The Expanding Role of Clinical Documentation Improvement Programs in Research and Analytics

by Howard Rodenberg, MD, MPH, CCDS; Lynn Shay; Karen Sheffield; and Yojanna Dange, MD

Abstract

The future of clinical documentation improvement (CDI) will require expanding the reach of CDI programs into new areas of expertise because the traditional realms of CDI work are increasingly becoming automated. CDI-based research and analytics can serve as a means for demonstrating continued value to an institution. We present four studies as examples of these efforts. We explored the use of claims data to determine whether a clinical condition meets the criteria for a secondary diagnosis and to evaluate whether a clinical problem should be elevated to the status of a comorbid or complicating condition. We demonstrated a way in which CDI professionals can evaluate the impacts of changes in clinical definitions, and we explored how CDI can work with other institutional programs to decrease length of stay. We believe that these models may serve as a springboard within institutions and among the larger CDI community to make research and analytics a foundation of future CDI activities.

Introduction

The ultimate goal of the health professions is to eliminate illness and injury through advances in preventative care and effective therapeutic interventions. Clinical documentation improvement (CDI) programs share a similar goal. CDI specialists hope to educate physicians and other healthcare providers to enhance their documentation skills to the point where queries and audits are no longer needed. Ewoterai et al. suggest that external technological forces may also hasten the demise of CDI programs as we know them.[1] Electronic medical record (EMR) data standards, cross-platform communication, computer-assisted coding, and documentation suggestions for clinicians with automatic links to the appropriate codes may obviate the need for CDI specialists and queries as we know them today.

The more that CDI work is built into the EMR, and the more that physicians accept these systems, the more important it becomes for CDI programs to assume a larger role in research and data analytics. Our CDI team has accepted this challenge and has engaged in several studies to demonstrate the potential impact of pursing a CDI research and analytics program. In this article, we share four examples of our efforts in order to provide a glimpse of the kinds of studies that might be included within the expanding role of CDI programs.

Morbid Obesity: What Defines a Secondary Diagnosis?

Background and Objective

A persistent issue within the CDI community is what defines a secondary diagnosis. A secondary diagnosis (also referred to as a "secondary condition" or an "other diagnosis") is an "additional condition (either present on admission or occurring during admission) that affect patient care in terms of requiring:

- Clinical evaluation, or
- Therapeutic treatment, or
- Diagnostic procedures, or
- Increased nursing care/monitoring, or
- Extended length of stay."[2]

While the definition may seem clear, the interpretation involves a plethora of nuances. What exactly constitutes treatment? How do you measure increased nursing care and monitoring? Might some conditions, simply by their presence and without specific mention of diagnostic tests or focused treatment, meet the definition of a secondary diagnosis, and if so, how could we assess this?

Clinicians have long recognized that patients with morbid obesity present a myriad of logistical, physical, and physiologic challenges in care. However, from a coding standpoint, the question is whether morbid obesity (defined as a body mass index [BMI] greater than 40) in and of itself qualifies as a secondary diagnosis, or whether it requires some sort of active intervention or documentation of difficulties in patient management to justify its inclusion.

Method

We reviewed claims data to see whether we could identify objective evidence that the simple presence of morbid obesity, independent of any particular intervention, was associated with increased length of stay (LOS) or with increased care and monitoring (as estimated by inpatient hospital charges).

A convenience sample of complete All Patient Refined Diagnosis Related Group (APR-DRG) claims data for fiscal year 2016 was used as the base population. Claims data were acquired using the in-house SMS 400 System Patient Extract function. Specific APR-DRG groups selected for analysis were those with at least 100 patients in the categories of BMI greater than 20 but less than 40 and BMI greater than 40. We evaluated these APR-DRG groups to determine the mean LOS and mean charges for each weight group. Malnourished patients within the selected APR-DRG groups, defined as those with BMI less than 20, were excluded from the analysis. The study population was also analyzed as a whole using paired-sample, two-tailed *t*-tests of the means to determine whether the presence of morbid obesity was associated with a significant ($p < 0.5$) difference in LOS and hospital charges.

Results

Overall values for the groups are presented in Table 1. We rounded the LOS data to two significant digits and the charge data to the nearest unit of ten. Results indicate statistically significant differences between the morbidly obese (BMI greater than 40) and non–morbidly obese (BMI greater than 20 but less than 40) patient groups, with the morbidly obese exhibiting prolonged LOS and incurring higher hospital charges than the comparison cohort.

Discussion and Conclusion

The focus of this effort was to determine whether claims data could support the hypothesis that morbid obesity, when noted by the attending physician in the absence of documentation of specific interventions or complications related to its presence, could meet the ICD-10-CM coding guideline definition of a secondary diagnosis. We believe that demonstrating a statistically significant difference in hospital LOS and hospital charges between patients with and without morbid obesity (as defined by BMI

criteria) supports this contention within our institution. Several works have explored the impact of obesity on hospital metrics in a more general fashion, and are helpful in laying the groundwork to consider that the presence of morbid obesity in and of itself has a deleterious effect in a wide variety of patient populations.[3–6] However, these studies do not link their individual definitions of morbid obesity to the specific criterion (BMI greater than 40) required by the coding guidelines to support documented morbid obesity as a secondary diagnosis.[7] With a focus on assessing the impact of morbid obesity defined in accordance with the established BMI criterion and the accepted definition of the secondary diagnosis, we propose that this model may be applicable in efforts to validate the presence of other secondary diagnoses.

Endotracheal Intubation for Airway Protection: When Should It Be Considered a Complication or Comorbidity?

Background and Objective

Coding systems rely on documentation of complications or comorbidities (CCs) and major complications or comorbidities (MCCs) to best reflect the patient's severity of illness and needs for care. CCs and MCCs are critical for coding accuracy, quality measures, and appropriate hospital payment. An extensive list of current MCCs and CCs is issued each year by the ICD-10 Coordination and Maintenance Committee of the Centers for Medicare and Medicaid Services (CMS) and the Centers for Disease Control and Prevention. However, some clinical conditions and scenarios are thought by providers to clinically complicate patient care but are not reflected in the MCC/CC list. The purpose of this brief study was to explore a methodology to evaluate this situation, using endotracheal intubation (ETI) for airway protection as the clinical scenario of interest and both LOS and hospital charges as the outcome measures.

Method

Initially, we identified three Medicare Severity Diagnosis Related Group (MS-DRG) dyads for study. A clinician chose these MS-DRG pairs to represent conditions in which endotracheal intubation was most likely performed for airway protection and not for the management of acute respiratory failure. These dyads were as follows:

DRG 100 Seizures with MCC
DRG 101 Seizures without MCC

DRG 896 Alcohol/Drug Abuse or Dependence, without Rehabilitation Therapy, with MCC
DRG 897 Alcohol/Drug Abuse or Dependence, without Rehabilitation Therapy, without MCC

DRG 917 Poisoning and Toxic Effects of Drugs with MCC
DRG 918 Poisoning and Toxic Effects of Drugs without MCC

We reviewed a convenience sample consisting of 12 months' worth of patient data. Cases were assessed using claims data for DRG assignment, presence of endotracheal intubation, LOS, and hospital charges. The DRG 100-101 dyad had a total of 157 cases (44 with ETI, 113 without ETI); the DRG 896-897 dyad had 130 cases (9 with ETI, 211 without ETI); and the DRG 917-918 dyad had 192 cases (77 with ETI, 115 without ETI). Results are noted in Table 2.

Results

An initial review of the data suggested an interesting trend. Although LOS did not seem to be significantly affected by the presence or absence of ETI for airway protection, there appeared to be a nonsignificant but noteworthy difference between intubated and nonintubated patients in DRG groups without MCC assignment. Evaluating this trend further, we compared the average charges per day for those patients within a DRG group who were and were not intubated, as well as the additional charges per day between the intubated and nonintubated groups. Simple calculations using the previously noted

number of patients in each group revealed that the mean additional charges for the intubated patients within the three collective dyads were $2,268.00 per day.

Discussion and Conclusion

Clinically, it appears that if a patient has a notable MCC, the presence or absence of ETI makes no difference in the LOS or overall charges, because the care of the patient is mostly driven by the need to address the MCC. However, in patients without other significant underlying or acute medical conditions, ETI for airway protection is associated with increased short-term needs for increased nursing care and/or monitoring, as evidenced by increased hospital charges. However, given the usually transitory nature of conditions requiring intubation for airway protection, those needs may quickly resolve, and these patients' LOS would therefore be similar to that of patients treated with simple observation and supportive care. This interpretation suggests that ETI for airway protection may meet the criteria to be considered a CC but that its impact on patient care is not of the magnitude necessary for it to be considered a MCC.

The primary caveat is the small number of cases examined in this study. Although the data were sufficient for the calculation of descriptive statistics, they lacked the volume needed for definitive analysis. Despite this limitation, we believe that analysis of this type offers a potential methodology by which clinical conditions may be assessed for consideration as a secondary diagnosis and as a CC. Studies such as these may support requests to the ICD-10 Coordination and Maintenance Committee to consider select clinical conditions such as ETI for airway protection to be included in the CC list.

Sepsis-2 or Sepsis-3? Impacts of Clinical Definitions

Background and Objective

The science of diagnostic medicine is fluid, and definitions of clinical diagnoses and syndromes change over time. CDI specialists are ideally poised to help hospitals evaluate the potential impact of these shifts on measures of revenue and quality. The recent publication of new definitions for sepsis (known as Sepsis-3) have been a subject of considerable clinical controversy.[8–11] We explored a model to assess the potential magnitude of a change from the use of the current Sepsis-2 criteria to the use of the Sepsis-3 criteria at our institution.

Method

We reviewed a convenience sample of 200 patients with admission dates between July 1 and August 10, 2016, whose cases included MS-DRG 870, 871, or 872. (These DRG groups represent septicemia or severe sepsis, with and without mechanical ventilation for more than 96 hours, with or without a major comorbid or complicating condition.) Charts were reviewed for the coded principal diagnosis (sepsis, severe sepsis, or septic shock) and for compliance with Sepsis-2 and Sepsis-3 criteria. Mortality rates for both groups were detailed, as were the potential change in DRG assignment and the result of that change on revenue for cases falling within the Sepsis-2 criteria but not meeting the definitions of Sepsis-3.

Results

All cases initially met the Sepsis-2 criteria for the diagnosis of sepsis and were coded as such. Using Sepsis-3 criteria, only 70 records (35 percent of the total) would qualify as sepsis. The mortality rate in the overall cohort was 12 percent; patients who met the Sepsis-3 criteria had a mortality rate of 28.6 percent (2×2 contingency table with Fisher's exact test; $p = .011$).

We then looked at the 130 cases that would no longer be classified as sepsis under the Sepsis-3 criteria, and we assigned them a revised DRG based on the underlying source of the patient's septic state. This revised DRG would reflect the assignment after sepsis has been removed as the principal diagnosis and the case has been recoded according to standard coding rules. Assuming a MS-DRG base rate of $5,100 at a relative weight of 1.0, these changes were estimated to result in a potential decrease in overall revenue of $220,240 (mean $1,694.15 per case) from the sampled population.

Discussion and Conclusion

The fiscal implications of a shift from the Sepsis-2 criteria to the Sepsis-3 criteria as the institutional standard for the definition of sepsis are clear. CMS has expressed solid support for the continued use of Sepsis-2 criteria on clinical grounds.[12] However, many private payers have switched to using a Sepsis-3 definition of the condition. While the decision may be based in part on clinical grounds, there is no mistaking that using the Sepsis-3 criteria also severely limits the number of cases that would need to be reimbursed at the higher levels. This action may put hospitals in the unenviable position of treating a patient with a life-threatening condition without the possibility of appropriate reimbursement. These losses would be especially pronounced in hospitals featuring large numbers of patients funded by governmental sources, which are currently willing to reimburse hospitals for cases classified within the appropriate DRGs based on the clinician's use of Sepsis-2. In smaller hospitals and those with meager reserves, a shift to Sepsis-3 may significantly affect overall hospital operations and negatively affect the care of all patients, not just those with sepsis.

Our data also suggest that a shift to Sepsis-3 criteria would raise mortality rates from sepsis within an institution, and the increased mortality would be negatively reflected in measures of care. Although the value of overtriage of septic patients is beyond the scope of this work, we believe that our analyses of measures of quality and revenue support, coupled with the risks of potentially delayed diagnosis and heightened mortality, support the continued use of Sepsis-2 as the preferred method of defining sepsis. In a larger sense, this test model gives CDI professionals an additional means to contribute to the discussion of clinical and institutional definitions.

Cross-Cutting Issues: The Impact of CDI on LOS

Background and Objective

As CDI programs advance, they inevitably stray into other areas of work. The expansion of CDI research and analytics must be synergistic with the efforts of others to avoid "turf wars" and to demonstrate broad value to the CDI effort as a whole. An example of this synergy can be seen in a model defining the contribution of CDI to efforts by the hospital's utilization management and hospitalist group to decrease LOS.

Preventing excessive inpatient stays is a primary function of utilization management programs. Excessive stays are determined through comparison of the patient's actual LOS with the target geometric mean length of stay (GMLOS) suggested for the patient's working diagnosis within the MS-DRG system. Because the DRG assignment is driven by the documentation provided by the attending physician listed within the medical record, we were asked to determine what role CDI could play in decreasing LOS. We developed a model to determine the potential contribution of enhanced documentation in decreasing excessive inpatient days on the medicine service line using a peer comparison tool, the Advisory Board's Revenue Optimization Compass (ROC).

Method

The initial effort encompassed the internal use of claims data to determine the top DRGs among adult patients by lost days over the target GMLOS suggested for the DRG. DRGs associated with the top 50 percent of lost days were identified. Of the 46 DRGs that were designated, 12 surgical and 3 obstetric DRGs were excluded from analysis. A further 17 DRGs had already reached the level at which further documentation would not change the DRG assignment.

Results

The remaining 16 DRGs were analyzed in a two-step fashion. First, the ROC tool was used to identify differences in the proportion of patients assigned within the studied DRG group and an associated DRG linked to a higher relative weight and GMLOS that might be assigned with additional documentation. (For example, we compared DRG 194, Simple Pneumonia with CC, relative weight 0.9468, GMLOS 3.6 days, to DRG 193, Simple Pneumonia with MCC, relative weight 1.386, GMLOS 4.6 days.) The difference was then multiplied by the number of patients in the studied DRG group to estimate how many patients could be reassigned to the higher-weighted associated DRG.

The second step consisted of taking the estimated number of patients that could be reassigned to the higher-weighted DRG group and multiplying that number by the difference in GMLOS between the studied DRG and the according higher-weighted DRG. This calculation provided an estimate of the lost days that could be recovered through enhanced documentation leading to a DRG change. This estimate was then divided by the total number of lost days for the studied DRG to determine the overall proportion of days recoverable from enhanced documentation. The overall proportion of days saved was 9.6 percent. Results are summarized in Table 3.

Discussion and Conclusion

Physician documentation remains the foundation for coding, billing, quality measures, and utilization management, and strong CDI efforts promote the most accurate reflections of the patient's severity of illness and needs for care. However, caution must be exercised when attempting to estimate the degree to which CDI alone can resolve issues within other spheres of healthcare. In this instance, note that the CDI effort does not affect the actual LOS; rather, it suggests a potential DRG associated with a GMLOS that captures days that would be considered excessive for a patient with a lower-weighted DRG. Other causes of excessive LOS, including patients with multiple complex illnesses or injuries not reflected by a single CC or MCC, socioeconomic factors, and lack of resources for hospital care, community placement, and transfer are major factors that can prolong LOS within the studied group.

This work suggests that CDI plays a small role in the resolution of problems of excessive LOS. However, it establishes a methodology by which the impact of CDI efforts on LOS might be assessed and measured.

Conclusions

The examples outlined in this paper represent possibilities for the expansion of CDI efforts in research and analytics. Given the challenges that traditional CDI programs face as a result of advances in technology and changes in physician culture, new approaches will be needed to continually demonstrate the value of CDI programs. The examples in this paper may serve as small-scale models of areas in which CDI professionals may offer services that add value to their institutions.

Studies such as these can be used to evaluate the coding, quality, and fiscal impacts of a wide range of physiologic, mental health, and socioeconomic factors. These methods may be used to supplement clinical insight and support local practices and policies for coding. Importantly, these claims-based studies can be performed by community hospitals and healthcare centers using their own claims data and simple statistical tools widely available to the coding and CDI community. Similar studies may be used to develop and validate consistent institutional definitions of clinical scenarios or to offer objective rebuttals to denials of payment. Such efforts may be even more powerful when linked to other measures, such as those assessing the intensity of nursing care. Collaborations between institutions' CDI programs could also be valuable to address questions that might benefit from the use of larger population datasets.

Overall, engaging in research and data analytics provides additional avenues for CDI to have an impact. These types of projects open new avenues for work, offer new opportunities for provider education, and enhance the ability of CDI departments to demonstrate value to the institution as a whole.

Howard Rodenberg, MD, MPH, CCDS, is a physician advisor at Baptist Health in Jacksonville, FL.

Lynn Shay is a manager of clinical quality analytics at Baptist Health in Jacksonville, FL.

Karen Sheffield is a clinical quality data analyst at Baptist Health in Jacksonville, FL.

Yojanna Dange, MD, is an assistant physician advisor at Baptist Health in Jacksonville, FL.

Notes

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Table 1

Analysis of Overall Means, Length of Stay, and Charges

Means	BMI between 20 and 40 (*n* = 13, 049)	BMI above 40 (n = 2,215)	*p*
Mean length of stay (days)	3.87	4.04	.031
Mean hospital charges (dollars)	$35,580	$37,610	.0069

Abbreviation: BMI, body mass index.

Table 2

Comparison of Average Length of Stay and Hospital Charges in Patients Intubated for Airway Protection

MS-DRG	Average LOS			Charges		
	Without ETI	**With ETI**	***p***	**Without ETI**	**With ETI**	***p***
100 Seizures with MCC	8.3 (38)	7.4 (33)	≥0.5	99,539 (38)	105,080 (33)	≥0.5
101 Seizures without MCC	3.1 (75)	4.0 (11)	≥0.5	33,119 (75)	56,939 (11)	≥0.5
896 Alcohol/Drug Abuse or Dependence, without Rehabilitation Therapy, with MCC	10.9 (21)	11.9 (7)	≥0.5	78,100 (21)	111,801 (21)	≥0.5
897 Alcohol/Drug Abuse or Dependence, without Rehabilitation Therapy, without MCC	5.7 (100)	2.5 (2)	≥0.5	32,190 (100)	43,481 (100)	≥0.5
917 Poisoning and Toxic Effects of Drugs with MCC	5.8 (71)	4.8 (73)	≥0.5	73,377 (71)	69,682 (71)	≥0.5
918 Poisoning and Toxic Effects of Drugs without MCC	2.9 (44)	3.0 (4)	≥0.5	28,646 (44)	38,145 (44)	≥0.5

Notes: Values in parentheses are the number of patients in each subgroup. No significant differences were noted in any comparisons.

Abbreviations: ETI, endotracheal intubation; LOS, length of stay; MCC, major complication or comorbidity; MS-DRG, Medicare Severity Diagnosis Related Group.

Table 3

Percentage of Days Saved by Peer-Optimized Clinical Documentation Improvement, per Diagnosis-Related Group (DRG)

DRG	DRG Name	Percentage of Days Save
392	Eso, Gast, and Misc Digest Dis w/out MCC	14.3
683	Renal Failure w/ CC	7.9
194	Simple Pneumonia w/ CC	6
812	Red Blood Cell Dis w/out MCC	14
872	Sepsis without MV > 96 hours w/out MCC	3.1
690	Kidney and UTI w/out MCC	0
603	Cellulitis w/out MCC	8.6
641	Misc Dis Nut, Met, Fluids, Lytes w/out MCC	8.4
92	Other Nerv Sys Dis w/ CC	5
378	GI Hemorrage with CC	23.4
638	Diabetes w/ CC	12.7
292	Heart Failure and Shock w/ CC	12.7
191	COPD w/ CC	9.5
309	Cardiac Arrythmias and Conduc Dis w/ CC	10.5
Total		9.6