A Detailed Audit of Reimbursement for Abdominal CT in an Academic Practice

Julia R. Fielding, MD, David Feiock, MD, Kelly H. Zou, PhD, Anna Poulos Jack Bernazzani, MPA, Brian Chiango, MBA, Steven E. Seltzer, MD

Rationale and Objectives. Declining fee schedules, decreasing operating margins, and increasingly stringent compliance regulations create a need for intense scrutiny and optimization of a radiology organization’s billing and collection procedures. The authors’ goal was to analyze the effectiveness of departmental professional billing procedures, identify controllable factors, and intervene when they could be improved.

Materials and Methods. A detailed audit of professional claims and payments was performed for all patients who underwent abdominal-pelvic computed tomography (CT) during July 1999 (n = 717). The adequacy of indication for the CT examination as given by the referring physician and modified by the radiology staff, the time required for claim generation, and the status of reimbursement within 120 days were assessed by an interdisciplinary team. After an intervention was performed to improve adequacy of the available clinical indication, the audit was repeated in December 1999 (n = 710).

Results. Despite a significant (P < .05) improvement in wording of clinical indications for billing purposes between July (68%) and December (85%), there was no significant change in reimbursement against gross charges. The vast majority of claims (97% in July, 99% in December) were generated in less than 30 days. At 120 days after the date of service, payments had been received that amounted to only 66% and 54% of discounted professional fees for July and December, respectively. For examinations performed in December, payment was delayed beyond contracted time periods in 138 cases (19%).

Conclusion. Optimum billing and collection for imaging studies is an increasingly complex task. Even when substantial efforts are devoted to eliciting the proper indication for the study, reimbursement remains low primarily because of payer delays.

For the past several years, academic radiology departments around the country have faced unprecedented financial challenges due in large part to the federal Balanced Budget Act of 1997 and the downward pressure from insurers on providers’ fees. Administrative and clinical staff within our department decided to work together to identify controllable factors leading to diminished reimbursement, to make process and personnel behavior changes that addressed deficiencies when possible, and to monitor the results.

MATERIALS AND METHODS

We approached the problem of inadequate reimbursement by using the plan-do-study-act cycle popularized in the medical community by Langley et al (1). Plan-do-study-act theory emphasizes rapid change through the use of sequential cycles of small changes with narrow aims. Using change cycles, Torres et al (2) reported success in...
improving patient flow through the interventional section of an academic radiology department.

A process or personnel problem(s) is first identified and clearly defined by a study group. The group must consist of personnel involved in all aspects of the problem area and must be led by a senior staff member with the authority and tenacity to complete the project. A plan for change—consisting of several sequential, clearly defined, and measurable steps—is designed and implemented. It is critical that an appropriate quantifiable outcome is identified and monitored as a measure of success. Change cycles are repeated based on the outcome measure, with one change after the next added or modified until the desired result is attained.

In our case, the study group consisted of the departmental chairman, a senior staff radiologist specializing in abdominal-pelvic computed tomography (CT), the director of administration and finance, the manager of managed care contracting, the group practice manager, and a 2-year radiology resident. We identified the problem as diminishing and unacceptably low professional reimbursement rates. To select factors responsible for poor reimbursement, an audit was performed for the month of July 1999. The audit was prepared by generating daily examination reports for six CT scanners (four mixed inpatient and outpatient, one strictly outpatient, and one located within the emergency ward) and then matching each patient’s accession numbers with an appropriate billing ledger \((n = 717)\), which listed charges and reimbursement. We chose to audit both inpatient and outpatient CT examinations because professional billing is handled identically. As in most departments, this paired information was not easily obtainable and necessitated a substantial amount of manual data entry.

The adequacy of clinical indication for the study as given by the referring physician was determined by assigning ICD-9 (International Classification of Diseases, Ninth Revision) codes to all examinations according to the Medicare guidelines of September 1999 \((3)\). In our department, ICD-9 codes are assigned by experienced coders after the images from an examination have been interpreted. We also recorded the number of cases not received in billing due to departmental operational errors, the number of days required for a claim to be generated, and reimbursement status at 120 days after date of service. In general, our agreements with payers specify that if the radiology department submits an error-free bill within 30 days after date of service, payment will be received in 90 days.

After we analyzed the data from July 1999, an intervention was made to improve the wording of indications for CT examinations in the hope that precise wording would lead to faster and more accurate generation of claims (see Results). After a 6-month interval, the audit was repeated with improved reimbursement rate as the desired outcome. The magnitude and statistical significance of changes that occurred were analyzed with the paired, one-tailed Student \(t\) test. Finally, we recorded the number of claims reimbursed and the reasons for delay or rejection at 6 months after date of service.

**RESULTS**

Review of the audit for July 1999 revealed that 717 patients had undergone CT of the abdomen, pelvis, or both. Fifty-three (7%) of these patients were scanned at an off-site outpatient clinic, 138 (19%) were scanned in the emergency ward, and the remaining 526 (74%) consisted of a mixed group of outpatients, the majority with cancer, and inpatients. Six (<1%) cases were not received in the billing office, and scans from 17 (2%) cases were not officially interpreted, for a total of 23 cases not billed by the department. Two hundred twenty-seven (32%) examinations had a clinical indication with wording inadequate for billing purposes. The most common inadequately worded indications were variants of cancer staging, such as “rule out mass” or “question recurrence,” without specification of the organ involved or physical finding. Claims were generated by our billing office in an average of 19 days (standard deviation, 18 days), well below the acceptable maximum of 30 days. Five hundred twenty-three (73%) patients were members of managed care plans. Collection rates against gross charges for the outpatient clinic (28%) and for the emergency ward (29%) were significantly higher than that for the mixed inpatient and outpatient hospital population (20%; \(P < .05\)). At 120 days, the collection rate after contractual allowances with managed care payers was 66%, and the collection rate against gross charges was 22%. During this same time period, the collection rate based on Medicare rates after contractual allowances was 78%.

Because of the large number of indications inadequately phrased for billing purposes, and because this factor was at least partly under control of the radiology professional staff, it was selected as the first target of change. At our institution, all inpatient CT examinations are scheduled with a computerized order-entry system that requires the history and diagnosis fields to be completed.
Review of the examination request forms generated by this system usually provides an adequate billing indication. Outpatient scheduling is done over the telephone. The radiology scheduling assistants are required to ask for the diagnosis and the reason for the examination. However, the booking secretary at the referring physician’s office usually does not provide us with adequate information.

The computer-generated daily CT schedule is reviewed the night before by the radiology residents and fellows assigned to the body imaging service. Contact is made with a referring physician as needed to obtain a medically necessary indication. After this discussion and/or review of a patient’s computerized medical record, changes are often made electronically to the scanning indication. The examination indications submitted by the referring physician and modified by the radiology trainees under the supervision of the radiology staff physicians were those used in this study.

During the interval between July and December, a sectionwide initiative was carried out to improve adequacy of wording of indications for abdominal-pelvic CT examinations. Specifically, the senior staff radiologist scheduled meetings with the staff and trainee physicians, stressing the importance of accurate and appropriate dictation including indication and the use of intravenous contrast medium. The top 20 indications used by our referring physicians and examples of good reporting styles were posted at each dictation station, as were Medicare guidelines for appropriateness. In general, these guidelines state that a physical sign or symptom, abnormal laboratory test result, or diagnosis based on physical and laboratory findings is adequate and acceptable for billing purposes. All staff radiologists were given a wallet-sized, laminated card containing the same information. Finally, all radiologists were requested to call referring physicians or patients and/or search the computerized medical record when necessary to clarify an indication or to obtain an indication when none was given.

To assess the effect of our intervention, the abdominal-pelvic CT audit was repeated for December 1999. The number, type, and distribution of cases were not significantly different from those in July 1999. Of the 710 total patients, 56 (8%) were scanned at the outpatient clinic, 179 (25%) were scanned in the emergency ward, and 475 (67%) were scanned as part of the mixed inpatient and outpatient group. Collection rates against gross charges for the outpatient clinic were stable (25%), for the hospital population were slightly increased (25%), and for the emergency ward population were decreased (19%). All of the cases were received in the billing office, and images from six (<1%) cases had not been officially interpreted, an improvement compared with July 1999. Claims were generated in an average of 22 days (standard deviation, 10 days), slightly increased compared with July 1999. One hundred seven (15%) cases had indications that were not worded adequately for reimbursement, a significant decrease compared with findings from July 1999 ($P < .05$). The greatest improvement occurred among patients undergoing CT for cancer staging. The percentage of patients affiliated with managed care plans remained essentially constant at 530 (75%). The collection rate against gross charges remained nearly stable at 24%, and the collection rate after contractual allowances decreased to 54%. With Medicare rates, the collection rate after contractual allowances was 72%. Results from December 1999 compared with those from July 1999 are summarized in the Table.

To assess more fully the reasons for poor reimbursement, in July 2000 we reviewed the status of 180 claims dating from December 1999 that had not been paid at 120 days following service. Of this group, 105 (58%) were paid after the contracted 120 days, despite our generation of an invoice free of errors. Of the remaining 75 cases with unreimbursed claims, 17 were designated free-care cases, 17 were sent to collection agencies, three were out-of-state welfare cases for which we have no contract, two had inadequate demographic information, three were billed incorrectly due to our clerical errors, and 33 with active insurance were still pending.

**DISCUSSION**

Despite the success of our intervention to improve the wording of examination indications, as shown by a 50% decrease in imprecise wording determined with ICD-9 codes, the time required to generate a claim and overall reimbursement stayed relatively constant during a 6-month interval. This indicates that the wording of indications used for ICD-9 coding was not responsible for any decrease in reimbursement.

We have shown that payer delays are the most important cause of diminished reimbursement. One hundred thirty-eight of a total of 710 claims (19%) either were paid after the agreed upon payment interval or were still pending at the time of this report. A complicating factor is that our largest managed care referrer went into receivership in mid-January. Payments for December 1999 were
likely slowed during restructuring of the health maintenance organization.

Although our first intervention was unsuccessful in increasing reimbursement, we are pleased with the improvement in communication with our physician colleagues. It is our hope that this leads to improved patient care. We plan to continue our efforts to improve reimbursement by instituting a second cycle of change. Our next intervention will likely focus on improving the accuracy of patient demographic and financial information in the hospital computer system. We also plan to meet with our managed care payers to review the reasons for payment delay.

Because this project required that all data be matched and typed by hand, it is likely that some errors were made. We estimate that at most 10 examinations either were not recorded or were recorded incorrectly. With such a large overall number of examinations, this small error should not have substantially changed the results. Also, because we have performed the audit only twice in a 6-month period, our interpretation of the data must be limited to that time period. The variations in reimbursement for the clinic, emergency ward, and hospital populations for the next year may not be inferred by behavior during the audit period. To identify larger trends in reimbursement, the audit must be repeated over several cycles.

This review taught us many useful things about our department. We discovered that our contracting, billing, and collecting systems need to be better synchronized and automated. We found the vast number of places an error can be made in the complex system of hospital record keeping and billing. Finally, we learned how to work as a team—with staff radiologists, administrators, technologists, and trainees approaching a problem in a cohesive way.

### REFERENCES