to determine which codes were rarely if ever hospital-acquired complications in association with a qualifying condition or procedure. These codes were treated as chronic regardless of POA coding. Other codes were used as potential risk factors only when coded as present on admission.

ICD-9-CM diagnosis codes were grouped into nested sets of potential risk factors for inpatient mortality based on empirical findings and clinical judgment. Stepwise logistic regression was applied to all potential risk factors derived from administrative (claims) data alone in order to select a robust, parsimonious set of predictive variables. Independent variables and their coefficients were reviewed for clinical plausibility. Models were validated using data sets other than those used in their original derivation.

Potential risk factors were constructed using admission laboratory results. Model development was repeated using all previously eligible administrative variables and all newly created laboratory variables. The performance of these two sets of models was compared. Final models will be forwarded when work on these models is completed. Comparative performance data will be added to this section when it is available.

Three new patient safety indicators[Q] were developed for a carefully specified set of elective surgical procedures. The first included inpatient mortality (which was extremely rare in these low risk cases) and hospital-acquired complications associated with very high mortality rates. The second included all cases positive for the first indicator plus cases with hospital-acquired complications associated with high mortality rates. The third included all cases positive for the second indicator plus cases with hospital-acquired complications associated with moderately high mortality rates. These indicators for very serious, serious, and moderately serious complications are specified in Appendix Q.

Administrative and administrative-plus-laboratory risk adjustment models were derived for each of the new patient safety indicators using the same methods as were used to construct comparable models for inpatient mortality for selected conditions and procedures. The performance of these two model sets were compared. Final models will be forwarded when work on these models is completed. Comparative performance data will be added to this section when it is available.

Project Results

Although the work is not yet complete, we believe will have shown that it is possible to merge administrative data with lab data to create a hybrid data set. Because these data already exist within hospital information systems, and because the lab information systems generally have the capability of delivering data in a standardized format, we believe the hybrid database can be compiled efficiently once the data formats become well established. Linkages between the data sets can be accomplished using patient account and medical record reference numbers along with other secondary linkage check variables such as birthdate.

The end result of our pilot experience was more difficult to attain than the initial vision, but it is comparable to other start-up data ventures. We anticipate having outcome data to share in the coming months.

Unexpected hurdles

We encountered some unexpected hurdles that primarily this fall into two categories. The first has to do with hospital resources. Often, there was support for participation among the quality staff, but the IT staff were more difficult to convince. In fairness, many of the hospital IT staff did report being currently engaged in large scale implementation projects, and it was difficult to persuade them to also prioritize our project. We used a variety of methods to resolve these issues based on each situation. Sometimes we would have the quality contact engage the IT staff in order to increase the priority, and other times we simply gave the IT staff more time to produce the needed data.

The other major lesson was that although the vast majority of the lab IT systems in use could produce data in the standardized format that we requested, very few were routinely using that format. Our request of them was in most cases different than every other data request they receive, and therefore took more time to explain. Going forward, we believe that once we have established the standardized format, hospitals will able to make our request routine which should alleviate the need for much interaction between the IT staff and MHA after set-up.

Clinical Data Elements Added

We asked for POA on the administrative data set and a separate data feed of identified lab values. While vital signs were contemplated and some hospitals could provide them, these were not pursued due to lack of consensus among the pilot hospitals.

The POA and lab data elements were chosen based on the research indicating these would provide the most important enhancements to the administrative data for quality

indicator adjusting. Based on feedback from the hospitals, these data were mostly readily available from existing information systems. A small minority would have been able to provide vital signs, but we wanted to have all hospitals providing the same elements. As mentioned above, vital signs were proposed but most hospitals could not provide this electronically at this time.

Methods and any related challenges

A kickoff meeting was held in January 2008. The invitation was sent to all hospitals to their CEOs, quality contacts, medical records coders, and information technology lead staff. Here is the text of the message:

> "Minnesota hospitals have a new opportunity to get better, more complete data for quality review, thanks to a contract the Minnesota Hospital Association (MHA) was recently awarded. The Agency for Healthcare Research and Quality selected MHA to be part of a two-year project that allows clinical lab data to be paired with administrative billing data.
>
> Hospitals already submit billing data to MHA – we need hospitals to also submit their lab data. What participating hospitals get in exchange is access to reports on quality and patient safety indicators with more sophisticated severity adjustment, as well as a way to check for the accuracy of coding conditions present on admission.
>
> Thirty Minnesota hospitals expressed interest in participating during the proposal phase of this contract, but **any hospital** can be part of this new initiative by agreeing to also submit their clinical lab data. **To participate in this project, we are asking for a "data dump" of your clinical lab value data on a quarterly basis**. We are working with a consultant who is the leading expert on this subject and has successfully merged lab data with billing data for projects in states such as New York and California.
>
> There is a kickoff meeting for this project on Jan. 15, 2008 at the Radisson Hotel in Plymouth for everyone who is interested in learning about the requirements and expectations for the project. The target audience is for: hospital information technology experts (particularly those familiar with the lab systems), medical records coders, and quality monitoring and improvement experts. We will be expecting a decision on whether to commit to participating in the project by the end of the program that day. The registration information and more specifics about the project can be accessed at http://www.mnhospitals.org/inc/data/calendar/908800.pdf.
>
> Please sign up for the meeting. If you have any questions please contact Joe Schindler (jschindler@mnhospitals.org) or Mark Sonneborn (msonneborn@mnhospitals.org) at the MHA."

After the kickoff, periodic telephone conferences were held to discuss both general and specific issues, and for the participants to ask questions of MHA and our subcontractors.

The most common challenge with the calls after the kickoff has been dealing with hospital personnel assigned to the project who did not attend the kickoff meeting. We often had to educate them about the basics of the project when others were concerned with issues of how to implement the project.

Hospital training and education

The kick-off event was the main source of education to the pilot hospitals. Beyond the kick-off, materials were made available on MHA's web site plus periodic meetings/conference calls were held to answer questions. Dr. Pine was very helpful answering questions from hospitals in these forums. Additionally, Dr. Pine provided POA training at the AAPC, statewide coders conference as outlined earlier. One-on-one conference calls were also held to answer hospital's specific questions.

Data formats, coding, and standardization

The POA coding was assumed to be based on the CMS coding standard as reported on a hospital claim. MHA's approach to collection of the lab data was to use both an existing data content standard (LOINC) and an existing data format HL7. Though as pointed out in other areas, the HL7 format was dropped in lieu of a simpler ASCII text-based file format.

Data transmission

MHA utilized its secure https:// web portal to transmit and receive data files. This method is similar to that used in online banking—the data being sent is encrypted when it leaves one site and enters the end site. A private key is used on both ends (sender and receiver) to encrypt and de-encrypt data. This method utilizes Secure Sockets Layer (SSL), cryptographic protocols that provide security and data integrity for communications over networks such as the Internet. TLS and SSL encrypt the segments of network connections at the Transport Layer end-to-end. After data is received on the Secure Portal, files are moved onto our Production Drive (called the U disk) for processing. The U disk can only be accessed by a few staff members who use the data. The necessary production jobs are run after all data is received. Files received over the SFTP are automatically moved over to the Production drive with the use of a Visual Basic file transfer program.

Data cleaning

Data received in the HL7 format were reconfigured into flat files without difficulty. POA screens were applied to ensure the quality of POA coding. Hospitals that failed

these screens were excluded from the analytic database used for model development. Laboratory data were screened using range checks shown in Appendix O. Values outside absolute upper and lower bounds were set to missing. Hospitals with high rates of missing or unacceptable laboratory data were excluded from the analytic database used for model development. The mortality rate for cases at each hospital that was missing all laboratory data elements of interest was computed to ensure that missing laboratory data would not introduce unrecognized bias into analyses of risk-adjusted outcomes.

Data merging

No problems in data merging were encountered that have not been described previously.

Data security

Record-level data files received by MHA are protected externally by firewalls and internally by security protocols. The MHA office is a secured office within a building that has cardkey access for employees only after hours and security services personnel available during non business hours. The UB administrative and clinical lab data is housed in a secured computer server room with cardkey access for authorized personnel only. The network topology is configured such that the servers are behind multiple layers of firewalls. Access to these servers from the network is also controlled and authorized for key personnel only with appropriate signed data use agreements. MHA has configured a secure FTP site for our member hospitals to facilitate data transfers. Data can also be accepted on CD-ROM or DVD. MHA has signed HIPAA Business Associate and Date Use Agreements with all of its participating hospital members. See appendices for further details.

As noted in above, only key staff can access the production drive where patient-level data is stored.

Data risk adjustment

Preliminary screening has suggested that an unusually large proportion of patients who subsequently died did not have any electronic admission laboratory data submitted. Development of laboratory models has been delayed until the nature of this apparent problem is clarified.

No problems in risk adjusting data were encountered that have not been described previously. (For more information about methods employed, see Pine M, Jordan HS, Elixhauser A, Fry DE, Hoaglin DC, Jones B, Meimban R, Warner D, Gonzales J: Enhancement of claims data to improve risk adjustment of hospital mortality. *JAMA* 2007; 297(1):71-76.)

Model results

Comparisons of administrative models and administrative plus laboratory models will require completion of laboratory models. These models require that participating hospitals resolve apparent problems obtaining electronic laboratory results on patients who died in the hospital. Initial exploratory analyses related to this issue are underway.

Final risk adjustment models will be forwarded as they become available. Notable characteristics of these models will be presented.

Summary findings

Enhancement of claims data with POA modifiers and a limited set of numerical laboratory results is feasible and of great potential value. Hospitals are very willing to participate when key personnel understand potential benefits. However, coordination of multiple hospital departments often is required and competing priorities may delay implementation.

Laboratory data elements are best described using LOINC codes. Hospitals appear to have little difficulty relating their internal codes to these LOINC codes when relevant LOINC codes are listed and described in a tabular format with clear instructions about how the table should be completed. Transmission of laboratory data is best done using HL-7 definitions for needed data elements but formatting data in a simple pre-specified flat array.

Administrative and clinical data generally are best merged centrally. Data cleaning and analysis are relatively straightforward. Potential biases introduced by the unavailability of electronic laboratory results on some patients may be problematic and should be evaluated carefully before creating and applying risk-adjustment models.

Expected value

Because the final analyses are not yet completed, we do not yet know if the addition of both POA and the lab values data improves the value of the database. However, our assessment will be based on whether these data provide greater insight for hospitals both on the accuracy of their POA coding and on their performance on the AHRQ Quality Indicators. We are confident that the hospitals will find this valuable.

We expect there may be some time lag for consistent reporting of the data in order for the results to be comparable.

Use of the hybrid data in Minnesota

It will be used to inform other stakeholders about the feasibility of creating a hybrid database, its use in creating and implementing enhanced analyses of quality indicators, and its benefits in improving hospitals' coding. The intent is to make the business case for funding expansion to potentially all Minnesota hospitals.

We plan to continue and expand our pilot project. As part of state health reform legislation in 2008, the MHA is a subcontractor for a project to collect and report hospital performance data. We are planning to fund a position from this contract to continue this work and expand beyond the initial participating pilot hospitals.

MHA has been in consultation with key state stakeholders in the identification of hospital quality indicators that could be use for transparency through the state health reform legislation passed in 2008. The MHA is a subcontractor for the state to collect and report hospital performance data. We are planning to fund a position from this contract to continue this work and expand beyond the initial participating pilot hospitals.

Dissemination plans

It is MHA's intent to disseminate results of the pilot project. We will likely do this differently for different audiences. For our hospitals, we will focus our communication with the purpose of encouraging the non-pilot hospitals to participate without necessarily needing a state mandate. With other stakeholders, we will talk about the project at several joint venues, such as the Minnesota Alliance for Patient Safety meetings or the Robert Wood Johnson "Aligning Forces for Quality" project meetings.

Potential challenges in dissemination

We do not anticipate any real challenges with dissemination of the results per se, but we want to be careful not to overhype the project to the point that non-hospital stakeholders believe it should be immediately mandated. We know from this project that hospital IT departments are challenged with their current workload – especially in implementing and maintaining electronic health records. We want to make sure that we can request their lab data without overburdening them before having to impose a mandate.

Review

Success factors

We believe a critical success factor for Minnesota pilot hospitals deciding to participate is that they trust MHA both with their data and that their interests will be protected. The upfront trust factor is very necessary for hospital buy-in. As an advocacy organization, MHA has to be mindful of hospitals' interests. MHA has earned the trust of its members by serving their interests over several decades. In Minnesota, the MHA collects the hospital administrative data on behalf of the state.

Other key factors to success would include having a sound project planning process. The AHRQ requirements for the pilot provided very good guidance for the development of an implementation plan. The materials provided by the pilot states could serve as a good jump start to any state in the planning phase.

As a part of the planning process, we would encourage development of a detailed communications plan. Some elements of that plan would include identification of key contacts, a timeline, communications, kick-off event, ongoing meetings, web page for reference materials.

Our kick-off event was very successful because we were able to have the expertise of Dr. Michael Pine, Dr. Richard Johannes and Linda Hyde to give our hospital representatives a solid background and education on the research and value of adding clinical data to administrative data. We would suggest any state initiating a similar project would be greatly served by having this type of expertise available.

A dedicated staff with a very supportive team effort was also identified as one the critical success factors for this pilot. As noted by ourselves and our colleagues in Virginia and Florida, it takes a full-time equivalent to keep track of all the process issues involved with communications, contractual arrangements, meeting coordination, hospital questions, data acquisition, and so forth. MHA's budgeted project plan called for nearly 2,300 hours of our staff time plus another 1,500 hours of consulting time since we were not doing the initial data linking and reports. These figures were for a two-year period and we're sure our actual MHA staff time was considerably larger than budgeted. The consulting time budgeted would primarily need to be focused on data integrity screening, linking data sets and analysis.

Use of standardized data content such as LOINC is extremely important. In our process even though LOINC was not widely understood initially, it was fairly easy to translate into from the mapping process we engaged in.

Continuation plan

As stated previously, there are funds from a subcontract with the Minnesota Department of Health to implement public quality reports (unrelated to this contract)

that we plan to use to fund the continuation of this pilot. To ensure public quality reports based on administrative data and AHRQ's quality indicators are relevant, we intend to expand the pilot collection of POA and lab data to all hospitals.

Additionally, the data integrity screens developed to improve the POA coding, for example cannot be underestimated. With the POA coding system being relatively new, we anticipate the need for ongoing POA coding reports to ensure consistency and comparability for reporting.

Ways to improve

We would be more systematic on including the IT staff in the initial stages of communications regarding the project. The quality managers understood the value of the project but were often unsuccessful in translating that value as a priority to the IT staff if they have not been involved in the planning. The buy-in of the IT staff makes the project much easier to implement. Additionally, the lab managers were supportive and when called upon to do the LOINC mapping, could have used some greater guidance or assistance to give them the tools they needed to do the work.

Also, we would be more open to find the "path of least resistance". We spent several months learning and finalizing a standardized HL7 format for lab data. Most hospitals had the capability of doing this but it was outside of their normal routine. If we were to do it over again, we would probably also allow hospitals to use a standardized text file format.

Lessons learned

Comprehension of data (LOINC) and transmission (HL7) standards and usage
We experienced a fairly steep learning curve regarding the collection of lab data. Since we relied on outside expertise to guide our standardization, we became somewhat confused by the details of these standards that were not widely understood by hospitals. Lesson learned: it would be a good idea to have an IT committee of hospital chief information officers help guide the standardization process.

Keep hospitals engaged to ensure buy-in
Though we had done some initial committee work of hospital representatives to address data collection and quality reporting concepts, it would have been helpful to keep them engaged more regularly throughout the start-up to ensure problems were addressed. Lesson learned: See above.

Stick to a plan, but be flexible to modify as necessary
From a data center point of view, communication and project management are keys to keeping the project moving. We experienced times where the project was not moving at the pace anticipated in the planning phase. Also, competing priorities arose

throughout the process. Lesson learned: Stick to a weekly check-in to assess the timeline and make adjustments. Keep a regular drumbeat of communications with hospitals to ensure they are engaged and working on what they need to.

Suggested AHRQ next steps

It would be very helpful for AHRQ to provide a tool kit (including POA video developed by MHA and MPA) to assist other states interested in launching similar projects to develop similar hybrid data sets. The POA video gets information over to the clinicians on the front lines whose assessment and documentation skills are critical to ensuring the coding quality on the back end.

AHRQ could facilitate Education on LOINC from its developers at the Regenstrief Institute. One idea that could systematically assist hospitals nationally would be to host a roundtable for lab system vendors. Bring them together to pitch the idea of getting them to provide easy crosswalks or systematic changes to their systems to allow hospitals to easily get at the LOINC coding schema to support clinical needs (portability of electronic health records), comparative research, and risk-adjustment of quality measures.

Regarding the use of HL7, there may be a way to facilitate a more streamlined approach to a standard more suitable the type of retrospective data mining project our pilot study pursued. Ability to create a relational download in a standardized format that is easily understood would be ideal.

MHA is willing to assist other states with tools or advice on our experience of adding clinical data to administrative data. Our pilot was obviously a voluntary one that attracted significant interest by hospitals. The challenge is to be positioned to provide the valuable data this effort promises to produce. We see working out the data standards and formats based on the pilot states' experience and hospital's capabilities as a key to success. MHA was greatly enriched by the collegial monthly conference calls with AHRQ and the other pilot (Virginia and Florida) / planning (Washington) states and other interested parties (eg. California, the Veterans Administration, Ed Hammond). Though we all had slightly differing approaches being pursued, we were able to share best practices, survey templates, sample reports and technical resources which was invaluable.

Table of Appendices

Web site references

MHA's web page for AHRQ Lab Project reference materials
http://www.mnhospitals.org/index/ahrq-project

AHRQ H-CUP: Enhancing the Clinical Content of Administrative Data
http://www.hcup-us.ahrq.gov/reports/clinicaldata.jsp

Health Level Seven web site
www.HL7.org

Logical Observation Identifiers Names and Codes
http://loinc.org/