

Social Work and Electronic Health Records: A New Frontier for Health Workforce Research



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◆ I. Introduction

Recent shifts towards integrated care have propelled social workers to become a vital workforce in providing comprehensive whole-health care. As one of the largest groups of clinically trained mental health providers in the United States, social workers are increasingly deployed on integrated health care teams to address patients' social determinants of health and provide behavioral health interventions (Fraser et al., 2018). However, information about the specific content of social work practice in new models of healthcare is limited (Rowe et al., 2019; Steketee, Ross, & Wachman, 2017), and further exploration is needed to better define social worker roles and functions in integrated settings (Fraher, Richman, Zerden, & Lombardi, 2018; Rowe et al., 2019). With more medical practices using electronic health records (EHRs), it may now be easier to collect valuable data to help clarify the expanding roles and functions of social workers. The EHR may give researchers the ability to analyze social work practice and documentation electronically to better understand social workers' activities in the healthcare system and their contributions to team-based care and team communication.

Natural Language Processing (NLP) is a machine learning analytic method that can identify and extract targeted EHR data (Bjarnadottir & Lucero, 2018; Friedman, 2000). To identify and extract concepts of interest from narrative EHR data, NLP employs a lexicon (a collection of words/concepts relevant to the topic of interest). The lexicon is iteratively developed using domain expert knowledge (obtained from interviews, surveys or focus groups with domain experts from the field of interest), literature reviews and content from EHR notes or text-based documents of interest. A lexicon is validated over time using varied patient samples and settings (Friedman, 2000). NLP has been used in EHR research in multiple medical fields including hypertension care and lifestyle modification (Shoenbill et al., 2019), radiology (Elkin et al., 2008), HIV/AIDS care (Hyun, Bakken, Friedman, & Johnson, 2003) and nursing (Hyun et al., 2009). However, to date, NLP has not been applied to social workers in health settings. If NLP were developed and adapted for research in the health care social work arena, it could be used to electronically sift through thousands of medical records quickly to identify notes related to social work practice and interventions.

This project was a preliminary step in building a lexicon to be used in extraction and analysis social work activities from the EHR. This brief also describes the manual chart review process to identify location and content of social work notes within the EHR from an academic primary care practice, and the content that was found in those notes. Study findings demonstrate how EHR data can be used as a workforce research tool to assess the scope, contributions and value of a profession still in the process of establishing its return on investment in health care. The specific aims were:

- 1) To determine the feasibility of using EHR documentation to help clarify the role of social workers in integrated primary care settings,
- 2) To describe and summarize content of social workers' documentations within the EHR,

- 3) To initiate development of a social work lexicon that may be used in future research using NLP to identify social work activities in the EHR.

◆ II. Methods

Overview of Methods. A multi-pronged approach was used to determine the feasibility of using EHR documentation to help clarify the role of social workers in integrated primary care settings. This study was approved by the research site's IRB#17-2717. First, expert interviews and focus groups were conducted with 30 practicing social workers representing more than 20 primary care clinics, medical providers and informatics experts. These interviews, in conjunction with academic literature, enabled investigators to develop the preliminary lexicon that was updated iteratively throughout the study. Second, EHR data were retrieved, manually abstracted and analyzed to evaluate social workers' documentations. The abstraction process was conducted using an abstraction guide developed by an experienced clinical informatician and NLP researcher working as a consultant on the project.

Data Access and Abstraction. EHR data were obtained from the North Carolina Translational and Clinical Sciences Institute (TraCS), a broker of the Carolina Data Warehouse for Health (CDW-H), the data repository for the UNC Health Care System. It was challenging to pull the intended data; researchers had to work iteratively with the data warehouse analysts and a clinical informatician to identify the varied locations of social workers' notes. Social worker documentation was uncovered in multiple locations including (but not limited to) providers' notes, discharge plans, treatment plan summaries and diagnostic reports. A random sample of 60 patients who had clinical contact with a social worker between September 1, 2016 and August 31, 2017 were selected and 647 notes were reviewed. As data were analyzed, the lexicon was expanded to include terms and phrases found in social work documentation. Two independent researchers with practice backgrounds in integrated behavioral health analyzed notes. Of these, 20% of the notes were double abstracted and then compared to ensure reliability. Findings on content and scope of social work practice documented in the EHR were synthesized quantitatively and qualitatively.

◆ IV. Results

Obtaining Social Worker Notes. This work analyzed the feasibility of using EHR documentation to help clarify the role of social workers in integrated primary care settings (Aim 1) and found that this type of analysis was possible but not without sizeable challenges. It was difficult to find the note and discern who authored the content. This study analyzed data collected from the Epic EHR Software (Epic Systems Corporation, version 1979-2018).

In this study, social workers were salaried employees and only in limited circumstances billed for their services. Because social workers did not bill, they did not create their own clinical encounter. Instead, social workers often documented their work within the clinical encounter of a provider who did bill, or they created a note associated with an encounter. These associated notes could have many different titles (e.g., "documentation" or "telephone encounter" note). Another barrier was the multiple "author types" of a note. For example, it became clear that social workers were not consistently referred to as social workers, but as case managers, care manager or other titles. This barrier was substantial; the only way to ensure notes by

social workers were not missed was to first compile a list of all known social workers employed within the primary care clinic and then only pull notes by those authors. From there, researchers worked backward to discover where in the EHR social workers were documenting. Even after narrowing the notes to all employed social workers, erroneous notes were inadvertently pulled despite efforts to filter them out. For instance, a social worker might be tagged to a note because another provider referenced them in patient discharge instructions. These challenges made it difficult to locate notes written by social workers.

Content of Notes. Abstracted EHR note data were grouped into two distinct domains: 1) Social work interactions with patients and 2) Social work communication with the interprofessional team (see Figure 1). A total of 647 notes from 60 patients were originally drawn from the data warehouse. Of these, 66% (n=425) fell into either domain 1, domain 2 or both, while the remaining 34% (n=222) were not actual examples of social work documentation. Figure 2 illustrates the note counts by domain. There was an average of 11 notes per patient, ranging from 3 to 52. Abstracted notes were from patients who varied by racial/ethnic background (53% white, 43% black), were mostly female (76%), and had a mean age of 64 (range from 28 to 97).

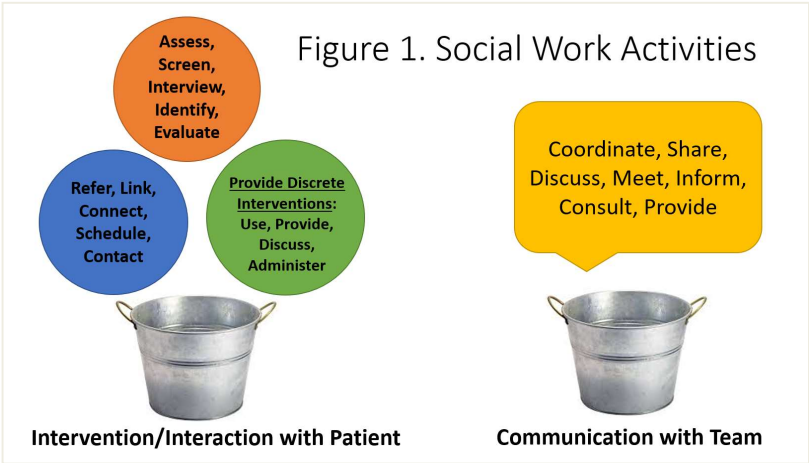
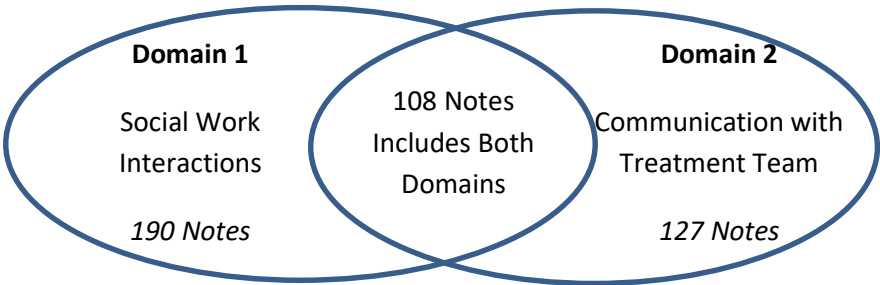


Figure 2. Breakdown of Abstracted Notes and Associated Domains



Domain 1: Social Work Interactions with Patients. About 70% of notes (298 of 425) related to Domain 1, focused on specific social work interactions which included information on social workers assessment, referral and discrete intervention practices. Domain 1 included the three most common types of social work roles in integrated settings as classified by Fraser and colleagues’ (2019) systematic review: behavioral health, care management and community engagement. More than 32% of notes in Domain 1 demonstrated a social worker assessing or screening for patient needs and mostly focused on patient mental health or substance use. Researchers tended to only find notes related to screening when a need was affirmed. This led to an assumption that the number of screening notes may not be representative of the number of screenings. Seventy percent of social worker notes relating to screening and assessment did not report using

a standardized tool; however, when they did, it was most often the Patient Health Questionnaire-9 (PHQ-9). Just over 68% of the notes related to specific social work interactions that contained discussions relating to physical health. Social workers provided discrete interventions such as cognitive behavioral therapy, intensive behavioral counseling for obesity management and motivational interviewing in 31% of the notes. Referrals and coordination of services were documented in just over 65% of notes. In these examples, social workers reported connecting patients to various services including housing assistance, transportation resources and specialty health services (see Table 1).

Table 1: Examples of Social Work Documentation on Domain 1- Direct Social Work Encounters
<p>Notes Related to Screening and Assessment</p> <ul style="list-style-type: none"> • "[Patient] states s/he has not been well for the last 3-4 weeks, noting increased fatigue, poor appetite, weakness, and worsening depression." • "[Patient] contacted [social worker] endorsing worsening anxiety without clear trigger...She feels restless and is experiencing racing and intrusive thoughts. [Patient] has tried relaxation techniques and self-talk without success." • "PHQ9: [Patient] scored 7, negative for suicidal ideation and homicidal ideation"
<p>Notes Related to Referral or Connecting to Services</p> <ul style="list-style-type: none"> • "SW will facilitate referral to cardiology and wound clinic. SW will follow-up with [home health agency] regarding Medicaid coverage for physical therapy/occupational therapy. SW will follow-up with Psych to facilitate rescheduling of appointment. SW manager discussed with [MD] the possibility of obtaining Diabetic Shoes; will facilitate via [agency]." • "[Patient's] family member contacted SW requesting assistance with food insecurity, in-home assistance and eye-glasses. SW submitted Diabetic Shoe application. SW contacted meals on wheels [county name], discussed case with [name]; no current routes for home delivery, [PT name] or a neighbor/family member would have to pick up meals at senior center. SW discussed [agency] as resources for low-cost eye glass options; [patient] has already received a Rx for glasses. SW manager will facilitate a referral via Medicaid." • "SW discussed Meals on Wheels referral, will follow-up with [county name] meals on wheels. Will facilitate referral for transfer via home care specialists." • "SW met with [Patient] at the request of [MD] to assist with transportation to [behavioral health crisis center]. SW and [Patient] contacted mobile crisis [number] spoke with [name]." • "[Patient] contacted this SW requesting assistance with ordering a shower chair. SW will facilitate order for shower chair via [agency]." • "SW will follow-up with [County] Housing Authority regarding transfer of section 8 from [city] to [city]."
<p>Notes Related to Discrete Interventions</p> <ul style="list-style-type: none"> • "...used CBT and inter-personal therapy techniques in discussion of grief, relationship difficulties." • "Spent greater than 40 minutes providing intensive behavioral counseling for obesity management." • "...provided supportive counseling, used solution focused techniques in discussion of coping skills. Reviewed behavioral activation techniques." • "SW validated [patient's] frustrations and utilized active listening, supportive counseling, and problem-solving techniques." • "Provided supportive counseling, used solution focused techniques in discussion of coping skills and living with chronic illness."

Domain 2: Social Work Communication with Interprofessional Team. About 56% of notes (235 of 425) included content of Domain 2 which described interprofessional communication between the social worker and the team. Social workers most often communicated directly with physicians (56% of the time), compared to nurses (12%), medical assistants (6%) and the entire team (9%). Communication occurred in both

directions regularly. Typically, when a social worker was communicating with other team members, it was related to an immediate need of a patient. For example, “[Patient] called and stated that there was no RX at pharmacy to pick up.” Social workers also used this documentation method to share information regarding a patient’s progress: “Please continue encouraging this patient to reach goals (see list above)...” or “Care manager will notify PCP of concern for worsening pain and need for results from MRI.” When team members were communicating to a social worker it was almost exclusively to request social work assistance. For example, “PCP requested that social worker follow-up with [patient] regarding no-show to today’s appointment” or “Care manager met with [patient] at the request of Dr. [name] to assist with transportation to [name of substance use treatment facility].”

Lexicon Development. The preliminary lexicon, based on domain expert interviews and academic literature review, was iteratively extended using terms and phrases abstracted from the EHR documentation dataset (see Table 2). Sometimes building the lexicon was difficult as many social work notes did not always include the activity of the social worker, but often recorded the details presented by the client and outcome of the contact. For example, instead of stating that the social worker “screened for depression” the note would indicate the patient reported depression. A similar result was found with referrals; while sometimes a simple process, a referral might also be time-intensive or complex. Below is an example where the written language does not accurately reflect the time, complexity or actual activities required to complete the final documented task. For example, “Patient reported being homeless. Social work care manager made a referral to [Named] homeless shelter.” However, this referral likely required multiple steps that likely occurred over hours of work. Specifically:

1. Social worker listened, validated patient’s feelings, and provided support during in-person encounter;
2. Social worker requested shelter admission/eligibility rules and required paperwork;
3. Social worker called patient to discuss options for proof of income/patient assistance with applications;
4. Social worker faxed completed documents to facility and awaited confirmation;
5. Social worker provided patient with shelter details.

Table 2. Examples of words added to the working lexicon

Assess	Refer	Intervene	Team Communicate
<i>Inquire, Scored, Conduct(ed), Reported, Endorse(s or d), Mental Status</i>	<i>Fax (ed), Submit(ed), Mail(ed), Email(ed), Request(ed), Receive(d), Messaged, Contact(ed)</i>	<i>Counsel(ed), Explore(d), Developed Collaboratively, Normalized, Empathized, Encouraged</i>	<i>Request(ed), Spoke, Notify(ied), Called, Contact(ed), Followed-up</i>

◆ VII. Discussion and Implications

For a profession still in the process of establishing its unique role and return on investment in health care, this exploratory study demonstrated that the EHR did not easily clarify the roles and functions of social work practice. Study findings highlight several challenges to accessing the EHR and the ability to use EHR documentation to understand social worker scope of practice in primary care settings. Barriers included the lack of a consistent place for social workers to document within the EHR and lack of consistent title for social workers within notes. Additionally, because social workers were not billing for encounters, they were unable to document within clinical encounter notes. Although it was difficult to identify social worker notes, findings demonstrate social workers were documenting their practice and communication with the team in the EHR. Yet, the language found within the EHR often reduced social worker contributions to patient care as a simple word or sentence. Therefore, the abstracted documentation did not fully capture the value or complexity of the intervention involved. The following recommendations are potential ways the EHR can be further harnessed to help clarify the role of social workers in integrated primary care settings.

Applicability and Usability of the EHR. This study helped identify limitations of EHR structures that impact the way social workers can document their work. Allowing clinical encounters to be created by providers regardless of billing permissions could increase the data abstraction process and general usability of data found within the EHR. Further, social workers consistently referring to themselves in documentation as their profession (i.e. social worker) as opposed to their job title (i.e. care manager) could also help improve the quality of the data available, and the ease of obtaining the data. If the social work scope of practice in health care settings was better operationalized, it could likely streamline documentation and clarify ways EHR developers can organize notes to be more conducive to research and understanding of the upstream determinants of health. Ultimately, EHRs have the potential through NLP and other methods to more rigorously understand the complexities of social work practice.

As health workforce researchers continue to define the roles and functions of social workers and others involved in team-based care, it is important to recognize EHR documentation is currently insufficient to understand the scope of social work practice. One example of this relates to formal assessment measures. Beyond the PHQ-9, other standardized measures were not clearly documented despite previous work indicating their frequent use by social workers in health care (Fraser et al., 2018; Horevitz, & Manoleas, 2013). Also, researchers tended to only find notes related to screening when a need was affirmed. It is reasonable to assume that sometimes needs were screened for but not addressed within the note if a need was not identified to warrant social work intervention. Given this, there are likely missing components in the EHR documentation available to researchers and in future abstraction efforts.

The EHR as a Communication Tool for Team-Based Care. The EHR is a patient care documentation and coordination tool, a mechanism for billing and a tool for communicating among providers. This study's findings show that social workers are active members of the interprofessional team and they have a role in facilitating team-based care processes. Given the EHR is a critical component for how information is shared among team members, health systems and EHR vendors should continue efforts to include end-users in

design and testing of documentation systems and tools for communication purposes. Ongoing efforts to improve interoperability and data sharing will be critical to optimize use of EHR data as a communication

tool, and as a data source for workforce analysis. This study's findings show that social workers are active members of the interprofessional team and they have a role in facilitating team-based care processes.

Valuing Contributions of Social Work Interventions. One way to offset the challenge of understanding the complexity of social work interventions as documented in the EHR is to develop and expand how value is calculated in health systems. Metrics for social work services could be created for a new application of Relative Value Units (RVUs). In the current fee-for-service system, RVUs have been used as a formula to account for the complexity of physicians' time, liability, and procedure complexity (Stecker & Schroeder, 2013). For example, a cardiac surgery has a much higher RVU compared to a breast biopsy. RVU calculations to determine the value of social worker contributions in health settings do not exist yet. However, a mechanism like this could help the social work profession as it grapples with defining its scope of practice and contributions within the health care system. While RVUs may change as health systems move to value-based models of care, workforce researchers should be cognizant of the processes and complexity involved in social workers roles in integrated care settings.

Social Work Education and Practice. As the EHR becomes a key source for helping define the social work workforce in healthcare, social workers should be trained to document in clear and consistent ways that help alleviate common barriers to EHR research. Social work students will require training in EHR use and succinct documentation. Although each health system has unique EHR nuances, practices can share minimum expectations and examples of EHR documentation students in didactic courses and as a component of clinical training. These trainings can reinforce why documentation is necessary and how it can be utilized to inform treatment plans and communication among team-members. Increasing the familiarity and use of EHRs for documentation and billing requires additional effort on the part of current practitioners and those training the future social work workforce.

◆ VIII. Conclusion

This exploratory study is among the first of its kind to evaluate EHRs as a mechanism to identify social work scope of practice in integrated primary care settings. Despite the promising potential of EHR data to better understand workforce trends, scope of practice, and workflow, there are research limitations with current documentation standards. Locating and manually abstracting EHR data of interest is not a straightforward process; it is challenging and time consuming. This work supports Milinovich and Kattan (2018) who note that raw EHR data are disorganized and often full of un-coded, tens of thousands of fields that require "intimate knowledge of the data structure of the EHR... for even the simplest of queries" (p. 42). With continued refinement of a social work lexicon and standardization of EHR documentation, NLP has the potential to help researchers more fully understand the scope of practice of social workers in health care.

Standardizing the way social workers document their practice will become increasingly important to better understand how the profession contributes to patient and population health outcomes. As this study helps demonstrate, social workers are regularly contributing to patient care and working as members of health care teams which was documented in the EHR. Yet, if EHRs are to become a robust resource for workforce and health care researchers, informed and purposeful changes to the interface and usability of EHR systems are required in order to more fully understand the scope of practice and contributions of the social work health workforce.

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