

A Mixed-method Approach for Workflow Identification in a Psychiatric Intake Response Center

Abstract

Clinical workflow analysis aims to understand workflow patterns and identify bottlenecks within a care setting. Both time motion studies (TMS) and electronic health records (EHRs) have been used for this purpose, but with significant limits. Recently, Real Time Location Systems (RTLS) are being used along with EHRs to better understand the workflow process. This paper describes the preliminary studies used to create the pipeline that is necessary for RTLS. This study was conducted at the Psychiatric Intake Response Center (PIRC), where we analyzed the workflows of the Psychiatric Social Workers (PSWs) and Intake Coordinators (ICs). The study primarily composes of thematic and workflow analyses to understand what the workflow process of PSWs and ICs are and to identify and preliminary bottlenecks. The inefficiencies have been identified through thematic and workflow analysis. The data are being used as a base for the ongoing RTLS phase of the study.

Keywords: Clinical Workflow, RTLS, EHR, Psychiatric Intake Response Center

Introduction

The Psychiatric Intake Response Center (PIRC) is a part of the Pediatric Emergency Department (PED) in the Cincinnati Children's Hospital Medical Center (CCHMC) and is responsible for admission and assessment of psychiatric patients. PIRC primarily focuses on children who arrive at the PED with psychiatric issues that need assessment. This is handled by the Psychiatric Social Workers (PSWs), who assess the patients and hand them off to the rest of the department. Care delivery is so dependent on several factors such as communication with the ED and other providers that there are several bottlenecks in the PIRC workflow. There is currently no information released on clinical workflow analysis in this area.

Clinical workflow analysis aims to understand workflow patterns and identify bottlenecks and inefficiencies through data collected from a care setting. Clinical workflow analysis traditionally has been conducted through time and motion studies (TMS), in which researchers shadow physicians to record when, where, and what they are doing in clinics.¹ TMS require a significant amount of effort in planning and execution the observation sessions. The results may vary if the process and measures are not standardized.² Moreover, TMS are not suitable for identifying a larger-scale health system issue and can be intrusive in clinical routines. Secondary use of Electronic Health Record (EHR) data, which consists of records regarding the workflow process itself, has been a new area of research in clinical workflow analysis as it relies on objective data automatically recorded for security and auditing purposes.^{3,4}

One limitation of using EHR data for workflow analysis is that the data only capture activities related to EHR use. When a gap is found between two timestamps, it is difficult to infer what happened. For example, a 10-minute gap may mean that the clinician continues reading a patient chart or talks to a co-worker at the hallway while leaving the patient chart open. Real Time Locating Systems (RTLS) systems would provide a complementary dataset to understand clinicians' behaviors and movement patterns. RTLS systems would also allow for more precise tracking of staff, devices, and other components to ensure they are in the right place at the right time.⁵ These systems can log in the exact locations of the physicians during the patient visit and to have a better understanding of where the devices and the medication orders are

between the order times and the administration. Moreover, the RTLS would pinpoint exact areas where certain physicians or devices are co-located to seek opportunities for streamlining the processes (which would contribute to the significance of the project relative to the goal of the study). By combining the RTLS and EHR data, clinical workflow can be analyzed in a more accurate and detailed manner without direct observations. These innovative approaches would largely overcome the limitations of TMS. With this, the main goal of this study is to create a preliminary data set to create process maps so that we can then set up an RTLS study accordingly based on the data.

Methods

This study took place virtually and was associated with a large academic urban free-standing children's hospital. The institution is affiliated with a Level 1 trauma center. The location consists of 35 - 40 PSWs. Approximately 200 to 300 patients enter the Pediatric Emergency Department (PED) and approximately 140 to 200 are assessed by Psychiatric Social workers (PSWs). The pediatric patients in this PED range from around 5 to 17 years old. All providers use the Epic electronic medical record (Epic Systems).⁶

This study incorporated a mixed method approach to analyze PIRC delays using semi structured interviews and RTLS data. In this paper, we introduce the details of the interview study. First, a series of questions were developed using information that was gathered from the head of the PIRC department. Next, twelve semi structured interviews were conducted: nine were with PSWs, who directly assess the patients, and three with ICs, who answer patient calls and refer them to PSWs or other services. With each interview, the questions were further refined to cover all aspects of the PIRC workflow, as more information would be gathered. Once the interviews were completed and information saturation was reached, the interviews were transcribed and analyzed using thematic and workflow analysis.

The interview process followed a semi structured method. With each interview's completion, questions were further analyzed to identify any missing components in terms of what to ask the interview

candidates. If any components were deemed absent or if any of the questions were considered incomplete, the questions were then revised based on the responses given by the earlier interview candidates. These modified questions were used in the later interviews to get more detailed responses. This cycle continued until there were no missing questions, and all the data could be collected precisely and accurately. Each interview was conducted over WebEx and was recorded for transcription and analysis.

Data Collection and Preliminary Results

We completed 12 anonymous semi structured interviews for the first phase of the study. Nine of the participants were PSWs and three were ICs, with one of the ICs being a part of the overflow shift (where patient threshold exceeds the staff capacity). The PSWs were assigned to one of three shifts (1st, 2nd, and 3rd) and the ICs were assigned to one shift. Based on this, a total of 12 initial workflow diagrams were created and four consolidated workflow diagrams were created, one per PSW shift and one for the IC. Issues within the PIRC workflow based on interview responses were divided into the following categories: bed/space, staffing, facilitative technology, information flow, and collaboration.

During each patient encounter, the PSW does the following: 1) Patient enters and discloses the issue, 2) patient enters triage and is treated, 3) PSW assesses the patient, 4) PSW decides to see if the patient is admitted or discharged, 5) PSW hands the patient off to the appropriate people or refers the patient to the appropriate services. This process is then repeated for the next patients. Within the PSW workflow process, Additional actors such as nurses assist in each patient encounter by doing triage and handing off the patient and then the doctors who assist with the decision-making process, this includes both the Psychiatrist and the Emergency Department (ED) doctor. Due to the space limit, in this paper we only report the workflow of PSW Shift 1 in Figures 1.

Prior to assessment, in the case that a patient is brought in by police, getting a response from guardians can take a very long time, given that the patient is not of appropriate age. Even when calling parents for collateral information, they might not know anything. Often during patient assessment, PSWs

cannot move forward with the evaluation/admission decision without a guardian present in some cases (P04, P06). When deciding whether a patient gets admitted, social workers must check with the attending psychiatrist regarding the decision for admission. Often times this can take up to 40 minutes (P03, P04, P09). Communicating with ED doctor and nurses to keep them on the same page is also very difficult especially if the doctor is not available. Occasionally, they won't use the bolt system (P07). Regarding reaching out to outpatient providers, there is often a delay in response time, which affects the development of safety plan and delay in patient treatment (P05). According to P06, there is also disorganization in the order in which the patient is seen. Occasionally the social worker will see the patient first even before being triaged in order to avoid unnecessary wait. This can lead to potential confusion in terms of collaboration with the ED, since both must see the patient to discharge. There are also several repetitive calls from the ER asking whether patients will leave, causing frustration for PIRC staff causing pressure to get patients out quickly.

Discussion and Ongoing Work

We believe that this project will have a large impact in clinical workflow and patient care for the following reasons. The first reason lies within the workflow itself, which consists of the actual visits and understanding how each task with the system is logged and analyzed. Since the problem is based on comparing the time differences of efficient and prolonged systems, there needs to be precise monitoring, which is why RTLS has been introduced. This would allow for a precise comparison on which tasks are the contributors to inefficiency within certain patient visits. Figure 2 shows the workflow detected from RTLS logs. Besides several common patterns, we also observe several inconsistencies, different from the workflow in Figure 1.

In the next step, we focus on a more quantitative method. It includes the usage of the RTLS timestamps and secondary usage of EHR logs, which give a more objective perspective on the pain points within the workflow process. This will allow for triangulation of the data with the PIRC process and better understand where the bottlenecks are to improve the quality-of-care delivery in PIRC.

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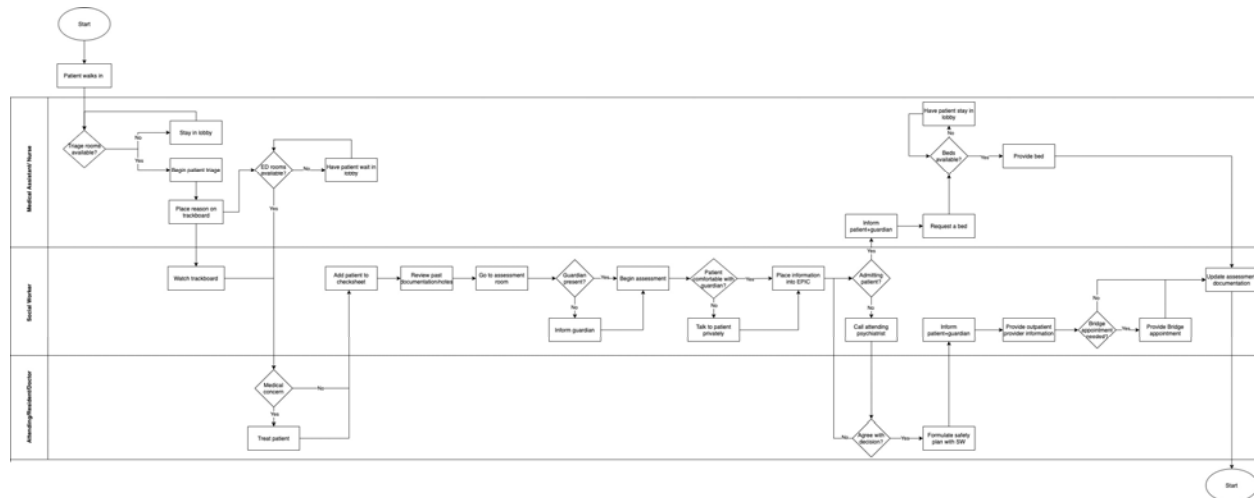


Figure 1: Workflow Diagram for PSW Shift 1 based on Interview Results

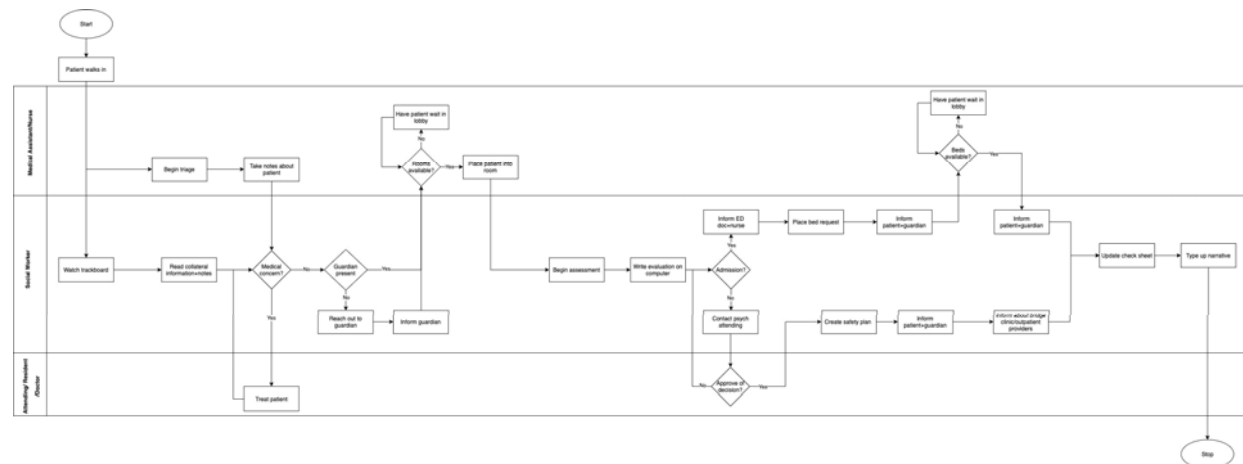


Figure 2: Workflow Diagram for PSW Shift 1 based on RTLS Logs