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## Increasing collaboration on substance use disorder research with primary care practices through the National Drug Abuse Treatment Clinical Trials Network

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### Abstract

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None.

Appendix A. Supplementary data  
Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jsat.2020.02.009>.

**Background:** The National Drug Abuse Treatment Clinical Trials Network (CTN) called for its national nodes to promote the translation of evidence-based interventions from substance use disorder (SUD) research into clinical practices. This collaborative demonstration project engaged CTN-affiliated practice-based research networks (PBRNs) in research that describes aspects of opioid prescribing in primary care.

**Methods:** Six PBRNs queried electronic health records from a convenience sample of 134 practices (84 participants) to identify the percent of adult patients with an office visit who were prescribed an opioid medication from October 1, 2015, to September 30, 2016, and, of those, the percent also prescribed a sedative in that year. Seven PBRNs sent an e-mail survey to a convenience sample of 108 practices (58 participants) about their opioid management policies and procedures during the project year.

**Results:** Of 561,017 adult patients with a visit to one of the 84 clinics in the project year, 22.9% (PBRN range 3.1%–25.4%) were prescribed opioid medications, and 52.1% (PBRN range 8.5%–60.6%) of those were prescribed a sedative in the same year. Of the 58 practices returning a survey (45.3% response rate), 98.1% had formal written treatment agreements for chronic opioid therapy, 68.5% had written opioid prescribing policies, and 43.4% provided reports to providers with feedback on opioid management. Only 24.1% were providing buprenorphine for OUD.

**Conclusion:** CTN-affiliated PBRNs demonstrated their ability to collaborate on a project related to opioid management; results highlight the important role for PBRNs in OUD treatment, research, and the need for interventions and additional policies addressing opioid prescribing in primary care practice.

## Keywords

Prescribing patterns; Opioids; Primary care; Electronic health records; Practice-based research

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## 1. Introduction

An estimated 20.7 million people 12 or older had at least one substance use disorder (SUD) in 2017, yet fewer than 20% of these individuals received any substance use treatment in the past year (Substance Abuse and Mental Health Services Administration, 2018). Primary care practice is a critical setting for SUD prevention, recognition, and treatment, as 85% of adults reported a usual source of medical care in 2015 (Ashman, Rui, & Okeyode, 2018), and roughly half of all physician office visits in 2018 were made to primary care physicians (Centers for Disease Control and Prevention (CDC), 2018). Yet a survey of patients in treatment for SUD in 10 facilities in California, Illinois, New York, and Minnesota found that 43% said their primary care physician did not diagnose their SUD (National Center on Addiction and Substance Abuse, 2000).

Opioid use disorder (OUD) is of particular relevance to primary care, as >20% of individuals prescribed opioid medications in primary care settings have evidence of OUD (Von Korff et al., 2017). Primary care providers write more than half of all opioid prescriptions each year (Saha et al., 2016), and prescription opioids are responsible for roughly a third of overdose deaths (Scholl, Seth, Kariisa, Wilson, & Baldwin, 2019). Patients report greater willingness to enter substance use treatment in primary care settings (37.3%) rather than specialty drug

treatment centers (24.6%) (Barry, Epstein, Fiellin, Fraenkel, & Busch, 2016). Working with primary care settings to better understand their current practices in preventing, diagnosing, and treating SUD, and their barriers to implementing evidence-based SUD interventions, is a first step toward improving care for patients with these conditions.

To generate, implement, and disseminate research evidence that supports optimal management of patients with SUD in primary care settings, the National Drug Abuse Treatment Clinical Trials Network (CTN) (National Institute on Drug Abuse (NIDA), 2019) specifically called on its “nodes” to partner with primary care practice-based research networks (PBRNs) (Department of Health and Human Services (HHS), 2018; Tai, Sparenborg, Ghitza, & Liu, 2014). Nodes are regional organizational units within the CTN that are based at academic institutions and provide scientific leadership for clinical research conducted within the CTN. Nodes bring together researchers and clinical partners who treat patients with SUD to facilitate rapid, multi-site testing of promising SUD treatments and the subsequent delivery of these treatments to patients in a variety of settings.

PBRNs are networks of practicing clinicians and clinics committed to improving medical care for a range of health problems. PBRNs ask and answer clinical and organizational questions central to primary healthcare, engage understudied populations, and accelerate the adoption of new knowledge and best practices (Agency for Healthcare Research and Quality (AHRQ), 2019; Baldwin et al., 2012; Carey, Halladay, Donahue, & Cykert, 2015; Tapp & Dulin, 2010; Westfall, Mold, & Fagnan, 2007). PBRNs include a diverse mix of community health centers, private practices, academic and health system-affiliated practices, and government-operated clinics.

The CTN’s call to collaborate with PBRNs built on its first decade of work focused on moving SUD research into community-based settings, which is where most medical care is provided (Centers for Disease Control and Prevention (CDC), 2018; Tai, Sparenborg, Liu, & Straus, 2011). By promoting research partnerships with PBRNs, the CTN has sought to foster collaboration between researchers and primary care providers in diverse, outpatient, community-based settings. This collaboration helps to ensure that the CTN studies interventions that are acceptable and feasible in community-based practices, and translates evidence-based SUD treatments into these settings (National Institute on Drug Abuse (NIDA), 2015).

This article describes a collaborative effort across five CTN nodes to conduct a demonstration project that could show how CTN-affiliated PBRNs might participate in research on opioid management, using both electronic health record (EHR) and survey data across seven PBRNs. The PBRNs viewed this collaboration as an opportunity: 1) to answer questions important to both primary care clinics and SUD researchers about opioid prescribing practices and policies, and 2) to demonstrate the ability of multiple PBRNs across the CTN to collaborate on OUD research. Through this project, both strengths of and challenges to conducting OUD research in primary care settings are identified.

## 2. Material and methods

### 2.1. Setting

The CTN is a platform for developing, validating, refining, and disseminating treatment options for SUDs through a variety of treatment and medical care settings (Supplementary file 1) (National Institute on Drug Abuse (NIDA), 2015). CTN affiliations with PBRNs provide opportunities to conduct research in varied outpatient settings that serve diverse patient populations. In spring 2017, eight PBRNs affiliated with five CTN nodes met at the national CTN scientific meeting, and planned this demonstration project, which was conducted under the auspices of the existing CTN and PBRN infrastructures. At the time of this meeting, the scope of PBRN affiliation with the CTN nodes was unknown, and few PBRNs were attending the meeting. Because specific funding was not provided, this project was limited to those PBRNs in attendance at the 2017 meeting, and limited in the scope of procedures it could undertake. Seven of the eight PBRNs attending the meeting agreed to participate in the project. One PBRN was unable to participate without dedicated funding. The seven PBRNs included 858 clinics at the time of the project (Fig. 1).

### 2.2. Data sources/variables

This project used methods from a project conducted between March 2016 and February 2017 by the CTN's Pacific Northwest Node and its affiliated PBRN. Data from all seven participating PBRNs, including the original project conducted by the Pacific Northwest Node, were included. Personnel from the Pacific Northwest Node trained staff in each participating PBRN's research office via webinar to promote uniformity of methods.

The original project collaborated with PBRN-affiliated clinics to identify questions important to opioid management in clinical care. It used straightforward research methods that could be translated across diverse sites and be conducted by the clinics themselves. These methods included: 1) a survey of primary care clinics to identify prescribing policies and procedures related to management of patients using long-term opioid therapy, and 2) a simple EHR query to identify the annual rates of opioid and sedative medication prescribing among adult patients in the clinics.

The survey (Supplementary file 2) asked 13 questions about clinic-wide opioid processes and policies, how consistently these were followed, provider access to the prescription monitoring program database, and whether buprenorphine was prescribed on-site for OUD. All seven participating PBRNs were able to conduct the survey. Each participating PBRN research office e-mailed the survey to a convenience sample of clinics within its network, with one to two reminders. Because there was no dedicated funding for this project, some PBRNs chose to survey only those clinics with which they had close collaborative research relationships. Other PBRNs sent the survey to all clinics participating in the EHR query. Each clinic's leader was asked to complete one survey on behalf of the clinic. Survey data were collected and managed using REDCap electronic data capture tools (Harris et al., 2009). A total of 102 clinics were e-mailed a survey (range of 1 clinic to 55 clinics depending on the PBRN); 58 (56.8%) responded (Fig. 1).

The EHR query sought to answer two questions: 1) What is the proportion of adult patients, seen for a primary care visit in the project year (October 1, 2015–September 30, 2016), that had been prescribed any opioid medication for any reason in that year? and 2) Of adult patients prescribed an opioid medication in the project year, what proportion were prescribed a sedative for any reason in the same year? All opioid medications were included, except buprenorphine and formulations commonly used for colds, cough, and diarrhea. Sedative medications included all formulations of benzodiazepines, and non-benzodiazepine hypnotics (e.g., zolpidem). The project included only medications with a prescription order date during the project year. No prescription fulfillment data were available, only data on prescription orders.

Each PBRN research office gathered anonymized, aggregate EHR data from a convenience sample of clinics within their PBRNs. Of the seven participating PBRNs, six (85.7%) were able to conduct the EHR query. The PBRNs invited 134 clinics to participate in the EHR query (range of 1 clinic to 60 clinics depending on the PBRN) and 84 (62.7%) participated (Fig. 1). The convenience samples were based on the availability of centralized EHR data across multiple clinics in a health system, or the interest of individual clinics in the project questions alongside their capacity to conduct data queries within their EHR systems on a short timeline. In four PBRNs whose clinics are members of a health system with a centralized EHR, an information technology or PBRN research office staff member conducted the data query. In two PBRNs whose clinics are not affiliated with a single health system, the PBRN research offices worked with individual clinics to extract and report aggregate project measures. One PBRN was unable to provide EHR data because of the complexity of gathering these data from its individual clinic EHRs. Because each PBRN gathered its own data, the project was unable to conduct centralized data quality checks, though the project team held training sessions attended by the PBRN research offices to review the requirements and specifications for the EHR data extraction (Supplementary file 3), and to ensure a common understanding of project variable definitions and the intended analysis.

The PBRN research offices also provided data when available on the characteristics of the clinics participating in the survey and EHR query, and for all clinics in their networks. These characteristics included clinic ownership (i.e., independent, affiliated with a hospital/health system, federally qualified health center, or other), clinic location (rural as defined by the Office of Rural Health Policy (Health Resources & Services Administration (HRSA), 2018), urban as all others), clinic size (i.e., small [1–4 providers], medium [5–10 providers], large [11+ providers]), academic/training clinic (yes/no), and the size of the clinic's publicly insured population (i.e., <25%, 25–49%, 50–100% Medicaid/Medicare insured).

### 2.3. Analysis

The characteristics of the clinics participating in the survey and the EHR query were described using simple frequencies, and the characteristics of these clinics were compared to those of the clinics overall in the PBRNs using overall chi squared tests. Simple frequencies of the survey responses were calculated, reporting the proportion of clinics with different types of opioid prescribing policies and processes, and the frequency with which they were

followed consistently. Frequencies of any opioid prescribing overall, by gender, and by age group (18–29, 30–49, 50–59, 60–69, 70–79 as of October 1, 2015), and the overall rate of sedative prescription among adults prescribed opioids were also calculated. Simple chi squared analysis was used to assess the differences in opioid prescribing between men and women, and adults of different ages.

### 3. Results

Characteristics of the PBRNs' 858 clinics overall, the clinics participating in the EHR query, and those participating in the survey are shown in Table 1. The seven PBRNs provided survey data from a total of 58 clinics (range 1–24 clinics, Fig. 1). These 58 clinics were largely affiliated with hospital systems (71.5%), and substantial proportions were medium-sized (5–10 providers, 43.9%), were located in urban areas (60.6%), and had a modest number of publicly insured patients (76.5% of clinics with <50% Medicaid/Medicare patients). The 58 clinics that provided survey data were significantly more likely to be academic/training clinics (41.4%) than those that did not provide survey data (13.0%). Otherwise, there were no significant differences in the characteristics of clinics that provided survey data versus those that did not.

Six PBRNs contributed EHR data from a total of 84 clinics (range 1–34 clinics, Fig. 1). Of the 84 clinics participating in the EHR query (Table 1), most were affiliated with a hospital system (95.0%) and were located in urban areas (90.5%). Just over half of these 84 clinics were medium-sized (55.0%) and were academic/training sites (52.4%). These clinics cared for a modest number of publicly insured patients (87.1% of clinics with <50% Medicaid/Medicare patients). Clinics participating in the EHR query differed significantly from those that did not—they were more likely to be located in an urban area and to be an academic/training clinic. Clinics participating in the EHR query had the highest rates of being affiliated with hospital or health systems and of having under 25% of publicly insured patients, and they had the lowest rates of having only 1–4 clinical providers.

The survey demonstrated that a preponderance of clinics had formal chronic opioid therapy treatment agreements (98.1%), provider access to state prescription drug monitoring program information (96.2%), and a urine drug testing policy (89.1%) (Fig. 2). Approximately two thirds of clinics had written policies for opioid prescribing (68.5%) and for checking the prescription drug monitoring program (61.1%). Less than half of clinics (43.4%) provided reports to providers with feedback on opioid management, and about a third had a random pill count policy (37.0%) or a registry for tracking patients using chronic opioid therapy (33.3%). Even lower proportions of clinics consistently followed the policies and procedures related to opioid prescribing. A quarter (24.1%) of responding clinics reported providing buprenorphine for OUD.

The EHR data included 561,017 adult patients with an office visit during the project period. Of these patients, 128,367 (22.9% overall, PBRN range 3.1%–25.4%) were prescribed at least one opioid medication in the project year (Supplementary file 4). The rate at which patients were prescribed opioids increased steadily with age, with elders 80 and older having more than double the rate of individuals 18–29 years (31.5% vs 15.3%). Women had only



slightly higher rates of opioid prescription than men (23.8% vs 21.6%,  $p = 0.001$ ). Potential concurrent prescribing of opioids and sedatives was common. Of the patients prescribed opioids in the project year, 52.1% (PBRN range 8.5%–60.6%) were also prescribed a sedative in the same year.

#### 4. Discussion

This project demonstrates that CTN-affiliated PBRNs can generate data on the prescription of opioid medications for hundreds of thousands of patients, and report on clinic policies and processes related to opioid management. The primary care clinics within the CTN-affiliated PBRNs had high rates of opioid prescribing, and had put a number of policies in place that focused on opioid management. Given these findings, these PBRN-affiliated clinics provide fertile ground for research partnerships with CTN researchers; the PBRN research offices provide the infrastructures needed to support these collaborations.

The five CTN nodes and their affiliated PBRNs in this project were able to share data across highly diverse primary care practices nationally. There are few other examples of data sharing across this diversity of practice types and geography (DeVoe et al., 2012; Fiks et al., 2015; Lin et al., 2010; Pace et al., 2009). The 22.9% rate of opioid prescribing across one year for adult patients in the participating clinics appears high for the 2015/2016 time frame of the project. Only one other study was found that reported an 11.1% rate of opioid prescribing using 2016 data from primary care clinics in a Virginia PBRN (Tong et al., 2019). The 52.1% rate of potential concurrent opioid-sedative prescription was also high compared to the recently published national figures of 23.0% for a commercially insured population and 25.7% for the Medicare Advantage population (Jeffery et al., 2019). The notably higher rates of opioid prescribing among elders are consistent with prior reports (Paulozzi, Strickler, Kreiner, & Koris, 2015). These findings confirm that the CTN-affiliated PBRNs are a rich environment for studying current care delivery practices, implementing evidence-based screening and assessment tools, and testing interventions for improving opioid management in primary care settings.

The National Drug Abuse Treatment Clinical Trials Network has created a valuable new resource for SUD researchers — a national network of PBRNs, many affiliated with NIH-funded Clinical and Translational Science Awards Program, that can collaborate with academic investigators. The development of this network of CTN-affiliated PBRNs fits with the CTN's increased support and conduct of studies in primary care settings. At the time of publication, the CTN has ten completed studies in primary care settings, eight studies currently active, and multiple studies in development that involve primary care practice settings. Some of these studies involve primary care clinics that are affiliated with academic health centers or health system settings (e.g., Kaiser Permanente, Health Partners) through the CTN's Health Systems Node. Collaborating with PBRNs provides the CTN with the opportunity to expand its studies into more and different primary care clinics (e.g., federally qualified health centers, independent clinics, and clinics affiliated with critical access hospitals) to ensure that its study findings are generalizable beyond academic and health system settings. For example, PBRNs affiliated with CTN nodes are recruiting some of the hardest-to-reach, rural primary care practices by identifying sites for the CTN's Rural

Expansion of Medication Treatment for Opioid Use Disorder Study (National Institute on Drug Abuse (NIDA)).

Conducting this project across diverse PBRNs illuminated challenges to conducting research in PBRNs, and demonstrated solutions to some of those challenges (Table 2). The foremost role of community-based primary care clinics is to serve the day-to-day medical needs of their patients, and clinics and their personnel have many competing priorities. These challenges can make it difficult to recruit clinics to a study, to achieve high levels of response to some research procedures such as surveys, and to maintain consistency in research procedures. Ensuring a research project's design and conduct are adapted to the reality of clinical practice, having an influential clinical champion at the site to promote the project, implementing strategies to address survey fatigue (e.g., including clinic-requested survey questions, returning results to clinics), and providing adequate funding both to the clinics and their personnel as well as to the PBRN research offices to coordinate and standardize the work can all help to mitigate these challenges. In the demonstration project reported here, a CTN-affiliated PBRN developed the methods, procedures, and training protocols to fit with the capabilities of PBRNs and their primary care settings, which likely contributed to the participating PBRNs being able to deliver both the EHR query (100%) and the survey (85.7%) from the convenience sample that was chosen. This project demonstrates the importance of strong research leadership within the clinics. Some PBRNs had identified research leaders at each clinical site; others did not. PBRNs whose clinics had research leaders were able to include more of their clinics in the survey component of the study. Lack of dedicated funding influenced PBRN participation, and may have influenced the survey response rate within individual PBRNs, since no incentive was offered to clinics for completing of the survey.

Challenges to conducting EHR data-based research in PBRNs include gathering harmonized data across multiple, diverse clinics with a number of different EHR platforms. In this project, PBRNs unified across EHR platforms or health systems pulled data centrally, and were able to provide data for a number of clinics simultaneously. In these cases, information technology or PBRN research office personnel used software to query a data warehouse. Other PBRNs worked with IT personnel at individual clinics to extract EHR data. Symmetrical data were extracted across larger organizations and individual clinic sites by using clear variable definitions (e.g., reference dates, names of opioid and sedative medications) and online training sessions both to review the requirements for the EHR data extraction and to ensure a common understanding of the intended analysis. This demonstration project gathered only anonymized, aggregate data, mitigating a common clinic concern about releasing patient data. This project showed that PBRN-based research requiring data from the EHR can be accomplished across health systems and practices, if clear parameters are defined.

Primary care PBRNs offer many opportunities for SUD researchers. First, primary care settings are well suited for pragmatic, randomized trials of effectiveness (Godwin et al., 2003). A strength of pragmatic trials is that their results often have greater generalizability and clinical applicability. Yet because pragmatic trials often implement their interventions at the level of the clinical organization, they require a larger number of organizations to



ensure adequate statistical power. In a pragmatic trial, clinicians and patients generally are not individually consented, and have discretion to participate in different aspects of the study (e.g., degree of implementation of the intervention, completion of study surveys). This may be unfamiliar to researchers accustomed to high response rates among individual participants who have consented to participate in efficacy trials. Primary care clinics are also important settings for implementation research, through which they can contribute to an understanding of how to implement evidence-based interventions in real-world practice.

PBRN research offices were critical to this study's success by developing methods feasible to the clinics (e.g., creating queries that could be accomplished across variable EHRs, using methods that minimized administrative burden for sites), distributing and collecting surveys, and training clinic personnel on the EHR query. The established, trusting relationships that PBRN research offices have with their clinical members allowed this study to be conducted quickly and without project-specific funding. PBRN research offices have expertise in research design and procedures appropriate for clinical practice, practice and patient recruitment, communications with clinical practices, ongoing research management, and interpretation and dissemination of research results. PBRN research offices have a long history of bringing diverse clinical settings into partnership with academic investigators (Berlowitz et al., 2017; Cene et al., 2017; Cole et al., 2016; Dolor, Schmit, Graham, Fox, & Baldwin, 2014; Heintzman et al., 2014; Ludden et al., 2018; Robins et al., 2013; Young et al., 2017).

This demonstration project has several limitations. First, the participants were PBRNs that were attendees at the 2017 national CTN scientific meeting and volunteered to be a part of the project, and thus may not be representative of all PBRNs affiliated with CTN nodes. Second, the participating PBRN research offices did not reach out to all 858 clinics and clinical organizations within their PBRNs, as this demonstration project was not designed to illustrate the full capacity of the PBRNs to conduct in-depth analyses with their EHR data. Instead, the research offices depended on convenience samples for both the EHR-based and survey components of the project. This resulted in participating clinics that are not representative of the PBRNs overall. Specifically, there was underrepresentation of rural clinics and overrepresentation of clinics that are part of health systems for the EHR query component of this project. There was overrepresentation of academic/teaching clinics for both the survey and EHR query components of the project. A fully funded study would have allowed PBRN research offices to invest resources toward recruiting a more representative sample of clinics, and supporting their participation in the research procedures. Additional funding would also have supported PBRN research offices to implement methods to increase the response rate to the survey, and decrease variability across PBRNs. Third, the research project was conducted using 2015–2016 data; clinics may have changed their prescribing practices and their policies since that time. Fourth, the data on opioid prescribing do not distinguish between long-term opioid therapy and acute treatment of pain, and opioid and sedative prescriptions ordered in the same year only were identified. Whether these prescriptions were truly concurrent is unknown. Creation of a centralized patient and provider-level database with full quality controls, harmonization of variables, and inclusion of a larger number of study variables (e.g., associated diagnoses, referral to behavioral health

providers) would help to address these limitations but was beyond the scope of this study. This would be possible in a fully funded project.

## 5. Conclusions

This demonstration project shows that many clinics within PBRNs associated with CTN nodes have high rates of opioid prescription and potential concurrent opioid-sedative prescription. These clinics could benefit from research addressing opioid prescribing and increasing treatment for OUD. Including PBRN research office personnel in research protocol development and implementation will expedite this research and optimize its success. Overall, PBRNs include a large number of patients in multiple clinics across diverse organizations, and their clinics are an important set of collaborators for OUD and other SUD research.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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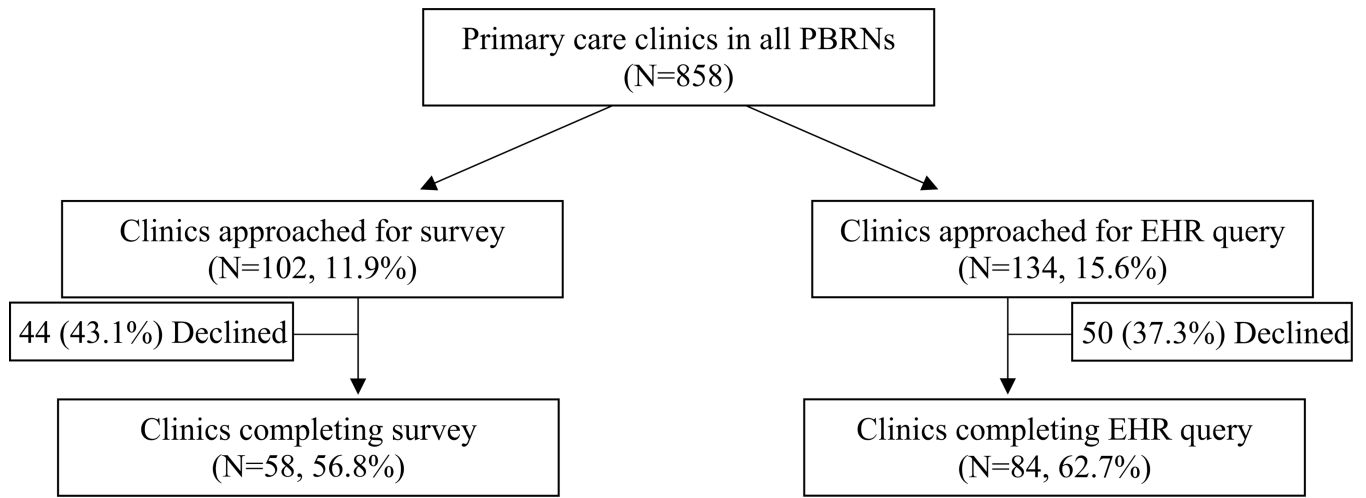
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**Fig. 1.**  
Clinic samples and participation.

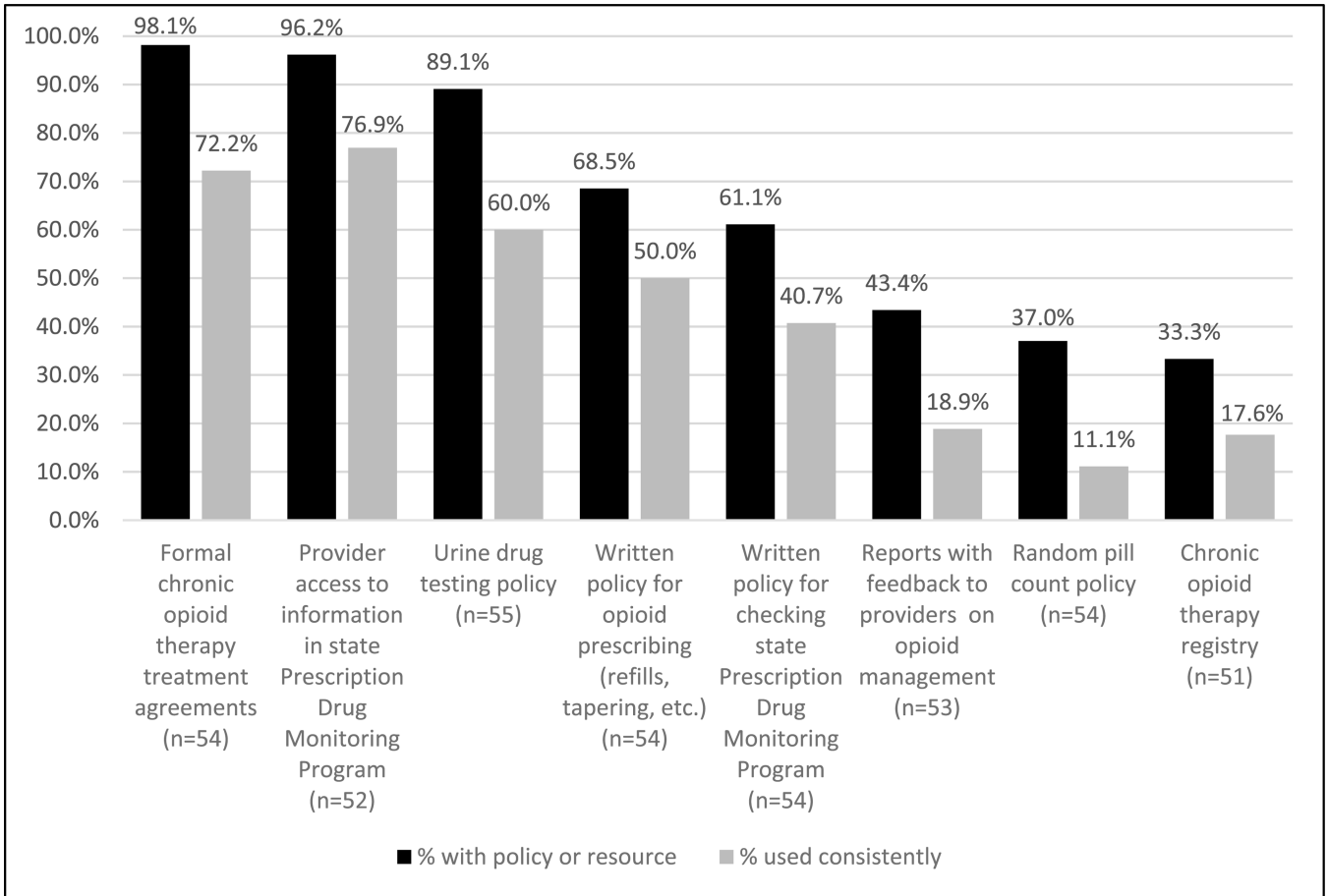
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**Fig. 2.** Proportion of practices that have and/or consistently use various opioid prescribing policies and resources (n = 58). N below each pair of columns represents the number of clinics responding to each set of questions.

Characteristics of clinics across PBRNs overall and of clinics participating in the two study components – the survey and the Electronic Health Record (EHR) query.

**Table 1**

Clinic characteristics	All clinics across the seven PBRNs	Clinics responding to the Survey	Clinics participating in the EHR Query
Clinic ownership	N = 858	N = 58	N = 84
Independent	20.6%	20.8%	0.0% ***
Affiliated with hospital system	64.3%	71.5%	95.0%
Federally Qualified Health Center	11.5%	7.7%	5.0%
Other	3.5%	0.0%	0.0%
Geographic location	N = 858	N = 58	N = 84
Urban	65.4%	60.6%	90.5% ***
Rural	34.6%	39.4%	9.5%
Clinic size	N = 560 <sup>a</sup>	N = 57 <sup>a</sup>	N = 80 <sup>a</sup>
Small (1–4 providers)	51.6%	38.6%	33.8% ***
Medium (5–10 providers)	35.9%	43.9%	55.0%
Large (11+ providers)	12.5%	17.5%	11.3%
Academic/training clinics	N = 731 <sup>b</sup>	N = 58	N = 84
Yes	13.0%	41.4% ***	52.4% ***
No	87.0%	58.6%	47.6%
Public insurance status of clinics' patients	N = 544 <sup>c</sup>	N = 34 <sup>c</sup>	N = 77 <sup>c</sup>
<25% Medicaid/Medicare patients	22.6%	32.4%	39.0% ***
25–49% Medicaid/Medicare patients	49.1%	44.1%	48.1%
50–100% Medicaid/Medicare patients	28.3%	23.5%	13.0%

\*\*\* p 0.001 based on chi-squared tests comparing characteristics of clinics responding to the survey to those not responding, and comparing characteristics of clinics participating in the EHR query to those not participating.

<sup>a</sup>Two PBRNs were unable to provide information on clinic size for all of their clinics.

<sup>b</sup>One PBRN was unable to provide information on clinic academic/training status for all of its clinics.

<sup>c</sup>Two PBRNs could not provide information on the public insurance status of their clinics' patients, and one PBRN could only provide partial information on public insurance status of their clinics' patients.

**Table 2**

Challenges and potential solutions to conducting research in PBRNs.

Challenges	Potential solutions
<i>Research conduct in PBRNs overall</i>	
Research designs less compatible with real-world clinical settings	<ul style="list-style-type: none"> <li>• Work with PBRN coordinating centers to design research appropriate to real-world settings (e.g., pragmatic trials, implementation research)</li> </ul>
Competing priorities – clinics will choose to participate in research based on interest, feasibility, and research capacity	<ul style="list-style-type: none"> <li>• Work with PBRN coordinating centers to ensure research feasibility in clinical sites</li> <li>• Have a large pool of clinics from which to recruit</li> <li>• Clarify research capabilities needed for conduct of research</li> </ul>
Lack of a clinic-based research champion	<ul style="list-style-type: none"> <li>• Have an influential clinical champion (e.g., physician) at the site to promote the project overall</li> </ul>
Maintaining consistency in research procedures across diverse primary care clinics	<ul style="list-style-type: none"> <li>• Implement strong training protocols with both PBRN research offices and clinical sites</li> </ul>
Inadequate funding for research procedures at the clinic site	<ul style="list-style-type: none"> <li>• Fund time for the research personnel in the PBRN coordinating centers as well as site-based personnel – a clinical research champion and research staff – to conduct research procedures</li> <li>• Fund the research procedures themselves (e.g., incentives for survey completion)</li> </ul>
<i>EHR data-based research in PBRNs</i>	
Gathering data across multiple, diverse primary care clinics	<ul style="list-style-type: none"> <li>• Identify PBRNs with a unified EHR platform or a data sharing infrastructure to facilitate a single data extraction across multiple clinics simultaneously</li> <li>• Identify PBRNs that have strong relationships with clinics experienced in data extraction to gather data from diverse, individual clinic settings</li> <li>• Provide clear data definitions for the extract</li> </ul>
Gathering harmonized data from different EHR platforms	<ul style="list-style-type: none"> <li>• Train IT personnel on the data extract</li> <li>• Have clear governance procedures in place (e.g., Data Use Agreements)</li> </ul>
Addressing clinics’ concerns about releasing patient data	<ul style="list-style-type: none"> <li>• Gather only essential data, if possible only a limited or deidentified set</li> </ul>
<i>Survey-based research in PBRNs</i>	
Achieving adequate response rate	<ul style="list-style-type: none"> <li>• Have an influential clinical champion at the site to promote or conduct the project and its survey procedures</li> <li>• Include methods that promote response (e.g., provide time during work day to complete survey)</li> <li>• Provide adequate compensation to participants and clinic- or PBRN-based personnel for survey procedures</li> <li>• Cast a wide net across many clinics (i.e., understanding that not all clinics will participate)</li> <li>• Make sure the survey content is relevant to primary care clinics</li> <li>• Include survey content that clinics request</li> </ul>
Survey fatigue	

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**Challenges**

**Potential solutions**

- Give back survey results to the clinics and their personnel
  - Design the survey for ease of response
  - Target clinics that have had fewer research/survey requests
-