HCFA's Health Care Quality Improvement Program: The Medical Informatics Challenge

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Abstract The peer-review organizations (PROs) were created by Congress in 1984 to monitor the cost and quality of care received by Medicare beneficiaries. In order to do this, the Health Care Financing Administration (HCFA) contracted with the PROs through a series of contracts referred to as "Scopes of Work." Under the Fourth Scope of Work, the HCFA initiated the Health Care Quality Improvement Program (HCQIP) in 1990, as an application of the principles of continuous quality improvement. Since then, the PROs have participated with health care providers in cooperative projects to improve the quality of primarily inpatient care provided to Medicare beneficiaries. Through HCFA-supplied administrative data and clinical data abstracted from patient records, the PROs have been able to identify opportunities for improvements in patient care. In May 1995, the HCFA proposed a new Fifth Scope of Work, which will shift the focus of HCQIP from inpatient care projects to projects in outpatient and managed care settings. This article describes the HCQIP process, the types of data used by the PROs to conduct cooperative projects with health care providers, and the informatics challenges in improving the quality of care received by Medicare beneficiaries.

Nearly 25 years ago, White et al. wrote, "Parsimonious collection of a minimal data set, through hospital patient discharge abstracts and claims forms that relate persons, health problems, and hospital charges to populations and institutions, has more power to influence medical care costs, hospital utilization, standards of care, and health-services planning than any other health information system likely to be available in the foreseeable future." The authors explained that the potential of such data sets lies in the ability to compare costs, utilization rates, and clinical performances across health care organizations, particularly hospitals.

To realize the "potential" of large, population-based databases, the Health Care Financing Administration (HCFA) issued the Medicare Hospital Information Reports from 1986 to 1990. However, in a national survey, hospital administrators rated the effectiveness of HCFA's annual hospital-specific mortality reports to be fair to poor in terms of stimulating internal quality improvement efforts. To improve the effectiveness of its population-based data information and to monitor the quality of health care received by Medicare beneficiaries, the Health Care Quality Improvement Program (HCQIP) was created by HCFA and initiated by the peer-review organizations (PROs).

The PROs were originally created by Congress to control the rising costs of Medicare. Over time, their role within the HCFA evolved into a quality improvement mandate, which is achieved through a series of contracts, referred to as "Scopes of Work." HCFA issued the First Scope of Work contracts from 1984 to 1986, the Second Scope of Work from 1986 to 1988,
Table 1

Activities of the Fourth Scope of Work and the Proposed Fifth Scope of Work

<table>
<thead>
<tr>
<th>Activity</th>
<th>Fourth Scope of Work</th>
<th>Proposed Fifth Scope of Work</th>
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<tbody>
<tr>
<td>Major changes</td>
<td></td>
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</tr>
<tr>
<td>Managed care review</td>
<td>Separate Scope of Work for fee-for-service and HMO/CMP</td>
<td>All review activities included in one Scope of Work</td>
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<tr>
<td>Random sample</td>
<td>Transition from sample-based records review to cooperative projects and project data collection</td>
<td>Discontinued</td>
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<tr>
<td>Data management reporting</td>
<td>PROs performed activity or subcontracted</td>
<td>Single contractor will perform function</td>
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<tr>
<td>Cooperative projects</td>
<td></td>
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<tr>
<td>Types of projects</td>
<td>HCFA-directed and PRO-initiated projects</td>
<td>No change</td>
</tr>
<tr>
<td>Clinical aims</td>
<td>No focus areas defined</td>
<td>National focus areas</td>
</tr>
<tr>
<td>Project scope</td>
<td>Primarily inpatient setting</td>
<td>Provides for inpatient, institutional, physician and beneficiary-oriented HCQIP projects</td>
</tr>
<tr>
<td>Managed care projects</td>
<td>Not required</td>
<td>Primary focus</td>
</tr>
<tr>
<td>Project approach</td>
<td>Primarily hospital-based</td>
<td>Plan/practitioner/provider-based, condition-based, and population-based</td>
</tr>
<tr>
<td>Surveillance</td>
<td>No national strategy; each PRO responsible for surveillance in its own area</td>
<td>National strategy for surveillance of key health care measures</td>
</tr>
<tr>
<td>Communications</td>
<td>No specific requirement</td>
<td>An important component of project development and implementation; activity includes: marketing strategy for HCQIP</td>
</tr>
<tr>
<td>Steering committee</td>
<td>Required</td>
<td>No requirement</td>
</tr>
<tr>
<td>Evaluation of project activity</td>
<td>Based on numbers of projects completed and quality improvement</td>
<td>Based on achievement of PRO objectives:</td>
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*HMO/CMP = health maintenance organization/competitive medical plan.
*PROs = peer-review organizations.
*HCFA = Health Care Financing Administration.
*HCQIP = Health Care Quality Improvement Program.

the Third Scope of Work from 1988 to 1990, and the Fourth Scope of Work from 1990 to 1995. HCFA released the proposed Fifth Scope of Work in May 1995 for contracts which will begin in April 1996.

From the First to the Third Scope of Work, the PROs' responsibilities shifted from detecting unnecessary and inappropriate admissions in order to control costs to identifying individual discharges with quality of care problems. To facilitate this shift, HCFA developed a system of six generic quality screens. Nurse reviewers employed by the PRO reviewed the total clinical record at the discharge hospital for claims being screened. Discrepancies identified using these screening tools were reviewed by a physician. If the reviewing physician identified a potential quality of care problem, the attending physician was notified. After consulting with the attending physician and the hospital administration, the PRO determined the level of severity and took an appropriate course of action to resolve the quality problem.

In the Fourth Scope of Work, HCFA created HCQIP. The objectives of this program were to improve the quality of health care received by Medicare beneficiaries through the development and sharing of health care community information about patterns of care and patterns of outcomes. With these objectives, the health care providers were willing to cooperate with the PROs. The Fifth Scope of Work expands HCQIP, making it a larger proportion of the PROs' workload. Substantive changes will be made to correct deficien-
cies that appeared during the Fourth Scope of Work. These deficiencies include the limited number of cooperative projects completed by the PROs and the high cost of providing each PRO with an information management system with which to process the administrative data supplied by HCFA.

Although there are many scientific and educational challenges associated with implementation of the HCQIP, in this paper we explore specifically the medical informatics challenges. We first describe the HCQIP process in terms of the generic model for a cooperative health services research study proposed in the draft Fifth Scope of Work. We then discuss the population-based data available from HCFA for HCQIP implementation and its inherent problems. From this, we identify a series of informatics challenges facing HCFA, the PROs, and the HCQIP, and recommend strategies for addressing these challenges.

**HCQIP: The Process**

The goal of the PRO program is to improve the quality of care for Medicare beneficiaries. Quality of care includes both the outcomes and the processes of care. During the Fourth Scope of Work, this goal was accomplished by a combination of random case reviews and cooperative HCQIP projects. Under the Fifth Scope of Work, case reviews have been eliminated. Performance of HCQIP projects will be the sole means for accomplishing the PRO quality improvement goals. Table 1 summarizes the differences between the Fourth and Fifth Scopes of Work.

HCFA defines cooperative projects as "collaborative efforts with health care providers and/or beneficiaries which result in measurable improvement of processes and outcomes related to specific clinical issues." Cooperative projects may be either HCFA-directed or PRO-initiated.

In an HCFA-directed project, HCFA specifies both the format and the content of the study. These projects have nationwide implications and are performed by more than one PRO. An example is the Ambulatory Care Quality Improvement Project for Diabetes, which will monitor the care provided to diabetic Medicare beneficiaries using clinical measures derived from medical records and administrative data. Fee-for-service and managed care will be evaluated in this eight-state project.

Most projects are PRO-initiated and may be performed by only one PRO or by several under a specific multistate agreement. In the past, PRO efforts have focused on inpatient care, and cooperative projects have generally been undertaken only with hospital providers. The PROs are now expected to initiate projects with managed care plans in proportion to the number of Medicare beneficiaries in each state who are enrolled in such plans.

HCFA has identified the following three areas of clinical importance that PRO-initiated projects should address:

1. Improving care for patients with acute myocardial infarction.
2. Improving care for diabetic patients.
3. Improving preventive health care (mammography, flu vaccinations).

Figure 1 depicts the process for developing a PRO-initiated project. This includes development of a project plan, identification of an opportunity for improvement of care, intervention in health care delivery, and project evaluation.

An important element in project development is the selection of measurable quality indicators. These indicators must conform to generally accepted process or outcome measures or benchmarks (for example, rates of readmission, lengths of inpatient stay) for which there is a "strong science basis" or "solid professional consensus." The PROs are not mandated to investigate new relationships between processes and outcomes. Instead, they investigate whether existing processes of care conform to practices for which there is strong support in the form of clinical practice guidelines endorsed by national organizations or medical specialty societies. Each project must have at least one measurable quality indicator. The PROs are discouraged from developing projects with only outcome measures.

The project plan is then tested by collecting and evaluating baseline data. These data may include data provided by HCFA (discussed in more detail below) or data abstracted from patient medical records. Since traditional fee-for-service data may not be available for beneficiaries enrolled in managed care plans, the PROs are expected to discuss potential data sources for projects with the managed care plans under review.

If the results of the data analysis confirm that an opportunity exists for an improvement in health care delivery, as measured by the quality indicators that were chosen, the PRO presents the analysis results to the providers involved in the study, asking them to evaluate the results and propose a plan of improvement within their area of operation.
is expected to offer assistance to the providers in developing the improvement plan to ensure that improvement efforts are a true collaboration between the PRO and the provider community.

In the final phase of the project, the PRO gathers additional, follow-up data and determines whether the project has produced significant improvements in the project quality indicators. The PRO is expected to seek feedback on all aspects of the project from collaborators and beneficiaries. From this feedback, the PRO can determine whether the project has accomplished its objectives, whether additional intervention is warranted, and whether the project is suitable for exporting to other states or should be implemented more fully within the PRO’s geographic area.40

**HCQIP: The Data**

During the Fourth Scope of Work, the focus of HCQIP was on inpatient care using administrative data supplied by HCFA. The PROs supplemented these data
Table 2

<table>
<thead>
<tr>
<th>Source</th>
<th>Characteristics</th>
</tr>
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<tbody>
<tr>
<td>Beneficiary data</td>
<td></td>
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<tr>
<td>Denominator File</td>
<td>Detailed demographic data for each Medicare beneficiary</td>
</tr>
<tr>
<td>HISKEW Files (Health Information Skeletonized Eligibility Write-off)</td>
<td>Cross-reference to claims for Medicare beneficiaries; includes some demographic data</td>
</tr>
<tr>
<td>Claims data</td>
<td></td>
</tr>
<tr>
<td>MEDPAR Files (Medicare Provider Analysis and Review)</td>
<td>Medicare Part A inpatient claims; one record per inpatient discharge</td>
</tr>
<tr>
<td>MEDPRO Files</td>
<td>Similar to MEDPAR Files:</td>
</tr>
<tr>
<td>Modeled MEDPAR Files</td>
<td>Supports HCFA’s Bailey-Makeham mortality model; includes mortality data for 30, 90, and 180 days from discharge</td>
</tr>
<tr>
<td>BMAD Files (Medicare Part B Annual Data)</td>
<td>Summarizes each service provided to each Medicare beneficiary; one record for each service provided</td>
</tr>
<tr>
<td>Outpatient Standard Analytical Files</td>
<td>Complete billing data for each service provided to each recipient; includes diagnosis and procedure codes; one record for each service provided</td>
</tr>
</tbody>
</table>

HCFA Administrative Data

To implement the HCQIP, HCFA provides the PROs with two types of administrative data—beneficiary data for Medicare-eligible individuals and claims data derived from provider bills for services provided to these eligible individuals. The claims data for Medicare Part A (Inpatient Services) and Medicare Part B (Physician Services) are distributed separately. Table 2 summarizes the administrative data available from HCFA.

Medicare beneficiary data are available in two file formats. The Denominator File provides detailed demographic information on each Medicare beneficiary, including program entitlement and enrollment data. Beneficiaries enrolled in a health maintenance organization (HMO) are also identified. The Denominator File is revised annually.

The Health Information Skeletonized Eligibility Write-off (HISKEW) File summarizes basic demographic data and cross-references the beneficiary and claims data files. Up to five Health Insurance Claim (HIC) numbers previously assigned to the beneficiary are included in the HISKEW File. This provides a mechanism for linking the beneficiary data with claims data from prior years.

Medicare Part A (Inpatient) data are available primarily in the Medicare Provider Analysis and Review (MEDPAR) format. Under the Medicare prospective payment system, hospitals are paid for inpatient services to Medicare beneficiaries based on a claim’s diagnosis-related group (DRG). DRGs are based on the diagnosis and procedure codes that appear on the claim. After patient discharge, the hospital files a claim with the designated Medicare fiscal intermediary, who assigns the DRG, pays the claim, and then forwards the claim data on to HCFA. HCFA assembles the claims data into annual MEDPAR data sets of approximately 10 million records. Each record contains claims data associated with a single hospital discharge, including:

1. demographic information (e.g., age, gender, race);
2. administrative information (e.g., length of stay, hospital identification, discharge data);
3. charges (e.g., service-specific charges, total charges, reimbursed amount); and

Inpatient claims data are also available in two other formats, MEDPRO (a variation of MEDPAR for PROs) and Modeled MEDPAR. MEDPRO and MEDPAR data sets are similar, but MEDPRO data sets include mortality data from the Social Security Administration, out-of-state hospitalizations, and some supplemental conditions flags and indicators. Modeled
MEDPAR data are derived from the full MEDPAR dataset and contain 69 data elements designed to accommodate HCFA's Bailey-Makeham inpatient survival model. This model uses patient characteristics and hospitalization history to predict patient mortality for the hospital-specific mortality reports.\textsuperscript{23} The file includes 30-, 90-, and 180-day mortality data supplied by the Social Security Administration.\textsuperscript{6,12,24}

Medicare Part B (Physician) data are available to the PROs in two formats, the Annual Data Beneficiary (BMAD) File and the Outpatient Standard Analytical File.\textsuperscript{29,34} The BMAD file includes a summary of each service provided, including the HIC number, gender, individual provider information (including provider type and service), charges, date, place, type, and units of service. The Outpatient Standard Analytical File contains complete demographic information, institutional provider information, charge data, and diagnostic and common procedure codes. Unlike the MEDPAR files, which consist of records with all of the information pertaining to a single hospital admission, Part B data files have separate records for each service provided, to which provider and beneficiary information are attached.\textsuperscript{29,34} Unlike the Part A data, Part B procedures are coded using Current Procedural Terminology—4th Edition (CPT-4), due to differences in the billing forms from which Part A and B data are derived. There is not a one-to-one correspondence between the procedure codings used in the Part A and B data.

As a result, Part B files are voluminous and are available to the PROs only on special request for a particular stratum of beneficiaries and/or services. The PROs prepare a study cohort description and forward it to HCFA's Bureau of Data Management and Strat-egy (BDMS). BDMS staff extract those data meeting the study specifications. Part B data (100% beneficiary sample) are available for approximately $30,000 per year. Alternatively, 5% sample files can be purchased from HCFA for approximately $4,000 each. Because the data are so voluminous, specifications of the necessary data fields and careful explanations for selection of these items are important. HCFA personnel review proposed projects with the PRO clinical coordinator to ensure that 1) the best choice of variable is made for the question asked, and 2) important information about the interpretation of some variable fields is made clear.

In the proposed Fifth Scope of Work, HCFA has decided to significantly alter the PROs' responsibilities in processing HCFA administrative data. While the Fourth Scope specified the hardware and software that each PRO was required to use to process HCFA-supplied data, the Fifth Scope transfers much of the responsibility for analysis activities to HCFA itself. The model for this process will be the same way in which PROs requested Part B data, as described above. The PROs will specify the selection criteria for the data they need, and HCFA will take responsibility for extracting the data for the PROs. In many cases, the data selected will be used to draw a sample for subsequent project data collection. HCFA has also initiated a National Surveillance System, which will monitor HCFA's data for patterns, trends, and variations in health and health care among Medicare beneficiaries. HCFA will disseminate the results to the PROs, which may form the basis for one or more HCQIP projects. HCFA will also supply longitudinal data for individuals on request.

**HCFA Clinical Data**

A frequent criticism of administrative data as a means for evaluating health care quality issues is the lack of specific clinical information. To address this problem, HCFA designed the Uniform Clinical Data Set (UCDS) during the Fourth Scope of Work. The UCDS included 1,600 to 1,800 clinical data elements organized into a series of files that could be linked to a specific episode of care. Only about 200 to 350 data elements would be coded for any given episode. These data elements were used by the Patient Care Algorithm System (PCAS) to make decisions about the quality of care.\textsuperscript{20} PCAS is discussed in Jencks and Wilensky,\textsuperscript{20} Audet and Scott,\textsuperscript{25} and Pendergrass et al.\textsuperscript{39}. PCAS has been used to select cases for physician review in a more uniform and reliable way than traditional nurse review of medical records. PCAS applies approximately 1,000 decision rules to identify patterns of care that vary from practices advocated in standard guidelines and protocols. Practice guide-
HCFA began pilot-testing the UCDS system in 1991 and originally scheduled the use of the data system by the PROS for selected projects in 1994. However, problems encountered during pilot-testing (e.g., lengthy abstraction time required) and questions raised concerning the degree to which the UCDS system was superior to other administrative databases led HCFA to delay nationwide implementation. HCFA has replaced UCDS with the Medicare Quality Indicator System (MQIS), whose data elements are tied to specific disease conditions and guidelines or protocols that define an acceptable level of care. MQIS was pilot-tested under the Fourth Scope using cardiovascular disease as the clinical test condition. Under the Fifth Scope its function will be expanded to include a number of other disease conditions. Table 3 lists the clinical conditions for which MQIS quality indicators are being developed.

Project-collected Data

The PROs frequently need to gather additional data during an HCQIP project (e.g., medical record review, provider practitioner characteristic data, sociodemographic data, and public health data) to supplement HCFA-provided administrative data. This usually involves the development of a project-specific abstraction instrument and the collection of data through medical records review. Historically, each PRO, using its own personnel, conducted medical records review and data abstraction. However, under the Fourth Scope of Work, HCFA contracted with two centralized, Clinical Data Abstraction Centers (CDACs). The PRPs were directed to use the nearest CDAC for certain abstraction services, such as abstraction of data in conjunction with an HCFA-directed project, or development of an MQIS module. Under the Fifth Scope, the use of CDACs for all data abstraction services will be proposed. The Fifth Scope specifies that each PRO may be required to subcontract with the nearest CDAC for data abstraction services. The CDAC will handle many of the records management functions that are currently done by each PRO independently. With this system, HCFA will reduce abstraction costs (due to volume) and minimize variations in abstracted data collected by the different PROs.

A major initiative under the Fifth Scope of Work will be the expansion of HCQIP to managed care settings. However, the data to support managed care products are not available in any standard format and there are little or no HCFA administrative data on which to draw. Recognizing this, HCFA will collect data from 23 HMOs in five states as part of its Ambulatory Care Quality Improvement Project for Diabetes. Under the Fifth Scope of Work, the PRPs are expected to work with the managed care plans directly to identify data sources for analysis and cooperative projects. HCFA recognizes that it may not be possible to conduct statistically valid primary data collection for managed care plans with low levels of Medicare enrollees. Nevertheless, the PRPs are required by statute to monitor managed care plans that enroll Medicare beneficiaries and will have to do the best they can to initiate cooperative quality improvement projects with such plans.

HCQIP: The Medical Informatics Challenge

The HCQIP, as conceived in the Fifth Scope of Work, presents four challenges to the medical informaticist:

1. How to effectively use HCFA-supplied administrative data to measure quality of care.

2. How to efficiently abstract and integrate clinical data from patient medical records with the HCFA-supplied administrative data. Since more than 50 PRPs will simultaneously be initiating numerous HCQIP projects, coordination of efforts among the PRPs is highly desirable to avoid duplication of effort in developing abstraction instruments for similar studies in different states. Opportunities will also exist to take advantage of MQIS modules in PRO-initiated projects, as these modules are pilot-tested and become available.

3. How to use the information, resulting from the cooperative projects between the PRPs and health care providers, to develop and implement quality improvement plans that can be integrated with efforts already undertaken and that lead to improved patient outcomes.

4. How to demonstrate that HCQIP improvement plans produce both objective improvements in patient outcomes and favorable changes in patient perceptions of such outcomes.

Administrative Data

Medicare claims files, as one type of administrative database, offer researchers the opportunity to unobtrusively sample large numbers of hospital discharges from geographically different areas. These samples can be drawn over long periods of time at relatively low cost, as compared with the cost of project data collection. Consequently, numerous studies have been conducted using such data. For example, epidemiologists have used Med-
icare claims files to conduct case-control studies that explore cancer risk factors in the elderly.\textsuperscript{29} Health services researchers have used these files to conduct investigations into health care utilization (e.g., variations in the use of medical and surgical services\textsuperscript{2}) and outcomes (e.g., return to surgery, readmissions, readmissions in the use of medical and surgical services\textsuperscript{2}) and outcomes (e.g., return to surgery, readmissions, mortality\textsuperscript{4}). Administrative databases are best used as a surveillance tool, and for drawing samples for subsequent project data collection.\textsuperscript{25}

The apparent advantages of administrative databases are tempered, however, by a number of significant limitations that can affect the accuracy, completeness, and clinical relevance of the data. Roos et al.,\textsuperscript{10} Romano and Luft,\textsuperscript{23} and Iezzoni\textsuperscript{32} reviewed the strengths and weaknesses inherent in using large administrative data sets for research or quality-related activities. These include errors in data coding, missing or incompletely coded data, lack of coding uniformity throughout the United States, changes in coding definitions by HCFA over time, and the use of incompatible coding schemes in hospital and physician claims.

Inaccurate or misleading data can be caused by coding errors (mis specification by physicians and mis coding or missequencing by medical records personnel).\textsuperscript{23,28,37} Since hospital payment for Medicare patients is based on DRG coding, hospital upcoding for a higher payment\textsuperscript{9,18} contributes to inaccuracies in MEDPAR files. Hospital coding practices can also affect accuracy of the data when hospitals vary in their level of specificity\textsuperscript{15} or understanding of the coding of diagnoses.\textsuperscript{11,32} The imprecision of the ICD-9-CM coding system used in the MEDPAR files can contribute to ambiguity of the data.\textsuperscript{33} For example, this system does not distinguish between a comorbidity or a complication.

Incomplete data can be caused by coding truncation, that is, the limit placed on the number of diagnostic codes (ranging from five to nine, depending on the year of the data set\textsuperscript{29} and procedure codes (ranging from three to four, depending on the year of the data set)\textsuperscript{2} that can be recorded in the MEDPAR files. Since the number of data fields is limited, chronic conditions that are unrelated to the primary diagnosis may not be reported. Instead, diagnosis codes, which reflect conditions that are more serious, account for longer lengths of stay, or greater resource use, may simply crowd out chronic conditions, such as diabetes and hypertension.\textsuperscript{5,10} The payment perspective of coders (as opposed to a clinical perspective) may also be the reason for underreporting in the case of variables such as urgency of admission and transfer.\textsuperscript{27}

Whittle et al. found estimates of resection rates among elderly cancer patients derived from Medicare inpatient data to be significantly lower than estimates derived from the National Cancer Institute’s Surveillance, Epidemiology, and End Results (SEER) data.\textsuperscript{16} Fisher et al. found that 9% of hip fracture cases were not identified through the Medicare inpatient data.\textsuperscript{8} These findings suggest that data may be incomplete because claims are undercoded (for some reason other than cited above), severely mis coded, or lost in the data transmission process.\textsuperscript{8,10,23,29}

In addition, MEDPAR files contain only Part A data. Important outpatient data involving biopsies, previous screening for specific diseases, and outpatient follow-up care are lacking. Part B files carry some of these data, but the files are not as readily available, and are more difficult to use, since there is one Part B record for each service, and thus many records for each MEDPAR record. Also, inpatient procedures are coded in ICD-9-CM while outpatient procedures are coded in CPT-4, due to the differences in the UB-92 (universal billing document–1992) and HCFA-1500 billing forms. There is no one-to-one mapping between these two coding schemes.\textsuperscript{34}

The MEDPAR files also fail to include data fields that would allow PROs to address quality-related health care questions. The data files lack variables such as process variables (e.g., administration of thrombolytic therapy), prognostic factors (diseased vessels), non-reimbursable services (e.g., preventive services), functional status, and services performed in an outpatient health care setting (e.g., treatment for cancer).\textsuperscript{4,13,28,33}

Audet and Scott have described a stepwise approach to quality improvement whereby claims data such as MEDPAR data are used for surveillance purposes.\textsuperscript{25} Other data sources are then used to supplement the claims data for hypotheses testing and other confirmatory activities. This is the approach that HCFA has chosen for implementing HCQIP projects. Since HCFA will be responsible for drawing claims samples to the PROs’ specifications, under the Fifth Scope of Work, the PROs’ primary challenge is to verify the accuracy of the coding through comparison with medical record data. HCFA’s challenge will be to provide the data requested in a timely manner.

Weiner et al. exemplify the use of administrative data to identify opportunities for improvements in the quality of care of Medicare patients. The researchers used a 100% sample of linked Medicare Part A and Part B claims with a diagnosis of diabetes for the period July 1, 1990, to June 30, 1991, in Alabama, Iowa, and Maryland. Using 1992 practice guidelines
for the care of diabetic patients, Weiner et al. identified four services/procedures as quality indicators for the treatment of diabetes. Diagnosis and procedure coding was verified by comparison of a sample of claims with data abstracted from patient medical records. Examination of the complete data set showed that up to 84% of the patients were not receiving the services recommended by the guidelines. Accordingly, the study concluded that "[e]lderly patients with diabetes do not appear to be receiving optimal care. . . . This study provides substantial evidence that existing administrative data can be used to support ambulatory quality improvement activities." 46

Project-collected Data

One challenge for the PROs is to select the data elements to be abstracted from patient medical records. Unfocused assemblage of clinical and administrative data has been criticized by Dans26 and others as "bad science," because the data are gathered before the research questions have been formulated. As mentioned earlier, this was an early criticism of the UCDS. The solution to this problem is to use established practice guidelines or protocols to identity quality indicators for a particular HCQIP project. The challenge then becomes the judicious selection of data elements to support these quality indicators. This is precisely how HCFA is proceeding to expand the number of clinical conditions in the MQIS. The PROs will be able to use the MQIS modules in their own projects and reduce the number of unique abstraction instruments that they must develop.

A second challenge will be the ability of the providers and the CDACs to keep pace with the volume of requests for medical records and abstraction services from the PROs. The CDACs are obligated to request medical records from the providers within five days of receipt of an MQIS sample list. The providers have 30 days to provide the records, and the CDAC must then complete the abstractions within another 30 days. Presumably the same timetable will apply to other HCQIP abstraction requests.41

To maximize opportunities for collaboration and sharing of project ideas and abstraction instruments, a consortium of PROs is working with HCFA on an Information Management System (IMS), which will be used for collective project management and tracking. Current plans are to have the IMS operational in early 1996, before the first Fifth Scope of Work contracts begin.43 This is a challenging opportunity for HCFA and the PROs to increase HCQIP productivity.

Two studies demonstrate the use of medical record abstraction and administrative data analysis in a successful HCQIP project. Meehan et al. demonstrated the feasibility of linking claims-based pattern analysis with medical record review in an assessment of the quality of hospital care among 300 Medicare patients admitted at six Connecticut hospitals for acute myocardial infarction (AMI). Quality indicators used for the study were usage rates for thrombolytics, aspirin, and beta blockers. The study concluded that these therapies were underutilized in the population studied and that pattern analysis of Medicare claims data can be useful as a quality of care screening tool.44 Similarly, Ellerbeck et al. used Medicare claims data and retrospective medical record review to measure 11 quality of care indicators among Medicare patients discharged from all the acute hospitals in Alabama, Connecticut, Iowa, and Wisconsin between June 1, 1992, and February 28, 1993. The quality indicators were derived from clinical practice guidelines in consultation with a national group of physicians and other health professionals. The study concluded that while many Medicare patients may not be ideal candidates for standard AMI therapies, the treatments measured are still underutilized and opportunities exist for quality improvements with these therapies.30

Integrating HCQIP with Other Quality Improvement Projects

HCQIP is based on the principles of continuous quality improvement (CQI). HCFA requires the PROs to have a CQI program in place under the Fifth Scope of Work.40 At the same time, application of CQI in other health care settings is commonplace. All of these applications share a commitment to improving the quality of patient care.36 HCQIP projects will be more likely to produce improved patient outcomes, because they share a common theoretical basis with other quality improvement projects. Projects should be chosen that coincide with providers' other quality improvement initiatives. Similarly, project designers should choose quality indicators and present results in such a way that the providers can incorporate the findings into their quality improvement planning. Since the goal is to improve the quality of care, not merely identify opportunities for improvement, it is important to design the studies to maximize the opportunity for providers to design and implement successful improvement plans. Much work needs to be done to analyze the impact of HCQIP projects on provider behavior. According to Nash, "While the process for delivering feedback is well described, measures of the effectiveness of delivering feedback are sorely needed." 45 The informaticist and the change agent must collaborate
Figure 2 The incorporation of patient-supplied data into the Health Care Quality Improvement Program (HCQIP) to satisfy the communication requirements of the Health Care Financing Administration’s (HCFA’s) Fifth Scope of Work.

Beneficiary Communications

One hallmark of CQI programs is the use of proactive customer feedback to identify opportunities for quality improvement. In health care settings, patient feedback is often sought in the areas of access to care, patient satisfaction, and functional and symptom status, or health-related quality of life.30 For example, Crawford Long Hospital and Emory University Hospital in Atlanta survey patients at discharge to measure satisfaction with the care received. Employees of the hospital receive bonuses if the proportion of highly satisfied patients consistently remains above 85%.37

In addition to mortality, health-related quality of life is an important health outcome measure. Although this is readily measured through patient surveys, many physicians downplay the importance of patient self-reports. For example, Packer claims that such information, “is not quantifiable, [is] subject to considerable interobserver variability, and lacks adequate sensitivity to detect small but important changes in functional capacity.”3 On the other hand, Hadorn et al. argue that: patient reports are both quantifiable and highly reliable using several well-known existing questionnaires; patient surveys, which use standard techniques, are as reliable as any other kind of survey; and important changes in functional status that cannot be detected by patients beg the question—who should be the final arbiter of how a patient feels?30

HCFA’s proposed Fifth Scope of Work recognizes the importance of beneficiary communication in HCQIP. One specific objective of cooperative projects is to “protect beneficiary populations.” The PKOs are also required to develop communications strategies whose “primary goal . . . is to help bring about improvement in the quality of care received by beneficiaries . . . .”40

Unfortunately, the methods actually used to implement HCQIP do not incorporate these communication requirements into the process in any formal way. There is an implicit assumption in the analytical process described earlier that adherence to published guidelines and protocols is sufficient to achieve quality care. A more robust hypothesis is that adherence to such guidelines is necessary for quality care, but is not necessarily sufficient. The final informatics challenge then is to incorporate patient-supplied data into the HCQIP process to satisfy the communication requirements of the Fifth Scope of Work, as depicted in Figure 2.

Conclusions and Recommendations

HCFA’s HCQIP is an ambitious attempt to improve the quality of care received by Medicare beneficiaries. It was conceived in the 1980s and implemented in 1990 to inject an emphasis on quality into a program whose previous focus had largely been cost reduction. HCQIP has overcome a number of obstacles and false starts in the ensuing five years and has begun to produce results that identify opportunities for improving patient care.

From an informatics perspective, the adequacy of HCFA-supplied administrative data was an early concern. A number of research studies identified problems with such data and suggested strategies for circumventing them.10,23,28,32 Most importantly, the addition of clinical data derived from medical record review significantly increased the ability to conduct meaningful quality studies.36,44,46 An early attempt to develop an omnibus clinical data set was later cancelled in favor of a medical record abstraction process tied to consensus practice guidelines and protocols for a number of clinical conditions. HCQIP projects under the Fourth Scope of Work examined the quality of inpatient care. In contrast, in the Fifth Scope of Work, the PROs will be obligated to study managed care settings as the number of Medicare beneficiaries enrolled in such settings increases. A major informatics challenge will be to identify and use administrative and clinical data from these managed care plans.

HCFA decided to centralize the process of selecting,
linking, and disseminating its administrative data for use in HCQIP projects. While this relieves the PROs of some routine data processing tasks, HCFA's ability to provide the administrative data in a timely fashion will be a challenge under the Fifth Scope of Work, as the number of PRO-initiated projects increases. At a time when the federal budget for health care services is being reduced, HCFA will be challenged to marshal the necessary money and personnel needed to implement the Fifth Scope of Work. In their economic evaluation of HCQIP, Cangialose et al. provide a definition of quality of care that recognizes resource constraints.47

HCFA is also centralizing the medical record abstraction process through contracts with the CDACs. The CDACs will be responsible for requesting medical records from the providers of care, abstracting the necessary data, and disseminating the data to the requesting PRO. Timely delivery of abstracted data will also be a challenge for the CDACs.

Recently, a number of studies have been reported that demonstrate the ability of HCQIP projects to identify opportunities to improve the quality of care received by Medicare beneficiaries. However, very little evidence exists that the PROs will be able to change provider behavior by merely identifying opportunities for improvement. The challenge for the PROs will be to emphasize cooperation in the development of such projects to ensure that identification leads to action. It is likely that the cooperating providers will already be involved in other quality improvement efforts. The PROs must ensure that HCQIP projects support and reinforce these other efforts.

A consortium of PROs is collaborating with HCFA on the development of a new IMS to support collective project management and tracking during the Fifth Scope of Work. This is a challenging opportunity for HCFA and the PROs to increase HCQIP productivity.

Finally, HCQIP has been conceived as an application of the theories of CQI. In keeping with these theoretical roots, beneficiary communication is an important requirement in HCFA's proposed Fifth Scope of Work. However, the actual cooperative project process does not include any provision for patient-supplied data on issues such as access to care, patient satisfaction, or health-related quality of life. The final challenge to the informaticist is to provide the tools necessary to integrate such data into project designs.

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