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Relational aspects of regulating clinical work: examining electronic and in-person compliance mechanisms

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ABSTRACT

Background Clinical documentation quality is an important way to facilitate clinical communication, improve patient safety metrics and optimise hospital coding and public reporting. However, the monitoring of clinicians by external individuals (ie, those outside the profession or emanating from outside clinical teams) raises difficult questions relating to the autonomy of clinicians and an organisation's control over clinical work. Typically, documentation improvement initiatives have relied solely on electronic monitoring systems to vet clinician documentation. In such systems, quality personnel monitor clinical documentation and, on encountering potentially problematic content, use an electronic querying system to ask the clinicians to voluntarily clarify or modify the text if appropriate. Importantly, clinicians retain their professional autonomy and can choose to disagree with documentation requests. The current study empirically examines a clinical documentation improvement program which takes a different approach. This programme uses two modes of querying clinicians: (1) conventional electronic documentation clarification queries and (2) in-person verbal documentation clarification requests.

Methods We conducted regression analyses using archival documentation query data (n=19 650) from an American teaching hospital to compare the efficacy of conventional electronic documentation clarification queries and in-person verbal documentation clarification requests. Our dependent variable is the length of time between the documentation clarification request and the resolution of the query (ie, the time until a clinician responds).

Findings Our analyses demonstrate that in-person verbal documentation clarification requests are associated with a 30-hour reduction in the time it takes for a query to be resolved relative to electronic-only queries.

Practical implications The results suggest that while electronic regulatory systems might afford hospitals with opportunities to scale quality initiatives in a cost-effective manner, organisational efforts to influence clinical work may yet benefit from the human touch of in-person regulator–clinician interaction. Furthermore, the replacement of in-person compliance interactions with digital compliance requests can potentially produce negative compliance outcomes.

INTRODUCTION

Clinical documentation quality is central to both the administrative and patient care functions of modern hospitals. From an administrative perspective, accurate, effective and timely documentation practices can serve as a means for optimising the classification of patients into diagnosis-related groups, which are central to financial operations.[1] Similarly, from a quality perspective, accurately capturing the risk of mortality and severity of a patient's illness at the time of admission through the time of discharge can influence risk adjustment and, as a consequence, hospital ratings and rankings.[2] In terms of patient care, scholars argue that the standardisation, quality and timeliness of documentation can meaningfully affect patient care outcomes. For instance, poor discharge documentation can lead to issues in care provision at the time of readmission.[3]

While maintaining high-quality clinical documentation is important, the increasing digitalisation of clinical work and practices has placed two types of strain on documentation quality improvement efforts. First, an obvious consequence of the ubiquitous use of electronic medical records is the generation of a large volume of documentation that must be vetted by quality personnel.[4] Second, documentation work increasingly places a burden on already time-constrained clinicians, with a recent study estimating that clinicians spend upwards of a quarter of their time on documenting patient data.[5] In terms of documentation quality, time-constrained clinicians may be more likely to produce lower quality documentation and be sensitive to further encroachment of documentation tasks on their time.

Hospitals have approached the challenges posed by documentation quality issues through improvement initiatives that combine two key features: (1) creating internal regulatory agents (eg, clinical documentation nurse specialists) and (2) using electronic monitoring and querying systems. Internal regulatory agents, such as clinical documentation specialists (CDSs), are clinically trained nurses who may operate under the aegis of the quality vertical within hospitals. While CDSs have prior clinical experience, they do not necessarily have expertise in the clinical specialties of the doctors whose documentation they monitor. Hence, CDSs inhabit an intermediary role, lying between the professional in-group constituted by a given clinical team and the professional out-group of other quality personnel and hospital management. In the last decade, the clinical documentation role has emerged as a proto-profession and has led to the creation of a professional association and conference (see: Association of Clinical Documentation Integrity Specialists; ACDIS (www.acdis.org)).

In most American hospitals, including the setting used for this study, CDSs use electronic monitoring

and querying systems to enact their regulatory duties. Using the electronic documentation platform, CDSs review the patient notes of designated clinicians and clinical teams. When a clinical documentation nurse locates a potentially problematic documentation instance, they send a clarification request (an 'electronic query' in the parlance of the research setting) through the platform. On receiving notification of the query, a clinician can choose to either (a) agree with the CDS's assessment and amend the documentation (b) disagree with the CDS's assessment and end the query or (c) ignore the query altogether. Clinician participation in documentation quality improvement programmes is a requirement for most clinical centres within the hospital. However, clinicians retain their clinical judgement and CDSs cannot direct their actions in any way other than asking clarification questions. Finally, should a clinician choose to disagree with a documentation query, the query may be escalated to their physician advisor for further review and communication.

In addition to the electronic monitoring and querying system, the clinical documentation programme we studied decided to use a two-prong approach which supplements the traditional electronic querying method with a verbal in-person query. The intent of this process was to pair CDSs with teams in order to build relationships and develop a shared learning environment wherein the CDS can learn more about the patient population and disease processes and the clinician can learn more about documentation. Starting in 2010, the clinical documentation programme instituted a 'rounding model', wherein CDSs attended clinical rounds with their assigned teams. Typically, each CDS was assigned to two clinical teams and expected to attend two rounds with each clinical team per week. The intuition behind this approach was that increased contact between the regulatory nurses (i.e., the CDSs) and the regulated clinicians would facilitate collaborative relationships as well as shared communication and learning. During the course of these rounding interactions, nurses could follow-up on any documentation issues (ie, electronic queries that remain open) in the form of 'verbal documentation clarification requests' (ie, verbally asking the clinician to clarify documentation) or initiate new verbal queries. After their rounds, the CDS then notes the resolution of the documentation issue in the electronic query platform (if a resolution was achieved) and awaits provider documentation updates.

One of the goals of implementing this two-pronged approach was to increase the speed with which queries were resolved. Expeditious resolution of documentation queries is an important means of improving patient care outcomes, hospital quality metrics, and reimbursement processes.[6 7] Befitting its importance, the response times of the clinicians (i.e., the time between when a clinician receives a query and when they respond) are recorded by the electronic query platform and the hospital's leaders in charge of clinical documentation focus on the timeliness of responses as a key performance indicator. However, the CDS's role as an internal regulator is a relatively recent innovation and little is known about the relationship between electronic queries and in-person verbal queries and, importantly, their impact on the time taken to resolve documentation queries. In the current study, we provide an important extension of extant research by using archival query records to investigate the relationship between query medium (i.e., electronic vs. verbal) and clinician response times.

BACKGROUND

The American Health Information Management Association formally defines the purview of Clinical Documentation

Improvement (CDI) programmes as facilitating 'accurate representation of a patient's clinical status that translates into coded data. Coded data are then translated into quality reporting, physician report cards, reimbursement, public health data and disease tracking and trending' (https://www.ahima.org/education-events/education-by-topic/).

We examine the CDI programme of a large Midwestern teaching hospital, which has been in operation since 2006. The programme began with five nurses and a modest mission and has expanded in both staff—at the time period of the current study, the programme had approximately 20 nurses—and scope over time. The typical career path of a clinical documentation nurse specialist (CDS) involves extensive prior clinical experience and a mid-career move to documentation. Programme leadership suggests that the selection criteria for CDSs emphasise both clinical expertise as well as 'social skills,' which are needed to overcome clinician resistance. Additionally, during the time period of the study, the CDSs were overwhelmingly female with only one male nurse, which is consistent with the gendered nature of the nursing profession in general. Procedurally, CDSs review clinical notes and check these notes for opportunities to 'accurately assign a code' (https://acdis.org/articles/2019-update-guidelines-achieving-compliant-query-practice) and ensure that the clinical documentation supports the use of the code. National guidance supports varied reasons for querying. While the reason for a query may be multifactorial, it serves to support the overarching requirements set forth for the reporting of diagnoses under the Uniform Hospital Data Discharge Set. Other reasons to query include but are not limited to, a need to clarify conflicting documentation, establish a cause-and-effect relationship, establish acuity or greater specificity of a condition. If they find any potential discrepancy, CDSs send requests (ie, 'queries' in the system parlance) to clinicians, objectively noting the current documentation and clinical indicators in the patient's medical record that may require further clarification or modification. In the final stage of this process, coders scour clinician notes in a literal fashion, aided by the natural language process tools, to check whether notes contain language that meet the criteria (i.e., coding rules) of reporting diagnosis categories.

As noted above, CDSs also accompany some clinical teams on their teaching rounds with interns and residents. There are three main aims for this CDS rounding. First, observing rounds can provide CDSs with an immersive understanding of the communicative and clinical norms and conventions of a particular group. Second, clinicians are often time constrained and unreceptive to electronic entreaties to clarify documentation particulars. As a result, the CDI leaders theorise that an in-person request to clarify outstanding queries (i.e., a 'verbal documentation clarification request') could facilitate a quick resolution of multiple queries. Third, CDI leaders and nurses believe that, in some instances, clinicians are more likely to respond to queries from a CDS nurse with whom they have an existing personal relationship.

While the CDI leaders initiated the rounding programme based on the intuition that face-to-face interactions between CDSs and clinical teams would establish trust within the relationships and facilitate compliance, it is important to note that such in-person CDI efforts are not the norm within the clinical documentation field. In fact, hospitals typically seek to restrict documentation and coding functions to electronic mediums. Yet the lay theory of CDI managers is borne out by regulatory research. Prior scholarship suggests that repeated interactions between regulators and regulated professionals can demonstrate and create trust.[8] Furthermore, regulators who develop

collaborative relationships with regulated professionals can achieve greater physical and temporal proximity to activities of interest.[9] In-person interactions can also help overcome a central difficulty of regulating professional work: communicating the ways in which abstract regulatory rules and categories apply to the particularities of complex professional work. Rochlin[10] suggests that expert compliance is hard to translate to clear and convenient abstractions and so regulators and the regulated must instead grapple with the 'interactions, myths, rituals of social structure' that constitute everyday work. In such scenarios, face-to-face communication can be advantageous as it provides information richness,[11] allows for complex information (of sequence and experience) to be encoded pithily as stories and anecdotes,[12] and provides regulatory agents with opportunities for impression management.

We focus on understanding the extent to which in-person verbal clarification requests are associated with decreases in the time taken to resolve a documentation query (i.e., the time between when a query is sent to a clinician and when the clinician responds). Decreases in the time taken to resolve documentation queries are an important means of assessing the overall quality of clinical record management. Importantly, the expeditious and accurate updating of clinician documentation can facilitate improvements in patient care. For instance, past research suggests that improvements in the documentation associated with the discharging of patients are associated with a reduction in medication errors.[13] Similarly, issues in documentation can be particularly important when patients move across levels of healthcare, such as when patients are discharged or moved from an in-patient to an out-patient setting.[14] From a health administration perspective, the time taken to resolve a documentation query serves as a useful measure of the voluntary compliance of clinicians to hospital quality initiatives, and the efficient updating of clinical documentation can assist hospitals in optimising and expediting billing processes.[6] Finally, clinical documentation, coding and billing processes proceed in a sequential manner, and inaccuracies in documentation can produce significant delays that can hold up the documentation processing pipeline.

The focus of this study is, therefore, to understand whether and to what extent clinicians' response times to clinical documentation queries are faster when the relatively commonplace electronic querying approach is coupled with in-person verbal documentation clarification requests. Our hypothesis is formally stated as follows:

> Hypothesis H1: Clinician response times to clinical documentation queries will decrease for queries which are issued verbally and in-person, relative to those responded to solely through the electronic system.

METHODS

We examine a longitudinal data set of archival query responses containing 25 458 CDI electronic queries sent over a 51-month period at our field site. We filtered out incomplete records to obtain a final subset of 19 650 queries for our analysis (Further details on the methods to determine the final sample are available upon request.). We used ordinary least squares (OLS) regression models to examine the effect of query mode (i.e., solely electronic vs in-person verbal documentation clarification) on query resolution times. The query response data set includes variables capturing the following details about each query: (1) resolution time in hours (dependent variable), (2) query date (control variable), (3) query author (control variable), (4) date of patient admittance to hospital (used to generate control variable), (5)

Table 1 Summary statistics for key variables (N=19 650)

Panel A: sample composition

	Count	% of sample
Query resolution type		
Electronic query only	18 022	92
Verbal clarification request	1628	8
Query year		
2014	1853	9
2015	4371	22
2016	6210	32
2017	6269	32
2018	947	5

Panel B: means and inter-quartile ranges (IQRs)

	Mean	IQR
Resolution time (hours)	26	5–93
Length of stay at time of query (days)	5	2–10

query impact (in terms of billing categories affected; control variable) (further details provided in online supplemental appendix 1), (6) location of the clinician in the hospital (control variable), (7) financial class of patient (control variable) and (8) query template (pre-existing templates for common queries; control variable) (further details provided in online supplemental appendix 2). In the context of the dependent variable, it is important to note that, at this organisation, response time is measured as the time taken between a query being sent by the CDS to a clinician, and the clinician altering the record with the clarifying documentation or replying to the CDS that the current documentation was accurate as is.

Using this data set, we generated four additional control measures. First, we control for the patient's length of stay in the hospital at time of the query to control for variance related to the point in time in the patient care process at which the query request is sent. Next, we control for the day of the week and the month of the query to account for temporal variations in work within the hospital. For instance, new residents join the hospital every July, which can lead to delays in responses to queries. Finally, we include fixed effects indicator variables for each unique pairing of CDS and clinician. This controls for any time-invariant differences across pairs of clinicians and CDSs, such as those that may arise due to differences in the relationship histories between the regulatory agent and the regulated professional.

Table 1 provides summary statistics for our data set. Panel A shows the sample composition: in our sample, 92% of queries are electronic only, while for the remaining 8%, CDSs perform an in-person verbal clarification request. Panel A also indicates that the majority of queries in the data set occurred between 2015 and 2017. Panel B shows the mean and inter-quartile range (IQR) for the dependent variable—resolution time—and the patient's average length of stay at the time of query. On average, clinicians respond to queries in 26 hours, though this ranges from 5 hours to over 90 hours. Typically, the queries occur 5 days after the patient is admitted.

FINDINGS

The results of our regression analyses are provided in table 2. We test our hypothesis using four different regression models to unpack the influence of different independent and control variables on compliance outcomes, namely, the number

Table 2 Regression results—effect of verbal clarification request on time to resolution

Dependent variable: resolution time (hours)	(1)	(2)	(3)	(4)
Verbal clarification request	−56.615*** (2.676)	−49.285*** (2.754)	−37.189*** (2.687)	−30.331*** (3.045)
Length of stay at time of query	0.288*** (0.051)	0.265*** (0.053)	0.140*** (0.051)	0.078 (0.055)
Primary query impact				
Principal diagnosis		8.362 (12.374)	22.265* (11.816)	30.277** (13.986)
CC		4.006 (12.291)	18.181 (11.729)	28.102** (13.878)
MCC		6.976 (12.277)	21.971* (11.712)	30.471** (13.848)
POA or HAC		20.430 (12.683)	16.735 (12.099)	26.215* (14.234)
ROM		18.296 (14.311)	16.993 (13.568)	28.508* (15.543)
SOI		7.327 (12.688)	17.558 (12.085)	24.485* (14.190)
I10 concept		5.084 (30.456)	23.710 (28.190)	47.155 (30.049)
Procedure		47.999*** (14.126)	44.228*** (13.922)	2.981 (18.289)
None		32.943*** (12.468)	33.758*** (11.904)	41.794*** (14.095)
Other		−4.466 (12.508)	11.801 (11.993)	26.198* (14.192)
Unassigned		18.012 (12.523)	26.766** (11.969)	32.554** (14.210)
Constant	72.142*** (0.885)	80.034 (108.158)	152.598 (137.219)	173.965 (175.984)
Fixed effects				
Financial class	No	Yes	Yes	Yes
Location	No	Yes	Yes	Yes
Query template	No	Yes	Yes	Yes
Query day, month and year	No	No	Yes	Yes
Query CDS	No	No	Yes	Yes
Queried clinician	No	No	Yes	Yes
CDS—clinician pair	No	No	No	Yes
Observations	19650	19650	19650	19650
R^2	0.025	0.083	0.357	0.636
F-statistic	247.241*** (df=2;19647)	14.929*** (df=118; 19531)	5.543*** (df=1792;17857)	2.947*** (df=7310;12339)

Robust SEs are in parentheses; *p<0.1; **p<0.05; ***p<0.01.
CC, complication or comorbidity; CDS, clinical documentation specialist; HAC, hospital acquired condition; MC, major complication or comorbidity; POA, present on admission; ROM, risk of mortality; SOI, severity of illness.

of hours taken to resolve a documentation query. All four models support hypothesis H1: we find that in-person verbal documentation clarification requests are associated with a significant decrease in the resolution time for documentation queries. The estimates in model 4, which is the most complete specification, suggest that verbal documentation clarification requests are associated with a clinician response that is 30 hours faster than for queries that are solely electronic. Of particular interest is the fact that the addition of CDS–clinician pair fixed effects (in model 4) leads to a significant increase in the R^2 value (model 3 (0.357) to model 4 (0.636)). The increased model fit suggests that the interpersonal relationship between CDSs and clinicians is key to understanding how compliance outcomes are achieved. The analyses also reveal interesting patterns with respect to the control variables. We find that, in three of the models, the longer the patient has been in the hospital before a query is made, the longer the response time.

DISCUSSION

Establishing an evidentiary basis for in-person regulatory interactions

Accurate clinical documentation is widely considered to be a key means of implementing quality improvement programmes in hospitals. However, a variety of organisational factors can impede the quality of documentation such as, the tension between time spent by physicians on documentation and time spent on clinical care and the lack of incentives for physicians to focus on documentation accuracy.[15] As a result, the

digitalisation of medical records has been accompanied by the adoption of electronic governance and compliance systems, which seek to redress organisational inefficiencies.[16] From the perspective of hospital leaders, electronic compliance systems can be advantageous in terms of costs and scalability.

In contrast to the increasing proliferation of electronic compliance systems, organisational scholarship suggests that the interpersonal relationships and in-person interactions between the regulator and the regulated professional can be key to achieving positive compliance outcomes, particularly in complex knowledge work settings.[17–19] Under an electronic compliance system scheme, the regulator (in the current case, the CDS) and the regulated professional (in the current case, the clinicians) engage in limited face-to-face interactions. This can be problematic since, as prior research has shown, these interactions can be a key conduit for professionals to transmit, translate and interpret complex aspects of their day-to-day work.[20 21] Yet, while it is relatively straightforward to measure the cost and scale benefits provided by electronic compliance systems, the benefits of in-person regulatory interactions can be harder to establish empirically. Hence, the increasing utilisation of electronic-only compliance systems despite prior research emphasising the importance of in-person compliance interactions raises an important question: *what are the benefits of in-person compliance-related interactions in addition to electronic-only compliance systems?* In our setting, we find that in-person resolution of compliance requests is associated with a 30-hour reduction in resolution time (in comparison to electronic-only resolution).

Regulatory relationships as a key driver of compliance outcomes

Our study advances extant knowledge on the effectiveness of electronic and in-person compliance efforts by empirically illustrating the importance of face-to-face interactions in achieving expeditious resolution of compliance requests. However, beyond simple interactions, our analysis also emphasises the importance of *regulatory relationships*. In particular, the influential role played by the CDS–clinician pair fixed effect in our regression analysis suggests that the compliance outcomes cannot solely be explained in structural terms. Put differently, the results suggest that the benefits of in-person verbal documentation clarification practices emanate not solely due to the interpersonal interaction between any given CDS and clinician. Instead, our findings suggest that the dyadic relationships between *particular* CDSs and clinicians are key to understanding how quality improvements are achieved. What might explain this relationship effect? Recent qualitative research[22] suggests CDSs skillfully translate compliance needs into professional terms, allowing them to nudge and educate clinicians into compliance and to build lasting regulatory relationships. Past organisational research suggests that relational ties can help intraorganisational interactions persist in the face of personnel turnover and organisational change.[23] Our findings provide further evidence, using quantitative data, of the theorised importance of the relationships between regulatory CDSs and regulated professionals.

Finally, in online supplemental appendix 3, we detail emergent evidence from a community hospital, which is an affiliate organisation of our focal research hospital, which suggests that in-person interactions can also meaningfully alter the behaviours of CDSs. The data from the community hospital spans a 2-year period and captures the initiation of CDS rounding through a pilot programme, the launch of a full rounding programme and two disruptions to the rounding service due to COVID-19 surges. It is important to note that this regional hospital does not have formal teaching rounds, however, in-person interaction rounding was established throughout the organisation in partnership between hospital, physician and clinical documentation leaders. Across this time period, we can observe that the initiation and continuation of rounding are associated with increases in the query rate of CDSs, and conversely, disruptions to the rounding programme are associated with a drop-off in query rates. The observed relationship between rounding and query rates illustrated in online supplemental appendix 3 is counterintuitive, as rounding is a time-intensive process, and it reduces the amount of time available to nurses for monitoring documentation and sending queries. Anecdotally, members of the clinical documentation management team hypothesise that rounding interactions are potentially increasing the comfort level of CDSs in encroaching on the work of clinicians with their queries, and that the converse happens during periods where rounding stops.

Taken together, our findings of improved compliance outcomes through regulatory interactions and relationships suggest a potential process model to explain the compliance behaviours of clinicians. In-person interactions allow regulatory agents (e.g., CDSs) to quickly and effectively translate complex compliance needs to busy professionals. Over time, such interactions facilitate the development of regulatory relationships that produce positive feedback effects in terms of future regulatory interactions.

Implications for practice and future research

The findings of our study have practical implications for clinical quality initiatives and hospital administration. For documentation quality improvement programmes, our research suggests that the scalability and cost benefits of electronic compliance systems can sometimes concomitantly produce inaccuracies in documentation that are not resolved in a timely manner, due to the reduced possibilities for the development and engagement of face-to-face regulatory relationships.[18 24] Such inefficiencies in detecting and resolving clinical documentation issues can contribute to significant delays in multiple organisational workflows, for example, clinical coding and billing. Consequently, quality improvement initiative administrators will need to critically evaluate the degree and pace at which they digitalise their compliance and quality processes. Conversely, in-person regulatory interactions are costlier and necessitate the organisation and deployment of CDSs, which may not be feasible for financially vulnerable organisations. Hence, healthcare administrators and managers will have to conduct cost-benefit analyses, which take into consideration factors such as the availability of resources and the organisational value of the enhanced compliance outcomes achieved by in-person regulatory agents to determine optimal compliance mechanisms. Furthermore, our study represents an instantiation of a problem faced by many clinical organisations: how can the organisation elicit voluntary compliance from autonomous professionals (e.g., clinicians)? Our study reinforces the insights of recent organisational scholarship,[18 19] which suggest that interprofessional interactions and relationships can be harnessed by organisations to achieve their compliance goals.

Future research can advance our knowledge of how patterns of clinical work practices influence the suitability of electronic and in-person compliance interactions. For instance, it is conceivable that in work settings, where clinicians are rushed for time or in teams with frequent turnover, electronic compliance systems might be preferred by both the regulatory agents and regulated clinical professionals. Ethnographic and longitudinal research can help establish clearer understandings of how clinical patterns of work interact with regulatory processes. In particular, further examination of the tactics and practices of successful clinician-regulatory agent pairings might be a fruitful avenue for future research.

Limitations

There are a number of features of our research site that are notable. First, the documentation quality programme at the hospital under study falls under the quality vertical, whereas other hospitals often place documentation programmes under the finance vertical. As a consequence, CDSs at the field site are not incentivised to optimise documentation from the perspective of organisational financial outcomes and instead solely focus on avenues of quality improvement. Second, the academic hospital that serves as the site for our study is a financially stable organisation. Consequently, hospital leaders can allocate resources, such as dedicated CDSs, for quality improvement programmes. Such organisational affordances may not be available to financially vulnerable organisations and limit the generalisability of our findings. Third, due to the confidentiality of patient records, we do not analyse the content of documentation requests, which could be an additional source of insight. For instance, the content of electronic medical records (EMRs), which elicit documentation queries, could be analysed to increase our understanding of problematic linguistic and interprofessional communication

features of clinician notes that inhibit documentation quality and accuracy. Lastly, our study was conducted at a teaching hospital, where teaching rounds are a routine practice. This provided opportunities for CDSs to interact with clinicians on a regular basis. In other settings that do not have regular teaching rounds, creating opportunities for interpersonal interaction may be more difficult,

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Supplemental material

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Appendix 1: Primary Query Impact (N = 19,650)

	Count	% of sample
MCC	6,071	31
CC	4,543	23
Principal Diagnosis	2,444	12
None	1,566	8
Other	1,521	7.7
Unassigned	1,246	6,3
POA or HAC	892	4.5
SOI	888	4.5
Procedure	213	1.1
ROM	183	0.9
APR DRG	70	0.4
I10 Concept	13	< 0.1

Primary Query Impact Categories:

- Major Complications and Comorbidities (MCC)
- Complications and Comorbidities (CC)
- Principal Diagnosis – the condition, after study, which caused the admission to the hospital
- Present on Admission (POA)
- Hospital Acquired Conditions (HAC)
- Severity of Illness (SOI)
- Procedure - performed for definitive treatment rather than diagnostic or exploratory purposes or as a procedure necessitated by a complication.
- Risk of Mortality (ROM)
- All Patients Refined Diagnosis Related Groups (APR DRG) - Reference Group
- ICD10 coding system for disease and mortality documentation, developed by WHO (ICD10Concept)
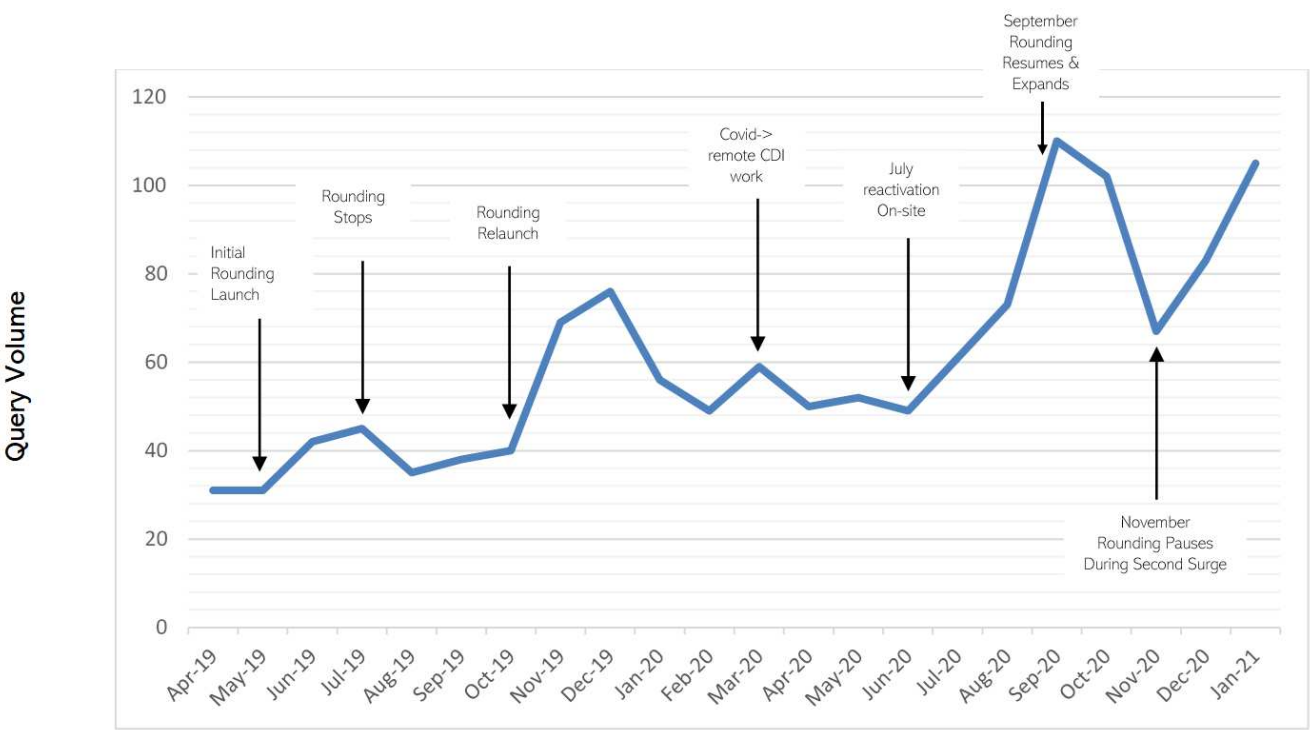
Supplemental material

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BMJ Leader

Appendix 2: Query Template Summary

To expedite the documentation query process, CDI nurses adapt and deploy pre-generated query templates associated with different types of queries. Hence, the query template variable allows us to capture the content of the compliance request.

Characteristic	N = 19,650[1]
Query Template	
Clarification of Clinical Findings	17,107 (87)
Heart Failure Specificity	364 (1.9)
Malnutrition - Specificity of type	345 (1.8)
Documentation Clarification	294 (1.5)
Anemia Specificity	198 (1.0)
Chronic Kidney Disease Specificity	171 (0.9)
Pressure Ulcer Specificity	157 (0.8)
Clarification of Diagnostic Findings	110 (0.6)
Nutritional Clarification	102 (0.5)
Pneumonia Specificity	97 (0.5)
Clinical Validity	89 (0.5)
Debridement Specificity	86 (0.4)
Cause and Effect Relationship	76 (0.4)
Pancytopenia Specificity	61 (0.3)
POA Diagnosis Clarification	55 (0.3)
Clinical Significance	48 (0.2)
Respiratory Failure Specificity	46 (0.2)
Rule Out Sepsis Clarification	40 (0.2)
Acuity Specificity	19 (<0.1)
Acute Kidney Failure	19 (<0.1)
Abbreviation Clarification	17 (<0.1)
Underlying Cause of SIRS Clarification	17 (<0.1)
Altered Mental Status Clarification	16 (<0.1)
Underlying Cause of Symptom Clarification	15 (<0.1)
Diabetes Mellitus Specificity	11 (<0.1)
Urosepsis Clarification	11 (<0.1)
Shock Specificity	9 (<0.1)
Condition Necessitating Admission	8 (<0.1)
Conflicting Documentation Clarification	8 (<0.1)
Medication - Correlation for Diagnosis	7 (<0.1)
Clarification of Clinical Diagnostic Findings Abbreviated	6 (<0.1)
Encephalopathy Specificity	6 (<0.1)
Bacteremia Clarification	5 (<0.1)
Fracture Specificity	5 (<0.1)
Procedural clarification	5 (<0.1)
Rule Out Condition Clarification	5 (<0.1)
Depression specificity	2 (<0.1)
HIV Clarification	2 (<0.1)
Postoperative Relationship Clarification	2 (<0.1)
Pulmonary Embolism Specificity	2 (<0.1)
Skin Ulcer Specificity	2 (<0.1)
Atrial fibrillation specificity	1 (<0.1)
Clinical Validity Abbreviated	1 (<0.1)
DVT Specificity	1 (<0.1)
Kidney Failure Specificity	1 (<0.1)
Myocardial Infarction Specificity	1 (<0.1)

[1]Statistics presented: n (%)

2

Appendix 3: Rounding & Query Volume at a Community Hospital

Appendix 1: Primary Query Impact (N = 19,650)

	Count	**% of sample**
MCC	6,071	31
CC	4,543	23
Principal Diagnosis	2,444	12
None	1,566	8
Other	1,521	7.7
Unassigned	1,246	6,3
POA or HAC	892	4.5
SOI	888	4.5
Procedure	213	1.1
ROM	183	0.9
APR DRG	70	0.4
I10 Concept	13	< 0.1

Primary Query Impact Categories:

- Major Complications and Comorbidities (MCC)
- Complications and Comorbidities (CC)
- Principal Diagnosis – the condition, after study, which caused the admission to the hospital
- Present on Admission (POA)
- Hospital Acquired Conditions (HAC)
- Severity of Illness (SOI)
- Procedure - performed for definitive treatment rather than diagnostic or exploratory purposes or as a procedure necessitated by a complication.
- Risk of Mortality (ROM)
- All Patients Refined Diagnosis Related Groups (APR DRG) - Reference Group
- ICD10 coding system for disease and mortality documentation, developed by WHO (ICD10Concept)

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[1]Statistics presented: n (%)

2

Appendix 3: Rounding & Query Volume at a Community Hospital