



## Using a health information technology survey to explore the availability of addiction treatment data in the electronic health records: A National Drug Abuse Treatment Clinical Trials Network study

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### ABSTRACT

**Background:** Healthcare data from electronic health records (EHRs) and related health information technology (IT) tools are critical data sources for pragmatic clinical trials and observational studies aimed at producing real-world evidence. To unlock the full potential of such data to advance science, the data must be complete and in structured formats to facilitate research use.

**Methods:** A Health IT survey was conducted within the National Drug Abuse Treatment Clinical Trials Network (CTN) to explore information related to data completeness and presence of unstructured data (e.g., clinical notes, free text) for conducting the EHR-based research for substance use disorders (SUDs). The analysis was based on 36 participants from 36 facilities located in 14 states and affiliated with the CTN.

**Results:** The mean age of the participants ( $n = 34$ ) was 48.0 years ( $SD = 9.8$ ). Of the participants enrolled, 50.0% were female and 82.4% were white. Participants' facilities were from four census-defined regions (South 35.3%, Northeast 29.4%, West 20.6%, Midwest 11.8%, Missing 2.9%) and represented diverse settings. The EHR was used by all surveyed facilities including 17 different kinds of EHR platforms or vendors, and 17.6% ( $n = 6$ ) of surveyed facilities also used a separate EHR for behavioral health care (e.g., SUD care). Paper records were also used by 76.5% of surveyed facilities for clinical care (e.g., for health risk appraisal questionnaires, substance use screening or assessment, check-in screening, substance use specific intervention/treatment or referral, or labs/testing). The prevalence of using a patient portal, practice management system, and mHealth for patient care was 76.5%, 50.0%, and 29.4%, respectively.

**Conclusion:** While results are descriptive in nature, they reveal the heterogeneity in the existing EHRs and frequent use of paper records to document patient care tasks, especially for SUD care. The use of a separate EHR for behavioral healthcare also suggests the challenge of obtaining complete EHR data to support research for SUDs. Much EHR development, integration, and standardization needs to be done especially in regard to SUD treatment to facilitate research across disparate healthcare systems.

### 1. Introduction

In contrast to data collected from traditional research studies that are separate from routine clinical practice, electronic health record

(EHR) data from routine patient care are considered the data source for generating real-world evidence (Food and Drug Administration (FDA), 2019). EHR data are essential for research efforts that promote a continuously learning health system (Greene, Reid, & Larson, 2012;

**Abbreviations:** CDE, common data element; CMS, Centers for Medicare and Medicaid Services; CTN, National Drug Abuse Treatment Clinical Trials Network; EHR, electronic health record; Health IT, health information technology; NIDA, National Institute on Drug Abuse; SBIRT, substance use screening, brief intervention, and referral to treatment; SUD, substance use disorder

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Krumholz, Terry, & Waldstreicher, 2016). Pragmatic randomized trials that leverage EHR data to recruit participants and measure intervention outcomes have the potential to produce generalizable results at a relatively low cost per participant (Li et al., 2016; Ramsberg & Neovius, 2015). Additional health information technology (IT) tools, such as patient portal, practice management system, and mHealth tools or apps, have become integrated components of an EHR for enhancing patient care or collecting additional patient care information (Irizarry, DeVito Dabbs, & Curran, 2015; Lai & Afseth, 2019; Waldren, Agresta, & Wilkes, 2017). A patient portal is a secure online website that gives patients convenient, 24-hour access to personal health information (e.g., medications, lab results) from anywhere with an Internet connection (U.S. Department of Health and Human Services, 2017). Practice management systems help to automate a practice's administrative and billing functions via electronic transactions and workflows (e.g., capturing patient demographics, scheduling appointments, maintaining insurance payer lists, performing billing, or generating reports) (American Medical Association, 2015). Mobile health (mHealth) can be defined broadly to include the use of mobile devices and technologies (e.g., mobile phone, personal digital assistant), including mHealth apps operating on a mobile device, to provide healthcare support, delivery, and intervention to improve clinical outcomes or health research (Society for the Study of Addiction, 2019; World Health Organization, 2011).

The use of EHRs, mHealth technology, and other electronic data-capture tools has the potential to recruit a larger clinical sample of patients with diverse clinical or demographic backgrounds not always included in traditional studies and to streamline the data collection capability for improving the efficiency of clinical studies. The Patient-Centered Outcomes Research Institute (PCORI) launched PCORnet in 2014 to develop a national research infrastructure to advance the use of EHR data in comparative effectiveness research and pragmatic interventional studies (Fleurence et al., 2014). Since then, there has been a substantial increase in the use of real-world data from patient care for clinical trials, observational studies, and safety surveillance research (Cowie et al., 2017; James, Rao, & Granger, 2015; Margolis et al., 2014). Likewise, the National Institute on Drug Abuse (NIDA) National Drug Abuse Treatment Clinical Trials Network (CTN) has initiated efforts to identify and develop common data elements (CDEs), such as validated screening tools, to improve Substance use screening, Brief Intervention, and Referral to Treatment (SBIRT) for substance use disorders (SUDs) in EHRs (Ghitza et al., 2013; Ghitza, Gore-Langton, Lindblad, & Tai, 2015; Ghitza, Sparenborg, & Tai, 2011; McNeely et al., 2016; Tai & McLellan, 2012; Tai, Wu, & Clark, 2012). NIDA has launched a public portal (<http://cde.drugabuse.gov>) to provide a single-source repository for CTN-recommended CDEs for SUDs for use in the EHRs and clinical research (Ghitza et al., 2015; NIDA, 2014).

However, healthcare data are generated from the natural settings for clinical care, not for research purposes. To produce valid and sensible findings to inform the effectiveness and harms of interventions or treatments from a pragmatic trial or an observational study, relevant healthcare data from the EHR and related health IT tools must be available and centralized. For example, EHR data elements for research interests must be documented in a consistent way, preferably through easily available EHR or health IT tool core functionalities. In addition, the EHR and health IT tool-generated data need to be standardized, collated and easily accessible in structured, computer-readable formats for data analysis and proper comparisons of results across disparate systems. Although computational techniques, such as natural language processing (NLP) to extract medical concepts from free-text documents, are currently available to help quantify unstructured EHR data (e.g., clinical notes), the use of such data from disparate systems to support multisite studies poses substantial operational challenges and increases study costs (Murdoch & Detsky, 2013). Furthermore, related regulatory issues, such as patient privacy, must be addressed to enable the broader use of real-world data for supporting the conduct of multicenter studies.

At the time of conducting this study, the NIDA CTN included 13 research nodes across the nation, which provide a research

infrastructure to conduct multisite trials of SUD-related conditions to evaluate the effectiveness of study interventions and treatments. A CTN node is a network of multiple universities and/or healthcare facilities/systems affiliated with the NIDA CTN. The optimal goal is to transfer study results to impact clinical practices and improve patient outcomes for individuals with SUD. Thus, the use of real-world data from patient care collected by the EHR and related health IT tools for study participant recruitment and/or clinical outcome measures is inherently relevant to the CTN's mission. The NIH HEAL (Helping to End Addiction Long-term<sup>SM</sup>) Initiative that supports studies related to opioid use disorder prevention and treatment likewise reveals an urgent need to better characterize EHR data and make it available for addiction research (Collins, Koroshetz, & Volkow, 2018).

The NIDA CTN's national research network provides the opportunity to explore characteristics of the affiliated healthcare facilities to support EHR-based studies. To date, no standards exist for describing the quality and completeness of electronic health data (FDA, 2019). Understanding the characteristics of a data source (e.g., what system is used to capture the healthcare information, what data elements of patient care are captured, whether the same data are captured by multiple systems) is critical for investigators in their determination of data fit for a specific use (FDA, 2019). The goal of this study is to conduct a health IT survey of CTN-affiliated healthcare facilities regarding their use of an EHR and health IT tools (patient portal, practice management system, mHealth tool) to capture clinical care tasks related to SUD prevention and treatment services. The survey also assessed the use of paper records for capturing clinical care tasks to understand the type or nature of patient care data that may be missed by EHR data. This survey provided information related to data completeness and presence of unstructured data at healthcare facilities within the NIDA CTN.

## 2. Material and methods

### 2.1. Study sample and recruitment

To collect proper information about the EHR and related health IT usage, we determined that participants should know how EHRs and additional health IT tools are used to support clinical tasks at their facility. To identify eligible participants from the CTN for the survey, the investigative team contacted each of the 13 CTN node principal investigators and their corresponding coordinators and collected the contact information of eligible individuals from each. The target population of the Health IT survey included individuals with knowledge of their facility's EHR system (i.e., IT manager/staff, clinical staff/provider) from a facility or health system affiliated with the CTN; eligible individuals did not need to be affiliated with the CTN as investigators. To ensure the diversity of surveyed facilities, only one participant at a facility could participate in the survey. There were no other exclusion criteria. Research coordinators received the information for 40 individuals from CTN nodes, and all were invited to participate in this online survey via an email.

### 2.2. Survey

The survey assessed (a) participants' demographic and facility information and (b) the Health IT usage characteristics at their facilities. The survey took approximately 45 min to complete. Fig. 1 presents the conceptual framework of the Health IT survey. Using guidance from the Agency for Healthcare Research and Quality (AHRQ)'s workflow resources (AHRQ, 2019), we included a list of clinical tasks ranging from scheduling a healthcare visit to treatment referral (Table 1). To understand whether healthcare data for SUDs are captured, clinical tasks also listed services related to SBIRT. SBIRT is an evidence-based practice for the detection of substance misuse and need for intervention and treatment (Shapiro, Coffa, & McCance-Katz, 2013; Pace & Samet, 2016; Substance Abuse and Mental Health Services Administration (SAMHSA), 2011). In the United States, the National Committee for

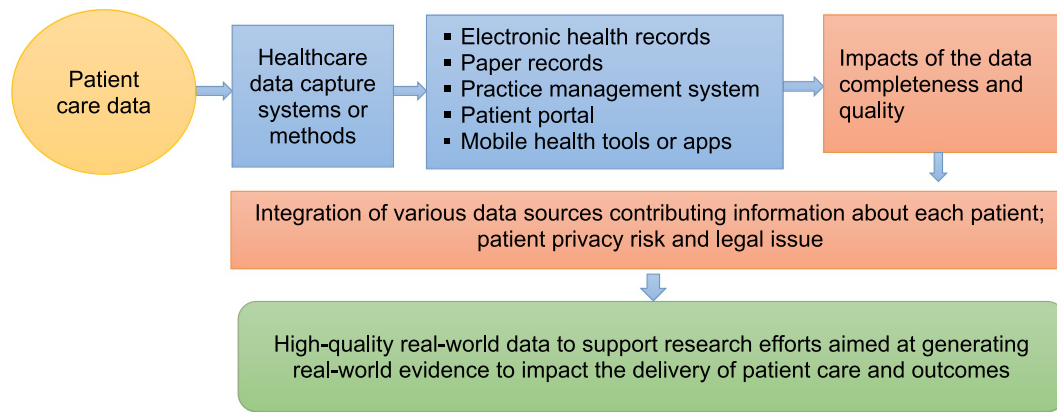


Fig. 1. The conceptual framework of the Health IT survey.

Quality Assurance (NCQA) and National Quality Forum (NQF) have endorsed quality measures for improving the delivery of behavioral health services for SUDs and patient outcomes, including measures for substance use screening, brief intervention, and treatment for SUDs (National Committee for Quality Assurance (NCQA), 2019; National Quality Forum (NQF), 2014, 2019). Thus, we explored the availability of SBIRT-related healthcare data in the EHRs to inform the development and usage of healthcare quality measures and SUD research.

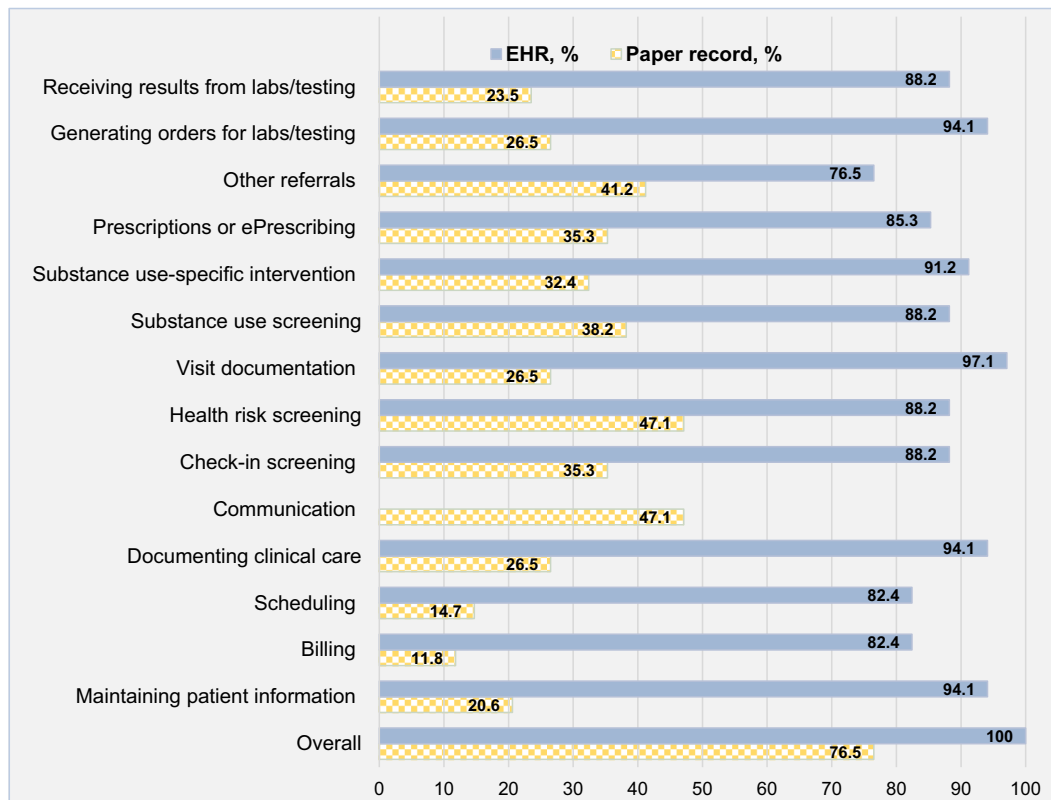
Each participant was asked to indicate the types of methods and systems used (paper record, EHR, practice management system, patient portals, mHealth, other or unknown systems) at his/her facility to support the provision of the following clinical care services: maintaining patient contact information; billing; scheduling; documenting clinical care information; communication between providers and patients; administration of check-in screening; health risk appraisal questionnaires (e.g., depression); visit

documentation; patient entry of reported events; substance use screening or assessments; substance use-specific intervention, treatment, or referral; prescriptions or ePrescribing; other non-substance use related referrals; generating orders for labs/testing; receiving and viewing results from labs/testing; and any other services.

Additional questions were included to assess the name of the EHR system, use of a practice management system, use of a separate EHR system for behavioral health care (psychiatric and SUD-related treatment data), and use of mHealth tools/apps for research and clinical care. Federal regulations restriction the disclosure and use of patient records pertaining to SUD treatment (i.e., Confidentiality of Alcohol and Drug Abuse Patient Records; CFR Title 42: Part 2) (Substance Abuse and Mental Health Services Administration (SAMHSA), 2019). To address patients' confidentiality, facilities may have used a different behavioral health EHR for psychiatric and SUD treatment services. Thus,

Table 1  
The Health IT Survey of clinical tasks by type of the systems used.

Clinical tasks	Description
Maintaining patient contact information	Tasks include entering and keeping a record of patient contact information, including patient's name, address, phone number/s, and other information such as alternate contact people, alternate numbers, or email. The system used to maintain patient contact information is often the system where the patient is "checked-in" when they arrive at the clinic and where appointments are scheduled.
Billing	Following a clinical visit, a provider identifies a procedure code that best describes the level of service rendered during the patient visit, and a diagnosis. The billing system uses this information to submit an electronic claim. Billing systems also receive responses from the payer, indicating which portions of the claim will and will not be paid.
Scheduling	Assigning a patient to an appointment time with a provider and updating or changing appointment information.
Documenting clinical care information	Entering and maintaining clinical data including observations, measurements such as vital signs, assessments, treatment plans and clinic notes.
Communication between providers and patients	Systems that facilitate communication between patients and providers, for example, patients can enter questions for providers and receive responses from providers. Such systems support entry and tracking of patient questions, clinician and patient responses and often function similarly to email but offer added security.
Administration of check-in screening	Collecting patient self-report data often accomplished with tablets, smart phone applications, desktop computers or kiosks in clinic waiting rooms or via web-based surveys sent to patients to complete before a visit.
Health risk appraisal questionnaires (e.g., depression)	Using one or more health questionnaires or tools to collect patient's health risks and/or quality of life (e.g., mental health, lifestyle, personal or family medical history, and attitudes toward changing behavior to improve health).
Visit documentation	Documenting the type of visit (e.g., preventive care), history, exam, counseling, treatment, or lab/diagnostic services.
Patient entry of reported events	Enabling patients to report information such as side-effects, adverse events, improvement or worsening of symptoms, to the clinic or to a provider between visits.
Substance use screening or assessments	Using a questionnaire, tool, or test to screen for substance use (e.g., tobacco, cigarettes, alcohol, illicit drugs; non-prescribed drug use, Rx drug misuse); if screening is positive, using a tool/test to assess substance use severity or diagnosis.
Substance use-specific intervention, treatment, or referral	Providing brief intervention or treatment for substance use-related problems; creating, editing, or routing a referral for substance use-specific assessment or treatment to another provider, usually a specialist; and receiving back relevant clinical documentation resulting from the referral. This row pertains to substance use-specific tasks only.
Prescriptions or ePrescribing	Generating a prescription that can be printed and given to a patient or sent electronically to a pharmacy.
Other referrals	Creating, editing, and routing a referral for assessment or treatment to another provider, usually a specialist, and receiving back relevant clinical documentation resulting from the referral. This row pertains to all referrals other than substance use-specific referrals.
Generating orders for labs or other testing	Creating or editing physician orders for labs or other tests.
Receiving and viewing results from labs or other testing	Receipt, displaying or storing lab results or results from other testing.



**Fig. 2.** Clinical tasks captured by the electronic health record (EHR) versus paper records. (Note: The communication task is not applicable to the EHR).

the survey assessed whether a separate behavioral health EHR is used and the name of the behavioral health EHR. This study was conducted between December 2016 and June 2017, and it was approved by the Duke University Health System institutional review board.

### 2.3. Data analysis

The CTN's Data and Statistical Center conducted the data management and analysis. Descriptive analysis was conducted to summarize results regarding the use of an EHR or other systems to support clinical tasks. Counts and percentages were calculated and presented for discrete variables. Mean, standard deviation, median and range were calculated to summarize continuous demographics.

## 3. Results

### 3.1. Demographic and facility characteristics

Of the 40 individuals contacted by email, 36 individuals from 36 facilities accepted the study invitation and provided the electronic consent at the study website. Overall, 85% ( $n = 34$ ) of the target sample (94% of the 36 individuals who provided an electronic consent) responded to the survey and were included in the data analysis. These participants were from facilities in 14 states (Connecticut, Florida, Idaho, Maine, Massachusetts, Minnesota, Montana, New York, North Carolina, Ohio, South Carolina, Texas, Vermont, and Washington).

The mean age of the participants ( $n = 34$ ) was 48.0 years ( $SD = 9.8$ ). Of the participants enrolled, 50.0% were female, 82.4% were white (Asian 14.7%, Black/African American 2.9%, refused/missing 2.9%), and 2.9% were Hispanic. Participants' facilities were from four census-defined regions (South 35.3%, Northeast 29.4%, West 20.6%, Midwest 11.8%, and Missing 2.9%). Participants were recruited from diverse settings: IT/Informatics (35.3%), ambulatory primary care (23.5%), ambulatory other/specialty

(8.8%), mixed setting (partial hospitalization in day/night clinic) (5.9%), emergency department (2.9%), hospital outpatient (2.9%), and other (17.6%: behavioral health, cancer, community treatment program, ophthalmology, outcomes/evaluation). The sample was about equally distributed between IT managers/staff and clinical providers/staff.

### 3.2. Facility's health IT utilization and clinical tasks

Each participant was asked to indicate his/her facility's current use of various systems for performing different clinical tasks. Of all clinical tasks, two were specifically related to addiction care (i.e., substance use screening or assessment; substance use-specific intervention, treatment, or referral). An EHR was used by all participating facilities (100.0%). A total of 17 different EHR platforms or vendors were identified: Epic ( $n = 13$ , 38.2%), Avatar/Myavatar ( $n = 3$ , 8.8%), Cerner ( $n = 3$ , 8.8%), Allscripts ( $n = 2$ , 5.9%), Meditech ( $n = 2$ , 5.9%), Centricity Practice Solutions ( $n = 2$ , 5.9%), Centricity ( $n = 1$ , 2.9%), Netsmart CMHC/MIS ( $n = 1$ ), Professional EHR ( $n = 1$ ), Awards ( $n = 1$ ), Canopy ( $n = 1$ ), Hyperspace-Prod ( $n = 1$ ), Menon ( $n = 1$ ), Nextgen ( $n = 1$ ), Point and Click ( $n = 1$ ), Success EHS ( $n = 1$ ), and Welligent ( $n = 1$ ). The facility's initial year of EHR system use ranged from 1999 to 2016 with 20 (58.8%) facilities using an EHR system before 2010. Each participant was asked to indicate whether a separate behavioral health EHR system was used by his/her facility for psychiatric/addiction patient care. We identified six behavioral health EHR platforms or vendors ( $n = 6$ , 17.6%) for psychiatric/addiction patient care (Cerner, Hyperspace-Prod, Meditech, Menon, Netsmart Avatar, Point and Click).

The EHR system was used to support a majority of the clinical tasks surveyed (76.5%–97.1%), including those related to behavioral health care (91.2% for substance use-specific intervention, treatment, or referral; 88.2% for administration of check-in screening; 88.2% for health risk appraisal questionnaires, such as depression; 88.2% for substance use screening or assessment). The prevalence of any paper record use was 76.5%. Fig. 2 summarizes clinical tasks performed via an EHR system versus paper

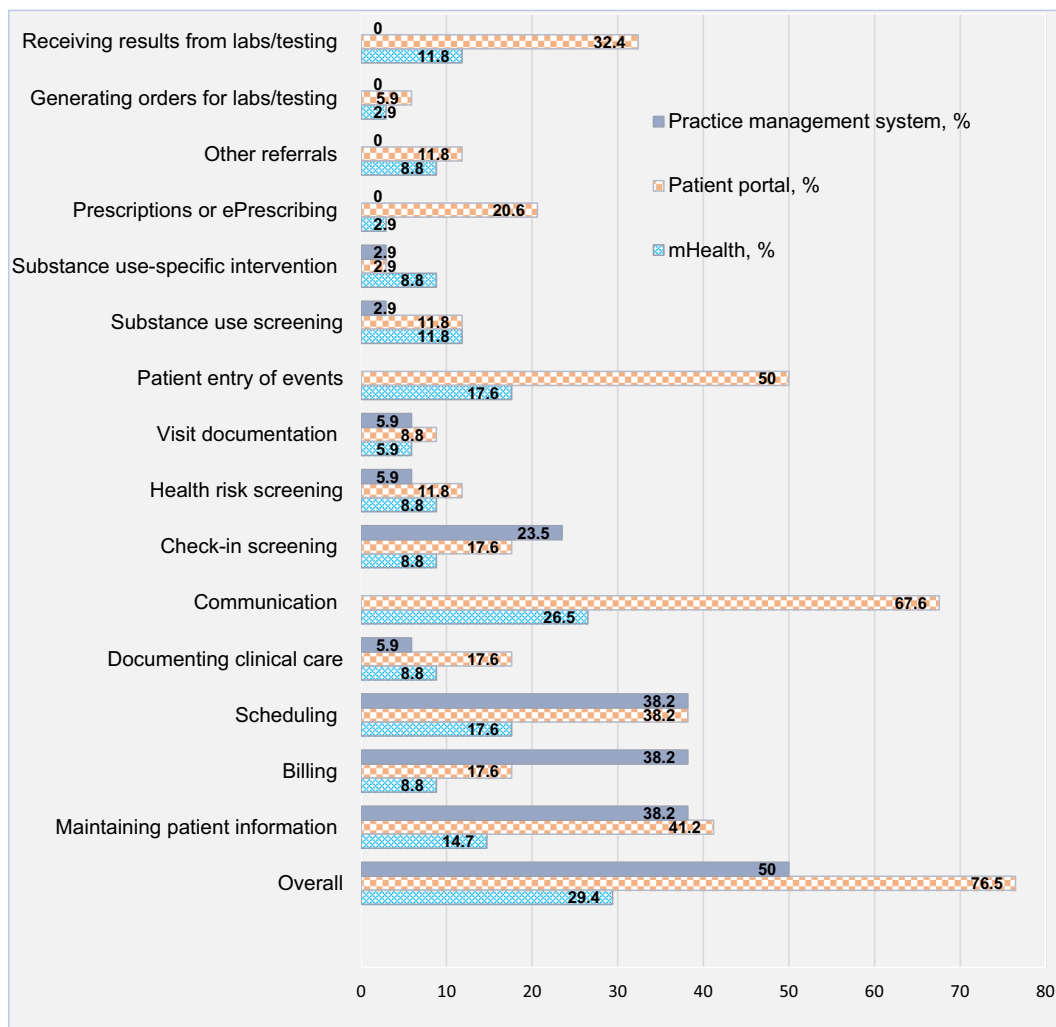


Fig. 3. Clinical tasks captured by practice management system, patient portal, and mHealth tool/app. (Note: “Communication” and “Patient entry of events” are not applicable to practice management system.)

records. Paper records were commonly used to support addiction related clinical tasks (38.2% for substance use screening or assessment; 32.4% for substance use-specific intervention, treatment, or referral).

Fig. 3 summarizes these clinical tasks by patient portal, practice management system, and mHealth utilization. The prevalence of any patient portal use was 76.5%. There was a low prevalence of patient portal use for supporting substance-specific tasks (11.8% for substance use screening; 2.9% for substance use-specific intervention, treatment, or referral). The prevalence of any practice management system use was 50.0%, which tended to be for maintaining patient contact information, billing, or scheduling. Twelve (n = 12) practice management systems were identified (Centricity Practice Solutions, Netsmart Avatar/Myavatar, IDX, Accumedic, Allscripts, Encompass, Epic PRactice, Menon, Netsmart CMHC/MIS, Nextgen/Topaz, Point and Click, Success EHS). The prevalence of any mHealth use (either patient-facing or clinician-facing tools/apps) was 29.4%. Five platforms integrated with mHealth tools/apps were reported by participants (Mychart, Epic Haiku/Canto, My Carolinas Tracker, Tableau, Apple Healthkit).

#### 4. Discussion

##### 4.1. Summary of findings

There is currently no gold standard for evaluating the quality of electronic healthcare data (FDA, 2019). While drug overdose deaths

and related addiction problems are a national crisis in the United States, the availability and integration of addiction related treatment data (e.g., SBIRT) in EHRs is a particularly understudied area. This study surveyed the usage of EHR and related IT tools for supporting clinical workflow healthcare tasks to identify sources of healthcare data, which may not be readily available in the EHRs. Although all surveyed facilities used EHRs, a small proportion of participants reported no use of the EHR to support clinical tasks for substance use screening (11.8%) or substance use-specific intervention (8.8%). Overall, paper records were used frequently to support healthcare tasks related to SUD services (health risk screening, substance use screening, substance-specific intervention, lab testing and lab results). However, it is unknown whether facilities using paper records to collect information have established a systematic way (i.e., a protocol) to integrate the information from paper records into the EHRs. There is a possibility that some healthcare data for substance misuse/SUDs collected by paper sources may not be fully integrated into the EHR database.

Additionally, 17.6% (n = 6) of the surveyed facilities also used a separate behavioral health EHR for psychiatric/addiction treatment services. Due to concerns about the protection of patients' SUD treatment data (Code of Federal Regulations Title 42, Part 2; 42 CFR Part 2), healthcare data from a behavioral health EHR may be stored separately from the other EHR data (SAMHSA, 2019; Schaper, Padwa, Urada, & Shoptaw, 2016). While health system staff may have concerns over balancing patient safety with privacy protections, the implementation

of 42 CFR Part 2 appears to vary greatly across settings and systems (Campbell et al., 2019). Furthermore, SUD treatment services have often been provided in separate specialty addiction treatment programs or contracted out and managed separately from a larger healthcare plan (McLellan & Woodworth, 2014). In such situations, patients' SUD treatment data tend to be excluded from the EHRs of a larger health system. SUDs in the EHR database may therefore be underreported. Further research should investigate the incompleteness of SUD treatment data in the EHR as well as contributing sources to and factors of these incomplete data (e.g., the IT systems used, EHR workflow and functionality, facility policy, and clinic/provider characteristics).

In addition, results showed a low proportion of surveyed facilities using a practice management system, patient portal, or mHealth tools/apps to provide health care for health risk screening (5.9%, 11.8%, and 8.8%, respectively), substance use screening (2.9%, 11.8%, and 11.8%, respectively), and substance use-specific intervention (2.9%, 2.9%, and 8.8%, respectively). These findings may reflect clinical practice procedures as well as the functionality and clinical workflow for addiction services in an EHR (e.g., utility, user-specific interfaces). For example, if validated tools and prompts/alerts for conducting preventive and treatment services for SUDs were not embedded within an EHR, providers might need to request screening questionnaires via a patient portal. Physician time constraints and competing clinical priorities are major barriers to providing SBIRT services to patients (Pilowsky & Wu, 2013; Rahm et al., 2015). To address time constraints during the physician visit, a patient portal or practice management system could be used to increase uptake of substance misuse and other health risk screening before a scheduled healthcare visit. Health IT tools should be better tailored to meet patients' and providers' needs and interests, to increase provider endorsement and patient usage of health IT tools to improve SUD treatment and outcomes (Mazur, Mosaly, Moore, & Marks, 2019). Only after effective clinical data recording tools are developed and integrated into a retrievable EHR system can effective pragmatic research be conducted. This survey highlights the ongoing variability in accessing complete information for SUD research through EHR systems (Wu et al., 2019).

#### 4.2. Limitations

Participants are a convenience sample recruited from facilities affiliated with the NIDA CTN. Given the research affiliation, results are likely to reflect a better view of the use of the EHR, paper sources, and other health IT tools for clinical tasks related to addiction treatment services than those of non-research, non-academic facilities or those not specifically affiliated with addiction treatment. The exploratory results are useful for identifying research gaps and generating hypotheses for further research. However, they provide no information about causality and no formal hypotheses were tested. These findings are based on self-reports of surveyed participants, which may be affected by self-reporting bias and memory. In addition, this Health IT survey did not include questions about whether the facility had a protocol in place to link the data from different sources (e.g., paper records, behavioral health EHR data) into the EHR data warehouse for research purposes.

Nonetheless, this survey provides timely and much-needed information on a vastly understudied area of addiction research. Because of the unique issues related to SUD treatment (e.g., privacy concern, segregated behavioral healthcare systems, carved-out financing for addiction treatment), EHRs and EHR-based research may be less prevalent in addiction treatment than it is in clinical care for other common chronic diseases (e.g., diabetes, heart diseases) (Cowie et al., 2017; Tai & McLellan, 2012). The drug overdose death epidemic and the HEAL Initiative demonstrate a great need for research to identify strategies for improving the completeness of SUD data in the EHRs to enable proper use of performance measures (Collins et al., 2018; Garnick, Horgan, Acevedo, McCorry, & Weisner, 2012; Scholl, Seth, Kariisa, Wilson, & Baldwin, 2019). This study investigated the fundamental areas of the

health IT systems/tools used to capture the EHRs and generated questions for further research (Garnick et al., 2012).

## 5. Conclusion

The U.S. government and its agencies are investing hundreds of billions of dollars toward prevention and treatment services for SUD and related conditions, as well as research efforts to curb the national opioid epidemic (Collins et al., 2018; US HHS, 2018). Patients' healthcare data collected from EHRs and connected health IT tools have been used to measure the progress or outcomes of such efforts through quality improvement processes, meaningful use requirements, and research studies (Centers for Medicare & Medicaid Services [CMS], 2020; FDA, 2019; Krumholz et al., 2016). There is an urgent need to make SUD treatment-related information available in real-world patient data (Wu et al., 2019). The findings from this study emphasize the need to improve the completeness of SUD treatment data in EHRs; design individualized, user-specific interfaces to enhance the delivery of SBIRT services for SUDs via EHRs and connected IT tools; and develop research-friendly tools to integrate patient care data from multiple sources.

### Institutional review board approval

The CTN-0071 study (Principal Investigator: Li-Tzy Wu) has been approved by the Duke University Health System Institutional Review Board.

### CRedit authorship contribution statement

**Li-Tzy Wu:** Conceptualization, Methodology, Project administration, Writing - original draft. **Elizabeth H. Payne:** Data curation, Formal analysis, Writing - review & editing. **Kimberly Roseman:** Investigation, Writing - review & editing. **Ashley Case:** Data curation, Formal analysis, Writing - review & editing. **Casey Nelson:** Data curation, Formal analysis, Writing - review & editing. **Robert Lindblad:** Project administration, Writing - review & editing.

### Declaration of competing interest

Li-Tzy Wu has received research support from Patient-Centered Outcomes Research Institute, Duke Endowment, and Centers for Disease Control and Prevention. The other authors have no conflicts of interest to disclose.

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