A Qualitative Analysis Evaluating The Purposes And Practices Of Clinical Documentation

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Summary

Objectives: An important challenge for biomedical informatics researchers is determining the best approach for healthcare providers to use when generating clinical notes in settings where electronic health record (EHR) systems are used. The goal of this qualitative study was to explore healthcare providers' and administrators' perceptions about the purpose of clinical documentation and their own documentation practices.

Methods: We conducted seven focus groups with a total of 46 subjects composed of healthcare providers and administrators to collect knowledge, perceptions and beliefs about documentation from those who generate and review notes, respectively. Data were analyzed using inductive analysis to probe and classify impressions collected from focus group subjects.

Results: We observed that both healthcare providers and administrators believe that documentation serves five primary domains: clinical, administrative, legal, research, education. These purposes are tied closely to the nature of the clinical note as a document shared by multiple stakeholders, which can be a source of tension for all parties who must use the note. Most providers reported using a combination of methods to complete their notes in a timely fashion without compromising patient care. While all administrators reported relying on computer-based documentation tools to review notes, they expressed a desire for a more efficient method of extracting relevant data.

Conclusions: Although clinical documentation has utility, and is valued highly by its users, the development and successful adoption of a clinical documentation tool largely depends on its ability to be smoothly integrated into the provider's busy workflow, while allowing the provider to generate a note that communicates effectively and efficiently with multiple stakeholders.

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1. Introduction & Background

Clinical documentation is a major component of patient care. We define clinical documentation as "a process in which healthcare providers record the observations, impressions, plans and other activities arising from episodes of patient care" that "generally occurs with each interaction between patients and the healthcare system" [1]. In recent years, electronic health record (EHR) systems adoption and usage has expanded across sites of healthcare delivery [2] and computer-based documentation of clinical encounters has become more and more prevalent. Studies evaluating the usage of computer-based documentation tools have suggested a growing need further to evolve documentation tools that best meet users' needs [3–8].

There currently exist a variety of methods available for providers to document clinical interactions. Methods include documenting by hand on paper (herein referred to as 'handwritten'), dictating the note's contents to be transcribed in a later step (herein referred to as 'dictation'), and using electronic or computer-based documentation (CBD) systems [1]. In recent years, other options using voice recognition technologies have also emerged in the market. These technologies offer instantaneous conversion of dictated notes into written documentation; however, products currently available on the market have been criticized for being inaccurate [9]. Each method may have implications for clinical workflow, note content, healthcare provider satisfaction, patient satisfaction, and the degree to which it integrates with an EHR system. For instance, handwriting a note may allow clinicians great flexibility in what and where they write, and the notes can then be digitally scanned and incorporated into an EHR system; however, the method is limited in its ability for content to be easily reviewed and reused. Dictation is often very quick and easy for clinicians to generate a note, and creates notes that can be easily processed to provide data that can be used to support research and clinical decision support. However, it is expensive to implement, transcriptions may not be available immediately, and the notes oftentimes require some editing [1, 4].

Unlike other approaches to clinical documentation, CBD tools offer a way for clinicians to enter notes directly into the EHR with minimal editing. There are two general ways in which this can be accomplished: *structured* and *unstructured entry* [1, 5]. The latter requires the provider to type a note in a relatively free form fashion, while the former requires the provider to select options from a formatted template via mouse or pen. The unstructured entry approach may give the clinician the flexibility to include a narrative for parts of the note, such as the history of present illness (HPI) section that may otherwise be difficult to summarize in pre-categorized concepts using a structured entry type of CBD. The narrative text can also be saved as a part of a template and reused for other patient encounters [1, 5]. However, the lack of structure of a free form note compared to a structured entry note can also make algorithmic reuse of documented data in decision support and clinical research more difficult [6].

The goal of this study was to expose the knowledge, beliefs and perceptions healthcare providers and administrators have about the value of clinical documentation and the process of documenting. Clinical documentation is a practice that is inextricably shared by both clinical and administrative workflows [10]. To better understand how clinical documentation methods could effectively serve both those who primarily generate notes and those who must review them in today's increasingly multidisciplinary approach to healthcare, we sought perspectives from both healthcare providers and administrators. While others have used observations, audit logs, and other human factors engineering approaches to study documentation workflow [11–14] and developed theoretical frameworks outlining the purposes of documentation [3], few studies have directly addressed documenters' and documentation reviewers' perceptions of the purpose and process of documentation. We conducted focus groups with providers and administrators to further develop ideas that may not be otherwise revealed using other methods. We do not propose a formal set of guidelines for the development of CBD tools, however our results can be used to inform future development, adoption, and continued usage of CBD tools in EHR systems.

2. Methods

We focused on the following two questions: [1] what do healthcare providers and administrators perceive to be the purpose of documentation and [2] what methods do providers use to document? We used a method of qualitative inquiry to gather and analyze impressions from healthcare providers and administrators about the purpose and practice of clinical documentation. Qualitative methods of information gathering are particularly useful for identifying the complexities of the perceived utility of clinical documentation and the variety of ways it is practiced.

2.1 Study Setting

The study took place at the Vanderbilt University Medical Center (VUMC), a large academic medical center that provides primary and multispecialty referral care to patients in Middle Tennessee and throughout the Southeast region through more than 50,000 inpatient stays and 1.6 million outpatient visits annually. VUMC has had successes developing and deploying comprehensive EHR systems and tools including provider order entry, clinical decision support, clinical documentation and patient personal health records [15]. Data were collected during the period from March 2009 through March 2010.

2.2 Subject Recruitment

Potential subjects were recruited from the VUMC research study announcement listserv and via flyers distributed to various VUMC clinical locations, such as General Internal Medicine clinics. Candidates were eligible if they were licensed healthcare providers, such as attending physicians, nurse practitioners (NPs), and ancillary healthcare providers, or if they were healthcare administrators who review clinical documentation on a professional basis. All subjects were required to have at least one year of experience with routine use of clinical documentation in this role. Inclusion criteria were verbally confirmed. A purposive sampling of typical cases of healthcare providers and administrators was conducted. Participation was voluntary, and subjects were asked to provide written informed consent at the start of the study. All subjects who completed the study were paid for participation. All recruitment materials, consent forms, and study methods for human subjects were reviewed and approved by the Vanderbilt University Institutional Review Board.

2.3 Focus Groups

We conducted one-hour semi-structured focus groups with individuals who generate documentation and those who review it, healthcare providers and administrators, respectively. Healthcare providers were grouped by professional role: [1] attending physicians and NPs and [2] ancillary healthcare providers (e.g., physical therapist). Focus group participants were asked to identify the purpose of documentation and describe their documentation practice. We conducted semi-structured group interviews using an interview guide developed by the co-authors (▶ *Appendix A: Sample Focus Group Interview Guide*). Questions were open-ended and designed to elicit maximal discussion amongst all focus group participants. All focus groups were facilitated by one of the coauthors (CG), an experienced moderator with non-clinical background. At least one other study team member (coauthor YXH, KLK) was also present during the session primarily to take notes. Prior to focus group sessions, all subjects completed a short survey developed by the co-authors for this study to collect information about their professional roles, practice patterns, and familiarity with and/or usage of clinical documentation methods central to this study (▶ *Appendix B: Focus Group Survey*). Satisfaction ratings for documentation tools were scaled from 1 to 5, where 5 represented maximal satisfaction. All focus groups took place in a private conference room on the medical center campus. Focus groups were audio-recorded and then transcribed. Anonymized transcripts were collected for all focus group sessions where possible and analyzed along with corresponding session notes.

2.4 Data Analysis

We summarized survey responses with descriptive statistics, and analyzed transcripts and notes collected from all focus groups using a method of inductive analysis to extract underlying common themes via condensing, interpreting, and categorizing the data (i.e., a theory coding approach) [16]. Iterative examinations of data and focused coding were performed as key themes emerged and converged. One investigator (YXH) first coded text categorically by focus group question (e.g., "What do you think is the purpose of documentation?") and then performed more theoretical coding by themes derived from the data (e.g., *documentation serves as a shared and personal record for clinical care*). Investigator bias was mitigated by reviewing themes with a second investigator (CG), who also helped to identify other themes, and by maintaining the link between the themes and the original quotes. All co-authors engaged in multiple discussions of the data periodically and focused coding was performed following each discussion. Several strategies were employed to maintain rigor in qualitative data analyses [17, 18]. Investigators involved in focus group sessions and subsequent analyses exercised reflexivity in order to allow for latent themes to be readily revealed. Member checking was performed in real time during focus group and interview sessions in the form of periodic confirmation and clarification. Focus groups were conducted until data saturation was achieved. Data were analyzed using the qualitative analysis software package NVivo 8™ [19].

3. Results

A total of 46 subjects completed seven focus group sessions, with four to eight subjects in each. Each subject participated in only one focus group session. Subjects included 32 healthcare providers and 14 administrators from a variety of practice backgrounds and characteristics shown in ►Table 1. Here, we report our survey results as well as themes extracted from our focus group discussions.

3.1 The purposes of clinical documentation

Among comments made by providers and administrators, a variety of purposes for clinical documentation emerged revealing that the clinical note is perceived as a record shared with all parties involved in a patient's treatment plan – including the patient and patient's caretakers. It is also a record used by the provider him/herself to track a patient's treatment plan. Providers agreed that documentation is fundamentally a "record" and a form of "communication" and serves at least five purposes: clinical, administrative, legal, research, and education.

3.1.1 Clinical

Providers agreed that patient care is an important, if not the most important, purpose of documentation. They remarked that documentation is important "for following that patient" and recording "what transpired at the visit and what the next steps are." Since patient care oftentimes involves more than one clinician and other ancillary services, the clinical note "helps to relay information to teammates to know what the status of the patient is." One provider added that the note is a shared document that is "a way to get agreement about what happened between those who are involved." And this collaborative process can even include the patient whereby "a patient can see the record and comment and articulate whether they agree or not."

   It can also serve as a personal record for the provider him/herself to "reflect on a next visit with the patient" and "just to document the thought process." One provider said, "it's very important for me to able to document accurately so I can progress the case and then be able to look back and see what I'm doing is effective or not." Another provider who sees many patients with multiple comorbidities remarked:

> "It could be a note to take a note at the time I'm seeing the patient…Many of my patients have 10 or more medicines all the time and there's always a change…I can't just go from the patient visit to the note, the electronic record, without something to jog my memory."

Another provider agreed "it really helps jog your memory down the road when you see [patients] again" and the documentation process "brings closure to the visit too."

3.1.2 Administrative

Providers and administrators pointed out that although they feel that the main goal of documentation is patient care, there are administrative needs such as billing and compliance requirements that must be met. Thus, the administrative purpose of documentation is perhaps just as important to provide detail needed to support services rendered for the patient, medical procedures, etc. and the note must be prepared to be reviewed for this purpose. As one provider stated, "in the general sense, obviously our major focus has got to be that this is directed at patient care, but what we often find today is that we need this clinical documentation for billing purposes." In particular, sometimes a provider will include certain information in the note if it is required to justify insurance coverage of certain clinical procedures. One provider remarked, "Sometimes you choose to say something because you don't get the CT scan from the insurance company unless they have the note that states the alarming features that would [qualify the patient for it]." The same provider added "we have billing issues that affect us and how much we're going say in a particular part of the note in order to validate the bill that we're going to put together." As one provider simply stated, "We don't get paid by the State if we don't have that information done."

From the documentation reviewer's perspective, administrative issues such as billing play such a large role in the documentation review process that a system that is optimized for billing purposes is preferred over systems that may otherwise be performing satisfactorily. As one administrator recollected, "the reason we are switching from [a current CBD system], which we have *been* happy with, and going into [another CBD system] is for billing purposes only."

3.1.3 Legal

Providers and administrators also identified a legal purpose to documentation to provide evidence to defend the provider against malpractice allegations. An NP in pediatric pulmonary suggested that careful documentation of a provider's thought process and treatment plan can serve as a "record for a possible liability suit and malpractice" and can "provide rationale for the type of intervention that one has done." Providers noted that their documentation must be sensitive to any potential legal issues surrounding the case. One provider remarked that even though the note is private, "I also think about clients who are, say, in custody disputes and so what do I put in that note that is pertinent without giving too much information that could harm that person."

Administrators agreed that when reviewing documentation, there is a substantial amount of legal requirements that must be met. According to one administrator, "a big part of the documentation process is to satisfy various legal requirements."

3.1.4 Research

Although research was not as commonly expressed as a purpose of documentation, a few providers nonetheless identified it as an important function of the data collected in documentation. As one provider stated, the note "is also the substrate for a lot of clinical research." It "allows tracking trends across different patient sets, so not only is it individually useful, but it's useful across a *panel* of thoughts." Another provider added that using documentation for research purposes means to "get accurate data and then compile it [in] a way that shows if your study is working or not."

3.1.5 Education

Another purpose that was mentioned in two focus groups is the use of documentation as a teaching tool. One provider remarked that in addition to documentation for clinical, legal, and billing purposes, documentation can be used for medical education:

> "I found that working with some of the medical students that there's some teaching in documentation. They'll say for example, 'Now what did that rheumatologist exam show and what should I be looking for in this patient'."

Even the act of documenting can include "teaching nuggets" so "some documentation can provide that education and reminder system."

Administrators agreed that documentation can be used to educate providers on how to document. One administrator remarked, "something that I would consider positive and memorable when I am reviewing notes might be something that I would certainly want to use as an example to other clinicians."

3.2 Choice of documentation methods

When surveyed prior to the focus group discussion, over half of providers reported using a CBD system – structured or unstructured entry – as the primary method of documentation. (▶Table 2) Dictation and a mixed methods approach to documentation both obtained the highest overall mean satisfaction ratings (3.7 out of 5) as a primary documentation method, while handwriting on paper scored the lowest in terms of satisfaction (2.5 out of 5). Providers who use dictation as a primary documentation method reported the most extensive experience with this method, averaging roughly 20 years of experience, whereas providers whose primary method is CBD reported fewer than 4 years of experience using it.

While we asked providers to report their *primary* documentation methods in the pre-survey, providers revealed during the focus group discussions the use of a variety of methods throughout the process of documenting a single patient encounter. One common approach is the use of handwritten notes during the encounter followed by either dictation or CBD use after the encounter. For a return patient, one provider reported that he would "scratch some notes on a paper and typically dictate a follow up letter." Another provider mentioned the he would write notes to himself during the encounter and then type them up afterwards.

Providers who reported handwriting notes during an encounter suggested that they felt that this technique preserves the rapport between the provider and patient during the encounter. One provider remarked, "I tend to interview my patient or interact with them and make some notes. I don't necessarily enter on the keyboard while I'm interacting, although I do hear that that's more efficient, but for me, it's important for me to have my full attention, in the exchange." Another provider asserted that using CBD and simultaneously interacting with the patient does require a certain level of skill: "I document, typically, my HPI as I converse with the patient and it, it takes…years of technique development so that your patient feels like you're paying attention to him while you're inputting all that information."

While there are a variety of factors that underlie a provider's choice of documentation method, the decision appears to be largely affected by providers' need to minimize the time required to complete documentation. One provider in pediatric cardiology described how the use of dictation supplemented by note-taking greatly reduced his documentation time:

> "I would just write down minimal notes when I was in with the patient and then normally, I would go out of the room and dictate and that would take 3 to 5 minutes for relatively complex patients."

However, the same provider lamented that since his practice discontinued the use of dictation, "I'll spend probably 20 minutes per patient documenting afterwards. Clearly more time documenting than seeing patients or making decisions. It's incredibly frustrating, and I think it's a huge mistake to do that." Another provider added, "In order to see patients I need to see, [the CBD system I use] just slowed me down too much. So I've turned in to writing most long things, um, out on paper and then dictating it later." A provider who uses CBD tools reported, "I do preliminary documentation and full chart review electronically prior to seeing every patient the day before, or two days before, [or] a week before. And [I] write a draft of that note on [the CBD system]…[it is then] simply a matter of editing that [note] I've already written." Another provider claimed that by taking care of some of the editing beforehand, "I can finish the note before the patient leaves the room because I have essentially written 80% of the note and I'm editing the other 20%."

Providers may choose to use different methods depending on the case complexity, which could affect the amount of time needed to complete the note. One provider remarked, "if it's a short acute thing, I do still template it, or well-child checks, quick physicals, I template. But if it gets in to a long,

drawn out, typing a lot of stuff, then I end up dictating and we have portable dictaphones that we dictate and then hot sync to our computers."

Providers may also choose particular techniques in their documentation practice to optimize communication with other providers of the same specialty. For instance, an ophthalmologist who reported both handwriting and dictation as her primary methods (i.e., mixed methods) expressed a preference for hand-drawn visual representations of a patient's case:

> "it's a little different because our complicated patients, you can tell not by reading text or words that we write, it's by our diagrams because we draw the scars that are on the cornea… and all the pigment destruction in the retina, it's what you see…for ophthalmologists to review each other's notes, we look at the diagrams so it doesn't matter what we say."

Among administrators surveyed prior to the focus group sessions, CBD was overwhelmingly the primary method that administrators reported reviewing documentation from. (▶ Table 3) These administrators averaged nearly 6 years of experience reviewing CBD, which obtained a mean satisfaction rating close to the highest rated mixed methods. Since dictated documentation is available for review through the CBD, administrators did not report reviewing it separately.

Even with the assistance of CBD tools, administrators felt that reviewing documentation can be a laborious task that can potentially be mitigated by a system designed to mediate between provider input and the output that administrators must subsequently review. From the reviewer's standpoint, it is critical that documentation received from the provider is in a form that allows for easy extraction of relevant information for their needs and future needs of other reviewers. When asked how an efficiently constructed and accurate clinical note aids in performing documentation review duties, a quality consultant remarked, "The first thing that comes to my mind is it saves time. I mean, a well-written note, I can just go to one piece of the documentation." Another administrator agreed that while reviewers "like to see the whole note, we look for that concise meat right in the middle where it says 'impression of plan.'" An administrator in clinical trials billing compliance added that a documentation system that allows the note to be easily parsed into text that separately addresses different aspects of the visit, e.g., visit's research purposes, clinical care, would be ideal, particularly "when there is kind of an argument on the back end and, and, and um, we're trying to decide who was supposed to pay for this."

4. Discussion

Clinical documentation is unarguably an important and integral part of patient care; however, designing a documentation tool that is optimized for patient care as well as providers' needs remains a challenge. Success in the development of documentation technology is often defined by its outcomes such as the ability of documentation tools to create easily accessible and reusable notes. However, success also relies on the adoption of these tools, which rests largely on providers' perceptions of how well these tools support their practice [20, 21]. To determine how a documentation tool may be designed to better suit the needs of its users, we asked providers to share what they believe is the purpose of documentation and to describe their own documentation practices. We found that providers perceive clinical documentation as important not just for clinical care, but for other purposes as well and these purposes are echoed by administrators who review notes. Furthermore, the process of documenting a patient visit is not standardized across providers; various factors determine how a provider chooses to document. We summarize the key observations from this study in ▶ Table 4 and discuss their implications below.

First, clinical documentation serves as a record as well as a means of communication. The old adage 'if it's not documented, it's not done' was well supported by our study participants. But a clinical note that serves simply as a record of a patient's visit is not perceived to be maximally useful in itself; it also serves as a way to communicate with others involved in a patient's care and management.

Second, documentation has multiple purposes that include, but are not limited to, clinical care. Providers and administrators in our focus groups identified four other key purposes of clinical

documentation: administrative, legal, and research – consistent with the goals of the medical record identified in previous research [22–31] – and medical education, previously unreported and perhaps only applicable to academic training facilities. Nonetheless, the multiple purposes of documentation are consistent with providers' belief that the clinical note is a shared record that serves multiple stakeholders. Namely, the note must be designed to communicate with billing specialists, legal representatives, other clinicians, researchers, and even patients and their caretakers. One provider who sees children in his practice elaborated, "we're supposed to please [the] parent, our supervisor and another clinician, so if we knew who we were writing to, we would know how to write." As noted by this provider, crafting a note that fulfills multiple purposes demands a comprehensive understanding of stakeholders' requirements.

Third, the process of documentation is not standardized across providers and practices. Providers reported different ways of completing their documentation with respect to the documentation methods they use in order to accommodate for the immediate needs of patients during clinic hours. Many providers reported that it is not always possible to complete documentation in a timely fashion due to limiting factors that include limited time between patient visits, providers' familiarity with the documentation tool, and the perceived comfort level of patients with the use of a given documentation method (namely, CBD tools) during the encounter. Providers who use CBD tools revealed that using a CBD tool exclusively may not necessarily be their preferred strategy to optimize patient care. Interestingly, while it has been shown that computers may inadvertently create a barrier to the rapport between the provider and patient [3], Johnson et al. showed that the use of CBD during a patient encounter does not negatively affect patient or physician satisfaction [7]. Our results suggest that there are perceived barriers to using CBD tools during patient encounters, consistent with those previously identified in studies on electronic health record system use in general [32]. One step towards mitigating these barriers may involve training providers to feel comfortable with integrating electronic health record systems into their encounters.

Fourth, clinical data retrieval is perhaps just as important as data input. While the main focus of our study was to collect providers' perspectives on the generation of clinical documentation, administrators, as well as providers, suggested that documentation tools must be designed to facilitate data extraction. Administrators in this study suggested that data should be easily parsed for their respective tasks. While generating documentation can be a time-consuming task, retrieving clinical data for the purposes of billing, etc. can be just as time-consuming.

Together, the themes identified in this study intimate a struggle that exists in the mission to design documentation tools and methods that best support the mixed utility of the clinical note and simultaneously support providers' and administrators' busy workflows. While it has been previously shown that providers believe that there is positive value in using CBD tools for documentation, successful adoption of CBD tools still depends largely on how the tools are implemented [7]. Consistent with findings by Embi et al. [10], we found that the note serves as an important form of communication between all stakeholders and there are existing concerns surrounding issues of integrating documentation practices with both provider and administrator workflows. Current development of CBD systems has focused on using structured data entry to facilitate data extraction and communication between multiple parties involved in the care of a patient. However, while structured data entry allows for a concept to be more easily reused and interpreted, some studies argue that restricting the clinical narrative in documentation can hurt the clinician's ability to fully convey clinically relevant information and increase the time needed to document [6]. Although the use of CBD provides opportunities to expand on the utility of documentation beyond providers' own needs, we must not lose sight of user satisfaction. Provider satisfaction with a documentation tool depends on at least five cognitive factors: document system time efficiency, availability, expressivity, structure, and quality [21]. These factors coupled with a better understanding of providers' and administrators' perceptions of the role that clinical documentation plays in their practices can help guide the development of CBD tools that better addresses the needs of its end users.

The emergence of CBD tools in documentation workflow has affected both the documentation process and the purpose – or purposes – that documentation serves today. CBD tools have the potential to reduce the frequency of diagnostic errors, improve legibility, and improve patient-provider communication [7, 8]. However, CBD adoption largely depends on user satisfaction and the successful integration of CBD tools with users' existing workflow [15, 20, 21]. A few qualitative studies

have suggested that while providers perceive advantages to using CBD tools in clinical documentation, it can negatively affect workflow and require the same amount of time to complete as paper documentation [13, 33]. Developing strategies for successful migration to computer-based patient care systems requires an understanding of how users perceive the systems that they use to carry out their everyday tasks (whether the systems are computerized or not) as meeting their needs. To the authors' knowledge, this study is one of the first to explore the perceived utility of clinical documentation from multiple perspectives and various strategies that users' employ to handle clinical documentation, with or without CBD tools.

4.1 Limitations

This study bears several limitations that we report here. First, we selected a study setting that limits the generalizability of our findings to other clinical settings that are not academic medical training facilities such as VUMC. For this reason, it is possible that medical education was regarded as one of the purposes of clinical documentation, but this may not necessarily apply to non-academic practices. Furthermore, VUMC is one of a few institutions that adopted EHR usage early in development and thus our study sample consisted of providers and administrators who are more likely to be exposed to CBD tools. Second, our sample was subject to some of the general limitations of self-selection, e.g., those who volunteered to participate might have been more likely to be interested and invested in the topic of clinical documentation. Third, nurse practitioners were included in the same focus groups as attending physicians, which could have introduced hierarchical bias. Fourth, we did not utilize other qualitative methods such as real-world observations, which could provide additional data that may corroborate participants' perceptions. For example, it would be particularly useful in future work to conduct observations of providers' documentation workflow patterns to determine what specific conditions underlie providers' decisions to document before or after a patient encounter and their use of different methods.

5. Conclusion

Due to the increasingly multi-disciplinary nature of healthcare today, an EHR system must support many separate islands of information, of which clinical documentation comprises a small archipelago. Importantly, these islands are not isolated. Impressions collected from providers and administrators in this study suggest that clinical documentation plays a critical role in clinical care, but there are other purposes of generating documentation that are inextricably linked to how the clinical note is reviewed. As the approach to patient care becomes increasingly diverse, CBD tools will need to be capable of generating a note that is flexible enough to serve a variety of stakeholders while supporting the provider's busy workflow. Future work lies in comparing different existing documentation tools and methods and identifying opportunities for improvement to address this critical aspect of documentation.

Conflict of interest statement
The authors wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

Clinical Relevance
CBD tools have the potential to reduce the frequency of diagnostic errors, improve legibility, and improve patient-provider communication, however perceived barriers to adoption still remain. This study focuses on the perceived purpose and process of clinical documentation. Impressions collected from healthcare providers as well as administrators provides insight that can be used to

further develop and refine CBD tools to better address the needs of its end users so that patient care remains a top priority.

Protection of Human and Animal Subjects
This study was reviewed and approved by the Vanderbilt University Institutional Review Board.

APPENDIX A: Sample Focus Group Interview Guide

Introduction

Welcome! Please come in and take a seat. Before we start the discussion, I will need you to read and sign this Subject Consent Form and then complete this survey. Bear in mind that your participation in this study is completely voluntary. If for any reason, at any time, you do not feel comfortable, you are free to withdraw from this study. Withdrawal or refusal to participate will not prejudice you in any way. Thanks! We'll begin shortly.

[Good afternoon / good evening] everyone. My name is _____ and I will be serving as the moderator for this group discussion. Today I am assisted by my fellow team member(s), _____, who will be observing and/or taking notes throughout the session.

The topic of this discussion is clinical documentation. As you know, documentation is an important part of every clinician's work routine. A variety of documentation methods or tools currently exist and are being used in different medical facilities, however, we do not know which documentation method is most effective and moreover, what makes a particular documentation method so effective. Your participation in this focus group session is critical in determining what is most important in designing the optimal documentation tool. Results from this present study will ultimately help clinicians better serve their patients and also improve communication between clinicians and other clinicians, pharmacists, medical administrators, etc.

So, for the next hour or so, I am going to ask you some questions about the process in which you document patient encounters. In responding to all of these questions, please think back to your own experience [documenting your patient visits / reviewing patient documentation].
Now, let me just take a couple more minutes to introduce some discussion ground rules and to address the subject of confidentiality. Then, I'll go around the table and have you introduce yourself and tell us what [documentation tool you use or have used / type of documentation you use or have used].

Confidentiality

I want to stress the confidential nature of our conversation. I assure you that your name will not be connected with information that we collect [today/tonight]. We plan to characterize your comments simply in terms of your professional background (physician, nurse, medical administrator, etc.).

Also for the sake of maintaining confidentiality, we are not videotaping or taking photographs. However, we are audio taping the proceedings so that we can produce a transcript. Only members of the research team will have access to this transcript. We will review the transcript to ensure that the notes were taken during this and other sessions are complete. The transcript will not be released in its entirety to the public. However, we may use excerpts from the transcript to fortify technical publications and for other related uses. In such cases, the excerpted material will not carry individual names or any identify information about institutions, providers, patients.

Ground rules and logistics

We have assembled a relatively small group so that everyone will have an ample opportunity to speak up and contribute to the discussions.

I think you will enjoy the session. And I encourage you to be open and honest with regard to the topics of the discussion. We are going to keep things fairly informal. You should not hesitate to tell it like it is. Generally, let's try to stay on point and keep the conversation moving.

If you have something to say, jump in when the moment is right. Or, raise your hand and I will make sure you get a chance to speak.

From time to time, I may interrupt the conversation to move it along to the next topic. I'll do this when I think we have adequately covered a particular topic and to ensure that we finish within the allotted time period.

I encourage constructive debate, but discourage you from criticizing one another. Let's keep the discussion relaxed and constructive.

Note: Focus groups composed of administrators will address questions below, focusing primarily on the product (as opposed to the process) of documentation.

General documentation and task analysis questions

1. What do you think is the purpose of clinical documentation and how important is it to your practice?
2. Describe the tasks you perform when documenting an encounter (i.e., what do you do first? How much time do you spend on each task?)
3. What factors influence whether or how you document a specific patient complaint, symptom, or sign?

Wrap-up

As we approach the close of the session, are there any final comments or questions? Ok, you have all provided us with extremely valuable insight about clinical documentation and my colleagues and I thank you for your time and contribution to this study. Let me just remind you once again the confidential nature of our discussions. Please do not share the basic purpose of the details of our discussion with others. However, if you see some of my colleagues in the hall, feel free to chat with them or ask them questions. Thanks again!

APPENDIX B: Pre-Focus Group Survey

1. What is your profession?
2. At how many different clinical sites do you see patients per week?
3. How many patients or patient records do you see a week?
4. How comfortable are you with the following documentation methods? *(Please circle one number for each method listed below.* [▶ APPENDIX B Table 1] *Circle "NA" if you never used the method.)*
5. What documentation method do you currently use as your primary method and how long have you been using it? (Please check one and indicate the number of years you have been using this method.)
6. How satisfied are you with your current documentation method? (Please circle one.)

1 – hate it   2 – dissatisfied   3 – indifferent   4 – satisfied   5 – love it

Characteristic	Providers (N = 32)	Administrators (N = 14)
Gender		
Female	16 (50%)	10 (71%)
Specialty[1]		
Internal Medicine	5 (16%)	0 (0%)
Pediatrics	6 (19%)	1 (7%)
Primary Care, Family Medicine	3 (9%)	0 (0%)
Occupational Therapy, Physical Therapy, Speech-Language Pathology	3 (9%)	0 (0%)
Orthopedics	0 (0%)	2 (14%)
Other Provider Specialty[2]	21 (66%)	Not applicable
Billing/Compliance/Quality	Not applicable	3 (21%)
Administrator Specialty[3]	Not applicable	8 (57%)
Number of Different Clinical Sites Per Week		
1 – 2	20 (63%)	Not applicable
3 – 4	10 (31%)	Not applicable
varies	2 (6%)	Not applicable
Number of Patients/Patient Records Per Week		
Under 50	16 (50%)	9 (64%)
50 – Under 150	13 (41%)	1 (7%)
150 or more	3 (9%)	3 (21%)
Varies	0 (0%)	1 (7%)

Table 1
Subjects' demographics and practice characteristics.

[1]Some providers reported multiple specialties.
[2]Other provider specialties included: Allergy, Rheumatology, Cardiac Surgery, Anesthesia, Dermatology, Endocrinology, Hematology, Cardiology, Geriatrics, Mental Health, Nephrology, Neurology, Obstetrics, Otolaryngology, Pathology, Perioperative Services, Urology
[3]Administrator specialties included: Assistant Director of Pharmacy, Director of Pharmacy, Director of Therapy, Director of Wellness, Health Data Coordinator, Respiratory Care Manager, Speech Pathology Manager, Patient Care Manager, Social Services Manager, Research Billing Compliance Specialist, Systems Analyst, Orthopedic Manager

Table 2 Providers' primary documentation methods.

Provider Primary Documentation Method	Number of subjects (N = 32)	Avg. Yrs. Experience [range]	Avg. Satisfaction[2] [range]
Attending/NP			
CBD[1]	17 (53%)	3.4 [0.5,7]	3.1 [1,5]
Dictation	3 (9%)	19.7 [7,27]	3.7 [2,5]
Handwritten	1 (3%)	3	4
Mixed	5 (16%)	4.4 [1,8]	3.8 [2,5]
Ancillary			
CBD	3 (9%)	4.3 [3,5]	4 [4,4]
Mixed	3 (9%)	3.7 [3,4]	3.5 [3,4]

[1]One subject did not report years of experience and satisfaction rating with CBD.
[2]Scored on a scale of 1 (least satisfied) to 5 (most satisfied).

Table 3 Primary documentation methods used to generate notes reported by administrators.

Primary Documentation Method	Number of subjects	Avg. Yrs. Experience [range]	Avg. Satisfaction[1] [range]
Administrators	14		
CBD	10	5.9 [2,9]	3.7 [2,5]
Handwritten	1	1	1
Mixed	3	1.8 [1,3]	3.8 [3.5,4]

[1]Scored on a scale of 1 (least satisfied) to 5 (most satisfied).

Table 4 Key observations about clinical documentation from this study

1. Clinical documentation serves as a record and a means of communication.
2. Documentation has multiple purposes that include, but are not limited to, clinical care.
3. The process of documentation is not standardized across providers and practices.
4. Clinical data retrieval is perhaps just as important as data input.

APPENDIX B Table 1

		Used once				Extremely Fluent
a. Quill *(Structured entry CBD)*	NA	1	2	3	4	5
b. StarNotes *(Unstructured entry CBD)*	NA	1	2	3	4	5
c. Handwriting on paper	NA	1	2	3	4	5
d. Dictation on transcription	NA	1	2	3	4	5
e. (If applicable) Other, please specify	NA	1	2	3	4	5

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