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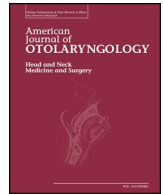
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Impact of a specialty trained billing team on an academic otolaryngology practice

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ABSTRACT

Purpose: To determine how the incorporation of specialty specific training for coders within a focused billing team affected revenue, efficiency, time to reimbursement, and physician satisfaction in an academic otolaryngology practice.

Materials and methods: Our academic otolaryngology department recently implemented a new billing system, which incorporated additional training in otolaryngology surgical procedures for medical coders. A mixed model analysis of variance was used to compare billing outcomes for the 6 months before and 6 months after this new approach was initiated. The following metrics were analyzed: Current Procedural Terminology codes, total charges, time between services rendered and billing submission, and time to reimbursement. A survey of department physicians assessing satisfaction with the system was reviewed.

Results: There were 4087 Current Procedural Terminology codes included in the analysis. In comparing the periods before and after implementation of the new system, statistically significant decreases were found in the mean number of days to coding completion (19.3 to 12.0, respectively, $p < 0.001$), days to posting of charges (27.0 to 15.2, $p < 0.001$), days to final reimbursement (54.5 to 27.2, $p < 0.001$), and days to closure of form (179.2 to 76.6, $p < 0.001$). Physician satisfaction with communication and coder feedback increased from 36% to 64% after initiation of the new program.

Conclusions: The implementation of additional specialty training for medical coders in the otolaryngology department of a large medical system was associated with improved revenue cycle efficiency. Additionally, this model appears to improve physician satisfaction and confidence with the coding system.

1. Introduction

Coding is an integral and evolving part of healthcare. This process starts with documentation of a patient's medical condition and services by a provider, which are rendered into medical codes. These medical codes are dictated by the Current Procedural Terminology (CPT) system, which establishes consistent terminology across the healthcare system to describe services, procedures, and surgeries completed by providers. Ultimately, the CPT codes are used to submit claims to insurance companies seeking financial reimbursement. Optimizing the coding process is critical to the financial viability of all medical practices and systems.

Medical coders trained in the process of deciphering this system are critical in facilitating its proper execution, as physicians and advanced

practice providers tend to lack consistent formal training in coding guidelines [1]. Furthermore, it has been reported that physicians often resist requests to change or align documentation with coding standards due to the complexity of these guidelines, which tend to be perceived as clinically irrelevant [1,2].

Solo or group practices often employ medical coders with extensive knowledge and experience with the relevant codes for their respective medical discipline. However, larger health systems often do not utilize this system, permitting coders to be responsible for a wide range of specialties. Unfortunately, the subjectivity and variability of the coding process makes it prone to errors, which can lead to the submission of inconsistent or incorrect claims [3,4] and even loss of revenue for a department or health system [3]. Emphasis on value-based care and outcome measures has become increasingly important for health

Abbreviations: CPT, Current procedural terminology

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systems in recent years [1] and has led to greater scrutiny of such clinical and administrative processes, with the goal of improving quality metrics and reimbursement.

Recently, more health systems have begun implementing changes to the coding process in an effort to increase efficiency and accuracy, with the ultimate goal of shorter turnaround time to reimbursement and final payment [2,5–7]. In 2017, our department implemented a new billing system. This primarily affected the coding of surgical procedures. Which were previously reviewed and assigned codes by a centralized institutional billing team. One crucial change to this system was the assignment of specialty trained coders with additional training in otolaryngology surgical procedures. The main interventions consisted of workshops and courses for these coders, as well as annual training sessions simultaneously incorporating providers and coders. The annual training sessions covered CPT code updates and documentation principles for surgical procedures, covering each discipline within otolaryngology. They specifically promoted active conversations between providers and coders throughout the session to address questions and clarify any inconsistencies amongst the group. There were no changes made to the electronic medical record system during this time, which remained consistent across all providers.

This study aimed to determine how the incorporation of specialty specific training for coders within a focused billing team affected revenue, efficiency, time to reimbursement, and physician satisfaction in an academic otolaryngology practice.

2. Materials and methods

The Henry Ford Health System Institutional Review Board approved this study. A retrospective review was performed comparing billing outcomes for outpatient surgical procedures during two 6-month time periods, February–July 2017 and February–July 2018, before and after this new approach was initiated for an academic otolaryngology department in a large tertiary care hospital. The 6-month interim period immediately following implementation of the new system was not included in the analysis in an attempt to exclude any confounders present during the transitional period. This also created two comparable time periods of the same seasonality to minimize seasonal variations of diseases encountered in practice. Coding and billing data for 15 otolaryngologists of general and various subspecialty disciplines within the department was used. Data for new hires during the time period examined in this study was excluded from analysis. Data analyzed included number of CPT codes, total charges, time between services rendered and billing submission, and time to payments. Individual portions of the coding process were examined separately, as well as the collective duration of the entire coding process. The specific metrics we examined in quantifying the timing of the coding process were number of days until coding of the procedure was considered complete, number of days until charges were posted for insurance companies, number of days to final reimbursement from insurance providers, and number of days until closure of form, meaning that any final payment was received from the patient, rendering the process complete. Variables were compared between the two time periods using a mixed model analysis of variance.

Following the successful implementation of the new billing system, a short three question survey was administered to physicians in the department to assess satisfaction with the coding system. This survey was administered to physicians by department administration prior to the initiation of the current study so is not included as part of this study design; however, the survey results were available for review. Physicians were asked to rate their satisfaction with communication and coder feedback under the new system, in comparison to the old system. Answer choices included very satisfied, satisfied, neutral, and dissatisfied. There was also an open-ended question for the physicians to report additional comments. There were 11 physicians who answered the survey.

Table 1
Billing metrics pre- and post-intervention.

Metric analyzed	Pre-intervention billing period <i>n</i> = 1854 CPT codes	Post-intervention billing period <i>n</i> = 2233 CPT codes	<i>p</i> Value
	Mean (SE)	Mean (SE)	
Charge per CPT code	\$2218 (\$69)	\$2185 (\$68)	0.181
Days to completion of coding	19.3 (0.6)	12.0 (0.5)	< 0.001
Days to posting of charges	27.0 (1.1)	15.2 (1.0)	< 0.001
Days to final reimbursement	54.5 (1.8)	27.2 (1.7)	< 0.001
Days to closure of form	179.2 (3.4)	76.6 (3.1)	< 0.001

CPT, Current Procedural Terminology; SE, standard error.

To assess the difference from pre- to post-intervention periods, a mixed model analyses of variance was used. The records were matched on physician and CPT code. A least squares mean and its associated standard error was estimated. A *p*-value less than 0.05 was considered significant. All analyses were done using SAS Version 9.4 (SAS Institute Inc., Cary, NC).

3. Results

During the 6 months before the new program was initiated, 1854 CPT codes were filed, compared with 2233 codes over the subsequent 6-month period examined. While the mean charge amount per CPT code was similar between the two periods (\$2218 before and \$2185 after, *p* = 0.181), we noted significant decreases in mean durations of all parts of the billing process timeline after implementation of the new system (Table 1). The mean number of days to completion of coding in the pre- and post-implementation periods decreased from 19.3 to 12.0, respectively (*p* < 0.001). The mean number of days to posting of charges in the pre- and post-implementation periods decreased from 27.0 to 15.2, respectively (*p* < 0.001). The mean number of days to final reimbursement also dropped significantly (from 54.5 to 27.2, *p* < 0.001), as did mean number of days to closure of form (from 179.2 to 76.6, *p* < 0.001). Overall revenue generated by surgical procedures performed by the same group of physicians in the pre- and post-implementation periods was \$4,266,389 and \$4,294,900, respectively. In comparison to the old program, physician satisfaction with communication and feedback from coders increased from 36% to 64% expressing satisfaction.

4. Discussion

The accuracy of CPT coding has significant implications for health systems' finances. Inaccuracies can lead to inadequate reimbursement for the system and increased patient financial burden. Efforts to improve the efficiency and accuracy of a department's coding system could potentially benefit providers and healthcare systems.

Various studies have examined ways to improve the accuracy of documentation and quality metrics in surgical departments [5,6]. Aiello and colleagues demonstrated that the implementation of a clinician-coder multidisciplinary team in the coding process increased coding accuracy, relative value units, and reimbursement [5]. However, hiring clinicians to be involved in the coding of all surgical procedures would likely be costly and time consuming. Additional clinical documentation training for physicians has also been shown to lead to improvements in coding accuracy [7], but implementing additional training requirements for physicians may not be popular or sufficiently cost-efficient.

The breadth of the field of otolaryngology and its range of complex surgical procedures performed in close anatomic proximity make it a specialty that is especially prone to coding errors [8–10]. Coding errors

have been reported in 24%–44% of otolaryngology encounters [8–10]. Nouraei and colleagues conducted one of the largest audits to date of otolaryngology cases, examining 3131 randomly selected patients between 2010 and 2012 at a large tertiary care hospital in London [9]. This audit resulted in at least one change to the initial coding in 44% of cases, as well as a change in the health resource group that determined reimbursement rate in 16% of cases. In otolaryngology inpatient care, comorbidities and complications have also been found to be frequently underreported, depreciating the complexity, and subsequently the value, of care provided [2].

Given the nuances of CPT coding, specialty coders offer the advantages of a deeper personal knowledge and experience to determine appropriate codes. Despite their pivotal role in overseeing the coding process, institutional coders tend not to be specialized, having limited training in specific medical or surgical specialties. In an effort to improve our coding process, several years ago our department initiated a program in which only dedicated, otolaryngology specific coders were utilized. The results of this study suggest a range of benefits of this model of coding. Similar interventions have been instituted in other otolaryngology practices, with one large Midwest academic center noting subsequent improvement in accuracy of inpatient documentation following the intervention [2].

In this new coding system, the mean number of days it took for coders to submit charges decreased from 27.0 to 15.2, which is likely due to improved documentation and better communication between providers and coders. The mean number of days it took the health system to receive final reimbursement from insurance companies was also reduced by half. Furthermore, the amount of time measured between the day the procedure was performed and when the patient made final payment, essentially closing the form, decreased to less than half of the amount of time under the new system. Factors suspected to contribute to this improvement include more prompt and accurate submission of claims, as well as better and more timely communication between surgeons and coders. It has been previously reported that provider and insurance payer errors can account for almost two-thirds of delayed payments in a medical practice, more commonly than payment delay due to technical errors or patient factors [11]. By focusing on improvements to the coding and billing cycle, departments can most effectively reduce delayed payments from insurance providers and patients.

In addition to revenue cycle improvements, physicians reported feedback that they were pleased with “more consistency in communication” that resulted from working with the same group of coders and having more opportunity for two-way communication. Physicians also expressed “more confidence in the system” that coding would be done accurately. Importantly, there was minimal increased cost or time commitment associated with this change, limited to incorporation of a single annual coding seminar for providers and coders, as well as additional educational sessions for the coders provided by a third-party consulting and education firm.

It is difficult to control for all of the factors that can affect physician performance between different time periods, such as personal events, changes in surgical technique, physical injuries, or vacation time. A purposeful effort was made to compare corresponding time periods with the same seasonality. Although the revenue generated by the same group of surgeons between the two time periods only increased marginally, it is important to note that new surgeons joined this department during the interim period, and the additional revenue generated by them was purposefully excluded from the analysis to maintain matched control populations. This effectively decreased the total department revenue reported in this study for the period following the intervention.

We speculate that the greater efficiency of this billing system has important implications for improvements in the overall revenue cycle and that this type of intervention may still have potential to increase overall department revenue.

5. Conclusion

It appears that employing specialty medical coders in the otolaryngology department of a large medical system provides a number of benefits. This study suggests that revenue cycle efficiency may result for other similar departments. Additionally, it seems that this model may also improve physician satisfaction and confidence with the coding system.

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Declaration of competing interest

None.

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