Grant Final Report

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Improving Quality in Cancer Screening: The Excellence Report for Colonoscopy

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Abstract

Purpose: The project goal was to create and evaluate a quality measures program for gastrointestinal (GI) endoscopy, specifically for colonoscopies performed in an ambulatory setting. GI and multi-specialty groups have recently defined quality measures for colonoscopy which were used in this project.

Scope: Resources of the Clinical Outcomes Research Initiative (CORI), whose mission is to study practice and outcomes for gastrointestinal endoscopy, were used. Participants contribute data to the National Endoscopic Database by using an endoscopic reporting system developed by CORI. Endoscopists practicing at 35 sites in 21 communities and 16 states were included in the study.

Methods: Individual quality report cards with 15 measures were created and made available to endoscopists in 2/3 of the communities. Quantitative and qualitative studies were performed on the effect of these reports. In addition, investigators participated in quality-related interoperability standards activities and conducted a series of webinars on standards issues.

Results: Full results of the quantitative study are pending as of this report. The qualitative study revealed six themes: Workflow, Organizational Structure and Accreditation, Temporal Issues, Integration Issues, Value of Measures and Reports, and The Need for Data of High Quality. Ongoing work on GI standardized terminology and document structure standards have resulted.

Key Words: None provided.

Final Report

Purpose

Colorectal cancer (CRC) is the second leading cause of cancer-related deaths in the US. Because screening for CRC has been demonstrated to reduce mortality, national expert panels have developed screening guidelines. Colonoscopy may be used either for primary screening or to evaluate after other positive screening tests, such as the fecal occult blood test (FOBT). The effectiveness of colonoscopy, however, depends on providing high quality examinations with few complications. The US Multisociety Task Force on Colorectal Cancer and the American Society for Gastrointestinal Endoscopy/American College of Gastroenterology Task Force on Quality in Endoscopy have provided recommendations for colonoscopy quality indicators which can be measured in clinical practice.

This study was designed to evaluate and improve the quality of screening and diagnostic colonoscopies in ambulatory care settings. It was implemented within the Clinical Outcomes Research Initiative (CORI) national consortium. CORI has previously developed gastrointestinal (GI) endoscopy reporting software which captures highly structured procedure data. Endoscopists at the participating sites use the CORI software to document their procedures and on a regular basis this data, minus most identifiers, is exported to CORI for inclusion in the National Endoscopic Database.

The objectives of the study were four. The first was to create a quality report card, the "Excellence Report", from this clinical data demonstrating individual performance on evidence-based quality measures for colonoscopy, including comparisons with other CORI practitioners and nationally published benchmarks. The second objective was to determine if providing this quality report card as monthly feedback to endoscopists in ambulatory settings would result in quality improvement as evidenced by improved documentation of and adherence to the quality measures. The third objective was to evaluate, using qualitative research techniques, the perceptions by participating endoscopists of this feedback and to search for both unintended consequences and alterations in workflow resulting from the intervention. Finally, the fourth objective was to explore and contribute to emerging interoperability standards that may affect quality measurement efforts and to help bring these standards to the GI community.

Scope

This study used the successful national collaboration of the Clinical Outcomes Research Initiative (CORI). The primary mission of CORI is to study endoscopic practice and outcomes in diverse practice settings with the goal of improving the quality of endoscopic practice. This primary research mission has been supported through funding from the NIH/NIDDK since 1999 with additional funding from foundations and industry. Use of this consortium gave this study a foundation for success, including:

- A mature, stable practice-based research consortium in endoscopy.
- Safe methods for transmission of a Limited Data Set of patient data from practice sites, consistent with HIPAA regulations.
- Quality control measures to ensure data integrity.
- Experienced research staff to maintain data quality and perform data analysis.
- Technical personnel to maintain and upgrade software, enhance interoperability, and maintain the data warehouse.
- Site services staff to install, maintain and support the software installation at remote clinical sites.

The CORI reporting software captures data on seven GI procedures, including colonoscopy. Whenever possible, data is entered in a highly structured format, although free text entries are permitted. Reports are generated which can be printed for inclusion in the paper medical record, and the newest version of the software provides interfaces for multiple electronic health records. Interfaces for importing endoscopic images from multiple imaging systems are available. The multi-tier client-server CORI application and database is installed at each of the participating practice sites. Communication software on a frequent basis exports data as a Limited Data Set to the CORI data center. During the life of this study, a major upgrade in software was in progress to a new version which has a new user interface, optimized for clinical entry and practice workflow, a new internal implementation to provide maintainability, flexibility, and security, and HL7 capabilities for import and export of data and reports.

CORI participating sites were selected based on geographic and practice diversity, and willingness to utilize the report software for all endoscopic reports. Recent expansion was designed to provide diversity in type of practice and geographic setting, as well as racial and ethnic diversity. At the beginning of this project, the reporting software was being used at 84 practice sites in 26 states with 458 providers, who are primarily gastroenterologists. Practice sites are diverse, including office practices, ambulatory care centers, hospitals, academic centers and Veterans Administration hospitals.

This study was approved by the Institutional Review Board of Oregon Health & Science University.

Methods

Creation of the Excellence Report for Colonoscopy

The "Excellence Report", a quality report card for colonoscopy, was created from data collected routinely in the CORI reporting software. Each report included data for an individual endoscopist and was made available to that individual or their designee through a secured web-based application (http://www.excellencereport.org). Reports were created monthly displaying aggregate information on the prior 6 months of data for the individual endoscopist along with comparison data for all participating endoscopists. Quality indicators chosen for implementation were based on recommendations of national society task forces and on the availability of the required data elements as structured data within the CORI reporting software.

Access to the quality report cards required participants to register on the web site. All participants were notified on a regular basis about the availability of these reports and CORI support staff was available to answer any questions that arose.

The Effect of the Excellence Report on Quality

All CORI endoscopists practicing in an ambulatory setting (i.e. sites identified as ambulatory care centers or offices) were included in the study. "Communities" were defined by city, or by shared practices or administrative units. Allocation was based on community, rather than site or endoscopist, in order to prevent contamination. Frequently endoscopists will work at more than one site in a community (e.g., ambulatory care center, hospital) and especially in rural communities endoscopists are likely to have close working relationships with each other.

Using a cluster randomized trial design, the communities were randomly assigned to one of three intervention groups. This allocation was performed within the strata of procedure volume: high volume communities (>1000 colonoscopies/year) and low volume communities (≤1000 colonoscopies/year). Allocation within these two strata assured that the few high volume sites, along with the lower volume sites, were reasonably balanced between the two allocation groups.

The following interventions were assigned equally:

- Group 1. Endoscopists within assigned communities would receive a monthly quality report card as described earlier. This was to be distributed for 18 continuous months.

- Group 2. Endoscopists within assigned communities would receive a monthly quality report card as described earlier. This was to be distributed for 12 continuous months then stopped to determine if the improvement in quality is durable.

- Group 3. Endoscopists within assigned communities would receive no information on quality indicators.

During the period when quality report cards were distributed to endoscopists by allocation community, data on performance on these quality indicators accrued using the CORI reporting software as previously described. This allowed comparison of data by allocation group and comparison between groups and to baseline.

Perceptions and Effects of the Excellence Report on Participating Endoscopists

In the second year of this study, research team members visited several of the endoscopists who were allocated to the 2/3 sample intervention groups and both interviewed these participants and shadowed them during endoscopy procedures and documentation tasks. Communities were chosen for study based on diversity and accessibility. Key questions to be answered were: What are the perceptions of the clinicians about the quality report card? What are the barriers to access and to application of the findings in clinical care? Are there changes in workflow, either during the procedure or documentation, that result from knowing that adherence to the standards are being measured? Are there any unintended consequences of the initiative?

Field notes from these observations, done manually on site, were expanded and put into electronic form. A template was developed as a guide for these notes. Files were entered into N6 (formerly QSR NUD*IST, QSR International, Doncaster, Victoria, Australia). Analysis of these files was performed using methods which have been used by this research team for several years with one file for each community. The files were compared and contrasted to identify common groupings of quality report card issues. This process is generally called the constant comparison method.

The above methods incorporate five strategies for assuring trustworthiness. *Reflexivity*, the acknowledgement of natural biases, is maintained by requiring the researchers to note their personal biases in their field notes and during analysis discussions. *Triangulation,* the weaving together of different data gathering techniques, data elements, and/or investigators, is accomplished by using different methods and researchers with different perspectives. *Member checking* is accomplished by going back to key informants to confirm that the study findings are reasonable. *Data saturation* is continuously monitored. Finally, the *audit trail* is carefully maintained by the project manager.

National Standards for Quality Report Cards in Endoscopy

Building on a previously established cooperative atmosphere between the several GI specialty societies and vendors of GI information, imaging and pathology systems, quarterly telephone conference meetings and two face-to-face meetings were initially planned to present and discuss emerging standards for quality reporting along with the creation of a plan for sustainability and growth of this GI endoscopy quality initiative. However, prior to project funding, an effort was undertaken by two of the GI societies to create a national GI registry for quality reporting. In an effort to coordinate with this project, only one telephone conference was held.

Instead, project members participated in meetings of several organizations, including HITSP, HL7, and IHE that are currently developing or using standards for quality measures. In addition, in the second year of this project, a four webinar series was sponsored, called "Define the Pieces and Solve the Puzzle: Implementing GI Quality Measures." The GI community described above was invited. The four webinar topics and speakers were, as follows:

- Terminology, with Louis Y Korman, MD (MST contributor) presenting on the Minimal Standard Terminology for GI Endoscopy (MST) and Trish Whetzel, PhD (Outreach

coordinator, National Center for Biomedical Ontologies) presenting on Ontologies in Biomedicine.

- Document Structure, with Bob Dolin, MD (Principle, Semantically Yours, LLC and Chair-elect of HL7) presenting on the HL7 Clinical Document Architecture standard.

- Messaging for Interoperability, with Harry Solomon (Information Architect, GE Healthcare) presenting on emerging interoperability standards

- Quality Measure Specification, with Karen S. Kmetik, PhD (Director of Clinical Performance Evaluation, AMA) speaking on current efforts to define quality measures in an implementable fashion.

All presentations are available at http://www.excellencereport.org/definePiecesInfo.html.

Following these presentations, two projects were initiated. The first is an effort to structure the MST as an ontology and is being headed by Shahim Essaid, MD, a fellow in the Department of Medical Informatics & Clinical Epidemiology, Oregon Health & Science University. This effort can be followed at http://skynet.ohsu.edu/essaid/gi/forum/.

The second project that has resulted and is currently in progress is the creation of an HL7 Clinical Document Architecture Implementation Guide (IG) for Procedure Notes. This IG will define a structured document for procedure notes in general with an example for GI endoscopy. Subsequent work can then specialize this Procedure Note IG for specific types of procedures and define specific data elements. The American Society for Gastrointestinal Endoscopy, Quality committee, is helping provide clinical expertise for this project.

Results

The Excellence Report

Fifteen quality measures were implemented using data from two versions of the CORI reporting software. Values were reported as number of procedure and/or percent of procedures, as appropriate. The measures and the data elements reported are:

1. Preprocedure risk assessment is documented.

    a. Procedures with documentation of ASA class.

    b. Of these, number in each of the 5 ASA classes.

2. A management plan is documented for patients on oral anticoagulants.

    a. Procedures in which current anticoagulant use is documented (includes procedures with documentation of NO current anticoagulant use).

b. Of these, number with current anticoagulant use.

c. Of these, number with documentation of the management plan.

3. Sedation medication(s) used and dosages are documented.

   a. Procedures with documentation of sedation medications (Includes procedures with documentation that no medications were given, of residual sedation present, or of managed by anesthesia staff).

   b. Number of medications documented.

   c. Of all medications documented, number with documentation of dosage.

   d. Number of procedures with medication documentation errors (defined as conflicting reports of medications given plus NO medications given).

4. Quality of bowel prep is documented.

   a. Number of procedures with documentation of quality of bowel prep.

   b. Of these, number with adequate prep results.

5. When rectal bleeding is present, type and extent of bleeding is documented.

   a. Number of procedures with rectal bleeding.

   b. Of these, number with type and extent of bleeding documented.

6. Depth of insertion is documented. The cecum is reached unless there are documented reasons for not reaching this depth of insertion.

   a. Procedures with documentation of depth of insertion.

   b. Of these, number where the cecum was reached (excludes from the denominator any procedures with poor bowel prep or severe colitis, if unable to complete the procedure or if the procedure is performed for certain therapeutic procedures).

   c. Of these, number with documentation by statement of depth reached / identification of anatomical landmarks / photodocumentation.

7. Average examination time for endoscope withdrawal is >= 6 minutes for screening colonoscopies where no biopsies or polypectomies are performed.

   a. Number of screening colonoscopies performed without biopsy or polypectomy.

b. Of these, number with documentation of withdrawal time (time from cecum to completion of procedure).
c. Of these, number with average withdrawal time <6 minutes / 6-8 minutes / > 8 minutes.

8. Details of polyps are documented including details of polyp removal and retrieval.

    a. Total number of polyps found.

    b. Number of polyps where all descriptors are documented.

    c. Number of polyps removed.

    d. Of those removed, number of polyps retrieved.

    e. Of those retrieved, number of polyps sent to pathology.

    f. Of polyps removed, number where completeness of removal was documented.

    g. Of polyps not removed, number that were biopsied.

    h. Of biopsied polyps, number of times a tattoo was placed.

9. Intra- and immediate postprocedural complications (to include serious events such as perforation or bleeding requiring intervention) and interventions are documented.

    a. Number of screening colonoscopies.

    b. Of these, number with documentation of complications (including NO complications).

    c. Of these, number with bleeding, perforation, or death.

    d. Number of non-screening colonoscopies.

    e. Of these, number with documentation of complications (including NO complications).

    f. Of these, number with bleeding, perforation, or death.

10. Review of pathology reports or results of pathology reports are documented.

    a. Number of procedures with biopsies sent to pathology.

    b. Of these, number of procedures with documentation of pathology results.

11. Adenoma detection rate in first time screening exams can be determined.

    a. Number of first time screening colonoscopies.

b. Of these, number where adenomatous polyps were detected (as determined by pathology result or documentation of a polyp > 9 mm).

12. Recommendations for followup colonoscopy are documented.

    a. Total number of ambulatory procedures.

    b. Of these, number with documentation of recommended screening or surveillance interval.

13. For average risk patients >= 50 years of age with no abnormal findings on screening colonoscopy, the recommended screening interval is 10 years.

    a. Screening colonoscopies performed in average risk patients at least 50 years of age with no abnormal finding (excludes procedures where a shorter interval might be recommended based on the current examination).

    b. Of these, number with documentation of followup interval.

    c. Of these, number with recommended followup interval <10 years / = 10 years / > 10 years.

14. For post-polypectomy patients undergoing surveillance colonoscopy, if no new polyps are discovered the recommended surveillance interval is 5-10 years.

    a. Number of surveillance exams for prior polypectomy (with no new polyps found, excludes procedures where a shorter interval might be recommended based on the current examination).

    b. Of these, number with documentation of followup interval.

    c. Of these, number with recommended followup interval < 5 years / 5-10 years / > 10 years.

15. For patients undergoing polypectomy during a screening or post-polypectomy surveillance colonoscopy the recommended surveillance interval is based on the worst pathological finding from the current polyps.

    a. Number of screening or surveillance examinations.

    b. Of these, number with polypectomy (excludes procedures where a shorter interval might be recommended based on the current examination).

    c. Of these, number meeting surveillance interval guidelines.

In addition, the total number of ambulatory procedures performed in the reporting period, the percent of procedures in which patient age was documented and average patient age, the percent of procedures in which patient gender was documented and the counts and percent of procedures for each gender were reported. For all reported elements, the value for all ambulatory practices combined was also reported.

For each measure, a report was created and made available online stating the inclusion criteria, exclusion criteria, value measured, additional values measured, if any. In addition, these reports include notes for CORI v3 users and notes for CORI v4 users explaining where to document some data elements in each system, and a section on "What if these numbers don't seem correct?" Users were able to link directly from their quality report card to this measure-specific documentation.

Other proposed quality measures were not implemented, either because of vagueness in the measure as stated or lack of documentation available in the CORI reporting software, including

- use of appropriate indications for colonoscopy
- informed consent obtained including risks
- appropriate action with regard to prophylactic antibiotics

Quantitative Analysis of the Effect of the Excellence Report

Twenty-one communities were identified where colonoscopy procedures were being performed at ambulatory sites and documented with the CORI reporting software. This included 35 clinical sites in 16 states, with 146 endoscopists. Endoscopists were excluded if they had performed <50 colonoscopies in the baseline period, January through June 2008. The first reports were announced in September 2008, significantly delayed from the planned start date because of the difficulty in implementing the quality measures. In addition, the initial reports did not contain all quality measures; the rest were added as they were developed. Endoscopists assigned to either Group 1 (18 month intervention) or Group 2 (12 month intervention) had new reports posted to the web site each month through September, 2009. Data on all measures was collected twice: during the preintervention phase January – June 2008 and for the last 6 months of the intervention, April – September, 2009. Because of the difficulties in implementing this system, both Group 1 and Group 2 received reports for the same period of time and data will be analyzed as a single group. The post-implementation data has just become available at the time of this report, so no data analysis is available.

However, from the aggregated data from all ambulatory sites, we know that there is a wide variation in the degree of documentation that is required for the measures. For example, sedation medication dosages are documented over 83% of the time while anticoagulation plans are documented only 7.8% of the time. In addition, on some measures there is a wide variation between clinicians in documentation rates, such as ASA classification which ranges from 0 – 100% documentation. Capture of pathology data in these clinical systems is difficult since it requires a provider to enter the pathology data after completion of the procedure report. Even with improved ability in the newer software version to import pathology data either within HL7

messages or as image documents, the discrete data needed for several of these quality measures was rarely available.

Qualitative Analysis of the Perception and Effects of Quality Measure Reports

Five practice sites in 4 communities were visited between December, 2008 and April, 2009. A total of 16 endoscopists were interviewed, most of whom were also shadowed while performing and documenting procedures, as well as 9 nursing or office managers.

Six themes emerged from the analysis of the transcripts from those interviews and from the notes taken by the research team (manuscript in preparation): Workflow, Organizational Structure and Accreditation, Temporal Issues, Integration Issues, Value of Measures and Reports, and The Need for Data of High Quality.

Theme 1: Workflow. There are two aspects to this theme: using the software and accessing the Excellence Reports.

- Using the software: Staff members at each of the five sites have designed clinic workflow for colonoscopy procedures somewhat differently, but there were many similarities in how and when clinicians used CORI. At most sites, a nurse entered preliminary information into the system before the procedure and a physician added information after the procedure. At one site, a nurse entered most of the information both before, during, and after the procedure, but a physician edited it. This was a clinic that had a nurse anesthetist available during each procedure, so the nurse in the room was free to use the computer. Some clinics had two computers in each room, one for either an imaging program or an EMR, and the other for CORI. One used the same computer for both and one did not have computers in the procedure room, opting to place them outside the rooms.

- Accessing the Excellence Reports: The clinicians who had looked at the reports felt that they might access the reports if they were either a novice or if they were trying to improve their ratings on a particular measure. A novice might routinely look at the reports, but an experienced GI physician would seek them out sporadically. Most physicians felt that monthly is too frequent and quarterly might be better. They like the rolling averages over three months, but there were several suggestions about showing more data as well. They felt that sending the reports to clinic managers might be more useful than requiring access by physicians.

Theme 2: Organizational Structure and Accreditation. There was great variation between a small clinic without Ambulatory Surgery Center (ASC) accreditation and the larger clinics that were accredited as far as motivation for measuring quality is concerned. One site was simply state licensed and did not have a formal quality program. One was part of a larger surgery center, certified by the ASC, AASC, and AAAHC and had an especially robust quality program. One was not ASC-certified but sends voluntary reports to FOSSA and has a quality improvement director. One was a large specialty site with AAAHC certification, voluntary membership in a statewide quality measures program for colonoscopies. ASC certification

requires a certain amount of measurement and reporting on a regular basis, and also requires annual selection of particular measures the clinicians decide they want to study. Several sites had once had JACAHO accreditation but had since opted to seek AAAHC instead because it seemed more appropriate for ambulatory environments. In addition, we were told that specialty board recertification for the GI physicians is now requiring some quality measurement. Generally, reports are generated using a combination of electronic billing software, CORI, and manual chart review.

Theme 3: Temporal Issues.

- Administrative burden: Clinicians cited time again and again when asked about quality measurement. They are concerned about "administrative burden" to such an extent that, when asked what they thought about pay for performance incentives, they always expressed doubt that the incentive offered would be worth the additional manpower needed for reporting.

- Timing of measurement: Temporal issues also arose when physicians discussed measures they would most like. They want adenoma counts, but these are only possible if data are entered into CORI after the pathology report information is available. Only one site was entering such after-the-procedure information. Others said it would add too much to their workload. A similar problem exists for complication rates.

Theme 4: Integration Issues. More complete quality measurement could be accomplished if CORI, the different EMRs, and the imaging systems could be interoperable. Two sites double enter information into both the EMR and CORI. Most use separate imaging systems, though one can import the images into CORI. At one site, the GI physicians have an ambulatory clinic using CORI and also practice at a hospital next door that uses CORI and the data in the two CORI systems are not integrated. Staff members at all of the sites yearned for data that could be generated from one system for multiple reporting purposes.

Theme 5: Value of Measures and Reports. Staff members at the sites that have designated quality assurance physicians and AAAHC accreditation seem highly motivated and even excited about the Excellence Reports and measurement in general. They all want the measures to be "the right measures," or, as one physician stated it, "the devil is in the details." The administrative burden cannot be too great for entering the data. One physician pointed out that physicians are "show me the numbers" kinds of people and that quality measures provide excellent feedback leading to behavior change. Many noted that insurance companies now want to see outcomes data. In addition, several interviewees pointed out that patients are starting to ask how the clinicians rate on some measures.

Theme 6: The Need for Data of High Quality. The measures that come out of the system and that can be reported on are only as good as the data that enter the system in the first place. One nurse manager was particularly skeptical about the doctors' ability to enter data that are accurate. Conversely, one physician was equally skeptical about the ability of nurses to enter accurate data.

In addition, differing viewpoints were detected.

- Specialists and others: We were told at nearly every site that the GI physicians' view of quality measures is very different from that of general surgeons or family practitioners. The GI physicians are proud to be knowledgeable about the latest evidence and on the forefront of putting this evidence into practice. One point of contention with those who are not specialists is follow-up protocols. The specialists are confident that quality reports will be in their favor.

- Specialists and hospitals: Another differing view is that of the hospital. There seems to be some competition between hospitals and ambulatory clinics and, we were told, hospitals in some states have lobbied to limit the number of clinics that can be licensed to perform these procedures.

Discussion

Implementation of quality measures as proposed by the GI society task forces proved difficult for several reasons, including the difficulty of finding and validating correctness of data from two complex clinical systems and the complexity of quality criteria, especially for determining exclusions. Most quality reporting programs depend on data registries (or equivalent local processes) where secondary entry of data is required, often with synthesis of data from multiple systems and categorization of data to discrete options. What we are attempting to do is to automatically extract data from a specialty electronic health record without requiring secondary input of data. Doing this, however, places stricter requirements on primary data collection systems and users. The discrete data needed must be recoverable and complete, and guidelines for automated categorization of data must be specified.

Our implementation was also limited by the difficulty in retrieving pathology results, either as narrative or discrete data concepts and even in getting access to images of pathology result reports. Although the CORI software provides discrete data fields for entering pathology data by the endoscopist or other team members, this is rarely used as it serves little purpose in clinical care. If electronic text-based reports can be obtained through appropriate interfaces, then either encoding of concepts in those pathology reports by the sending pathology labs or natural language processing by the receiving entity hold promise for obtaining required information. We are also currently exploring use of a caBIG component, caTIES, for processing of pathology data sent by HL7 v2 messaging for this purpose.

Data analysis is still pending on the quantitative study, but it is our expectation that no change in compliance with the quality measures will be found. From out interviews of clinicians participating in this study, we know that although they received multiple emails announcing and reminding them about the program, most clinicians were not accessing the reports on a regular basis, if at all. At more than one site, however, a nurse manager received permission to access the reports on behalf of all endoscopists, and this may be a preferred method of distributing the quality report cards in the future. In addition, we had planned to add a mechanism of presenting the reports to users through a link on the "home" page of the newer CORI version, but its deployment was so delayed that this feature has not yet been implemented.

The qualitative study revealed that endoscopists are not only aware of quality measurement recommendations but have changed their practice to meet those recommendations. For example, they are especially aware of their cecal withdrawal times and more than one endoscopist stated

that he slows his procedures to meet expected standards. Most endoscopists felt that they were performing within guidelines and would be willing to share their quality reports even with their patients although the distrust of payors was clear. Our conclusion is that clinicians will not need encouragement to participate in quality measurement programs, which are seen as inevitable and even desirable, but that programs will need to emphasize quality measures that are relevant to clinical care and be certain about the accuracy of the information presented.

During the course of this project, we have seen the continued development of standards related to quality measurement. It is our expectation that with continued harmonization between the standards organizations such as HL7, HITSP and IHE, that this technology infrastructure will mature and become implementable. We will continue to investigate terminological and document structure issues that can contribute to the robustness of quality programs for gastroenterology.

List of Publications and Products

The Excellence Report. Judith R. Logan. http://www.excellencereport.org

The GI Endoscopy Ontology Forum. Shahim Essaid. http://skynet.ohsu.edu/essaid/gi/forum/.

HL7 Structured Documents WG. Contains working documents including the Procedure Note Implementation Guide. http://www.hl7.org/Special/committees/structure/index.cfm.