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Original Contributions

A RANDOMIZED CONTROLLED TRIAL OF A CITYWIDE EMERGENCY DEPARTMENT CARE COORDINATION PROGRAM TO REDUCE PRESCRIPTION OPIOID RELATED EMERGENCY DEPARTMENT VISITS

Darin Neven, MS, MD,*† Leonard Paulozzi, MD, MPH,‡ Donelle Howell, PHD,* Sterling McPherson, PHD,§ Sean M. Murphy, PHD,*|| Becky Grohs, RN, BSN, CCM,* Linda Marsh, RN, BSN, CCM,¶ Crystal Lederhos, MS,* and John Roll, PHD*

*Program of Excellence in Addictions Research, Washington State University College of Nursing, Spokane, Washington, †Elson S. Floyd College of Medicine, Washington State University, Spokane, Washington, ‡National Center for Injury Prevention and Control, Centers for Disease Control and Prevention, Atlanta, Georgia, §Elson S. Floyd College of Medicine, Washington State University, Spokane, Washington, ||Department of Health Policy and Administration, Washington State University College of Nursing, Spokane, Washington, and ¶Providence Sacred Heart Medical Center and Children's Hospital, Spokane, Washington

Reprint Address: Darin Neven, MS, MD, Program of Excellence in Addictions Research, Elson S. Floyd College of Medicine, Washington State University, PO Box 1495, Spokane, WA 99210-1495

☐ **Abstract—Background: Increasing prescription overdose deaths have demonstrated the need for safer emergency department (ED) prescribing practices for patients who are frequent ED users. Objectives: We hypothesized that the care of frequent ED users would improve using a citywide care coordination program combined with an ED care coordination information system, as measured by fewer ED visits by and decreased controlled substance prescribing to these patients. Methods: We conducted a multisite randomized controlled trial (RCT) across all EDs in a metropolitan area; 165 patients with the most ED visits for complaints of pain were randomized. For the treatment arm, drivers of ED use were identified by medical record review. Patients and their primary care providers were contacted by phone. Each patient was discussed at a community multidisciplinary meeting where recommendations for ED care were formed. The ED care recommendations were stored in an ED information exchange system that faxed them to the treating ED provider when the patient presented to the ED. The control arm was subjected to treatment as usual. Results: The intervention arm experienced a 34% decrease (incident rate ratios = 0.66, $p < 0.001$; 95% confidence interval 0.57–0.78) in ED visits and an 80% decrease (odds ratio = 0.21, $p = 0.001$) in the odds of receiving an opioid prescription from the ED relative to the control group. Declines of 43.7%, 53.1%, 52.9%, and 53.1% were observed in the treatment group for morphine milligram equivalents, controlled substance pills, prescriptions, and prescribers, respectively. Conclusion: This RCT showed the effectiveness of a citywide ED care coordination program in reducing ED visits and controlled substance prescribing.**

☐ **Keywords—frequent ED users; ED care coordination; prescription opioid abuse; prescription drug monitoring program; opioid prescribing**

All authors report no conflict of interest except Darin Neven and Becky Grohs. Darin Neven reports owning a medical practice performing ED care coordination that was created after completion of this clinical trial, and Becky Grohs reports working for this practice as the clinical director. Darin Neven also reports being the medical director for the nonprofit Alliance Consistent Care Program and the nonprofit Providence Consistent Care Program. Becky Grohs reports being the program coordinator for the nonprofit Alliance Consistent Care Program.

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An increase in overdose deaths related to opioid analgesics over the past 15 years has amplified the importance of safely managing prescription opioid medications prescribed by all physicians, including those who practice in emergency departments (EDs). Pain is the most common reason people seek care in EDs (1). Among all adult ED patients with pain-related complaints, approximately 43% are administered an opioid analgesic, and 26% receive a discharge prescription for an opioid during a pain-related ED visit (2). Roughly one in five prescriptions written by emergency medicine practitioners is for an opioid analgesic (3). ED providers find it difficult to balance effective pain treatment against risk for addiction and overdose (4).

Designed and outfitted for the rapid treatment of acute conditions, the ED lacks the resources for management of chronic pain (5). Such management is difficult in a setting of brief patient–physician interactions, with little or no access to primary care medical records, with small amounts of useful data buried within a voluminous electronic health record that is too lengthy and ill-formatted to efficiently and fully search, and with little training in the treatment of chronic pain or addiction. As a result, the care coordination process tends to break down when patients seek treatment for chronic pain in the ED. Moreover, the lack of timely, accurate information leads to difficulty in appropriately limiting controlled-substance prescribing in the ED. This incomplete substance abuse history makes it very challenging to discuss chemical dependency treatment with appropriate patients. These gaps make it possible for patients with drug addiction to use the ED to obtain controlled prescription drugs (6).

Of particular concern in this context is a small subset of patients who use the ED frequently. It has been reported that 3% to 4% of patients account for up to 20% of total ED visits (7). Frequent ED users are a particularly difficult population to treat appropriately due to a lack of consistently implemented ED treatment plans, which are routinely employed in the primary care setting. Patients who frequent the ED are more likely to have complex problems, be socially and economically disadvantaged, covered by Medicaid or Medicare, have comorbid psychiatric and substance abuse conditions, be in overall poor health, and have made frequent outpatient clinic visits (8,9). Some ED visitors go to multiple EDs in their communities to obtain prescriptions for drugs prone to abuse, a behavior known as “drug seeking” (10). Many efforts, such as statewide prescription monitoring programs, patient alert lists, and a non-narcotic protocol in the ED, have been implemented with unclear effect on ED opioid prescribing practices (11–13).

ED-specific care coordination programs are a novel strategy that seems to be effective at assisting frequent users with obtaining the appropriate level of care in the appropriate setting (14). Care coordination programs represent a client-centered, assessment-based, interdisciplinary approach to integrating health care and social support services wherein the individual’s needs and preferences are assessed, a care plan for ED treatment is developed, and services are managed and monitored by an identified case manager following evidence-based standards of care. ED care coordination programs that do not operate in all area EDs are not effective at deterring patients from frequenting nonparticipating EDs, and their outcomes are skewed (14).

In 2006, Providence Sacred Heart Medical Center and Children’s Hospital in Spokane, WA, established a citywide care coordination program, Consistent Care (CC), to offer ED providers at all metropolitan hospitals real-time ED treatment plans for patients at risk for using the ED to obtain prescription analgesics for inappropriate use. A pre-post analysis of a convenience sample of CC patients revealed a significant reduction in ED visits and indicated that the program was cost saving from the hospital’s perspective (15). Although these results were encouraging, a more rigorous evaluation of this program in a new community was needed, one that also evaluated the program’s impact on controlled-substance prescribing.

We conducted a multisite, randomized controlled trial (RCT) of the effectiveness of an information-exchange-assisted citywide ED care coordination program for the management of frequent ED users exhibiting opioid-prescription-seeking behavior in the Tri-Cities area of south-central Washington, 135 miles southwest of Spokane. We sought to determine if the intervention decreased participants’ frequency of ED visits, the controlled-substance-prescribing practices of ED clinicians located at the study sites, and the number of controlled substance prescriptions frequent users received from all providers in the state relative to a treatment-as-usual (TAU) control. If the intervention is shown to be effective, it might provide a management approach that can be implemented in cities nationwide. Such care coordination might ultimately reduce morbidity and mortality risks associated with prescription opioids and reduce related health care expenditures.

METHODS

Study Design and Setting

We utilized a multisite, RCT design. The study took place at three hospital-based EDs located in a region composed of three contiguous cities with a total population of 242,000. The number of combined yearly ED visits for these hospitals was approximately 112,000. The trial included all EDs in the metropolitan area. Each ED was operated independently in separate health care systems.

Two of the hospitals operated internal programs for monitoring frequent ED users prior to the RCT; however, there were no communication or coordination efforts with the other hospitals. Patients enrolled in these internal programs were excluded. This study received Institutional Review Board (IRB) approval from Washington State University and each of the hospitals.

The hospital information systems of the three study hospitals were connected to the Emergency Department Information Exchange (EDIE), an Internet-based ED care coordination application. Each hospital implemented a Health Level 7 admission, discharge, and transfer data feed from the hospital information system to the EDIE system. With the EDIE system, hospitals can track and analyze patient ED utilization patterns, compile historical patient data (e.g., diagnoses, medications, allergies, discharge summaries), manage patient care by creating ED Care Guidelines that are faxed to the ED provider in real-time, and document care coordination interventions provided to the patient.

Participants

Potential participants were identified by aggregating the ED census from all three hospitals and ranking patients according to their frequency of ED visits in the 12 months prior to January 2012. Patients who met the following criteria were included in the study: 1) five or more ED visits to study hospitals in the previous 12 months, 2) at least half of the ED visits attributed to pain complaints or drug-seeking behaviors, and 3) age 18 years or older. Patients were excluded who had 1) a medical condition that in the principal investigator's (PI) or the study medical director's judgment might interfere with safe study participation such as a terminal diagnosis; 2) a documented cancer diagnosis suspected of causing chronic pain; 3) acute suicidal behaviors (overt attempts or current serious suicidal intention) documented in the medical record; or 4) high frequency ED utilization for medical reasons other than pain, such as serial inebriation. Patients were randomly assigned to either the intervention group or TAU group using the urn randomization procedure (16). To minimize participant selection effects, a waiver of consent was obtained from the IRB, and participants were not informed of study participation. The waiver of consent prevented patients from being influenced to participate or not based on their impression that participation would affect being prescribed opioids during their ED visit.

Patient-specific care guidelines were automatically faxed to the ED by the EDIE system and placed on the patient's chart within 3 minutes of the patient presenting to the ED. Enrollment in the intervention group was evident to ED providers by virtue of the faxed ED Care Guidelines being made part of the patient's ED chart. Providers were not informed when patients in the TAU group presented to the ED. The ED Care Guidelines were recommendations and not mandatory. ED providers were educated to use clinical judgment when providing care to the patient. Patient charts of participants were monitored regularly by the study research coordinator for adverse events. Participants in the intervention and TAU group were removed from the study if they presented to the ED with suicidal behaviors.

Enrollment

The study enrollment period was March 2012 to July 2012. Participants in the intervention group received citywide care coordination for 1 year after entering the study. Participants in the control group were observed for 1 year after entering the study. The trial ended in July 2013.

For patients in the intervention group, the enrollment protocol started with one of the three hospital-based ED case managers reviewing the medical, mental, and social history contained in ED visit medical records from all the hospitals in the study area. Next, the ED case manager called all the current care providers of patients in the intervention group, including any substance abuse and mental health providers, to explain the program and solicit information on the patient and their ED treatment recommendations. Patients in the intervention group were sent a letter and contacted by phone to inform them of enrollment in the program. The ED case manager solicited their input regarding their frequent ED use, and offered to assist the patient in obtaining needed care. Thereafter, an ED case manager attempted to meet the patient whenever they presented to the ED. Patients that visited the ED when case management was not present received a follow-up call the next day to discuss their ED visit. Patients were enrolled using this process every 2 weeks during the study enrollment period in groups of 10–12 patients, and then discussed at biweekly multidisciplinary committee meetings.

The role of the multidisciplinary committee was to make recommendations for individualized ED Care Guidelines and for care coordination interventions on the patients in the intervention group. It included social service staff, a pharmacist, a chaplain, ED providers and staff from all three hospital sites, mental health and substance abuse providers, and study staff, including the Study PI and Research Coordinator. Cases were presented by an ED case manager from one of the three hospitals and included any relevant medical history and an identified reason behind the frequent ED visits. Meetings were held at each of the three study sites. The committee held eight meetings over the 14-week enrollment period.

Recommendations were developed and documented in the EDIE system for follow-up by involved agencies and case management staff.

The ED Care Guidelines were written by the research coordinator, who is also a certified nurse case manager, based on the recommendations of the committee. The Guidelines included eight sections:

1. Security Summary: An assessment of the security risk of the patient to ED staff and a description of any patterns of dangerous behavior demonstrated on previous ED visits.
2. Opioid Recommendation: A recommendation from the multidisciplinary committee not to administer or prescribe opioids from the ED when objective findings to substantiate complaints of pain are absent.
3. Primary Care Provider: The patient's primary care provider and clinic name, including the phone number.
4. Chronic Pain Medication: Information about whether the patient has entered into an opioid agreement with their provider or is receiving a scheduled supply of controlled substances.
5. CT Scan Statement: A statement summarizing the number of CT scans the patient has received in the last 3 years and how often CT scans had significant findings.
6. ED Visit Summary: A table of all ED visits made by the patient in the metropolitan area for the past 2 years.
7. Referrals: A statement regarding the referrals recommended by the multidisciplinary committee, such as chemical dependency evaluation, psychiatric evaluation, or physical therapy evaluation.
8. Past Medical History: A compilation of diagnoses listed on medical records, as well as a summary of other pertinent psychosocial history factors obtained from hospital medical records.

The guidelines were entered into the EDIE system and were also provided to the assigned Primary Care Provider and other members of the care team at the conclusion of the enrollment process for each participant in the intervention arm. The ED Care Guidelines served as a permanent care coordination document that could be updated as the patient's situation changed. Patients were contacted by the ED case manager as needed during the 12-month observation period to arrange for services that were thought necessary, such as specialty referrals or primary care follow-up. This allowed the ED Case Manager and hospital staff to work toward addressing identified gaps in care at every ED visit. For all patients, the multidisciplinary committee recommended the ED provider not provide any controlled substances if objective findings to support the pain complaints were not observed. Examples of objective findings would include ED imaging studies showing acute pathology or physical examination findings that are consistent with acute pathology. The study team educated the ED providers and hospital staff about the importance of following the ED Care Guidelines shortly after beginning the study and periodically throughout the course of the study. When ED care guidelines were not followed, follow-up education was provided to promote behavior change by the ED providers.

Care Coordination

Each hospital employed an ED case manager that performed care coordination for all ED patients. The study reimbursed each hospital for 10 hours per week of the ED case manager's time to provide ED care coordination for study participants. Patients in the intervention group were assigned to an ED case manager at the ED they most frequented. The role of the ED case managers was to identify the factors contributing to ED use and to develop interventions to address the issues. This included addressing any untreated mental health or substance abuse issues, finding resources for basic needs (housing, transportation), connecting study participants to primary care, and providing education on alternatives to the use of the ED for nonemergent issues. The case managers also served as a liaison to identify a sole prescriber in the community for any individuals visiting multiple prescribers for controlled substances.

To determine whether study participants were acquiring controlled substance prescriptions outside of the study area, we retrieved data on Schedule II and III prescriptions from the Washington State Prescription Drug Monitoring Program (PDMP). The PDMP collects information on all controlled-substance prescriptions dispensed by all pharmacies in Washington State. The PDMP started mandatory collection of such information in October 2011, which was 5 months prior to the enrollment of the first group of study participants. Due to the limited prescription history in the PDMP, we analyzed PDMP outcomes only for the final month of the intervention, when we could compare all patients in the intervention and TAU groups during the same calendar month. This was the 10th month of the intervention. We compared aggregate data for the two groups because state privacy regulations prevented PDMP data from being reported on individual patients. In addition to examining whether the intervention decreased the overall number of controlled substance prescriptions, we also determined whether patients returned to the ED sooner if they were provided a controlled-substance prescription from the ED.

Statistical Analysis

Chi-squared and *t*-tests were used for categorical and continuous variables, respectively, to assess the success of the randomization procedure (see Table 1). The 12-month observation period for each participant began when the participant was enrolled in the study. We used generalized estimating equations (GEE) to compare the groups with respect to longitudinal ED visits (i.e., as a count; using the Poisson family and a log link function) per month during the 12-month observation period, and whether or not patients had one or more ED visits (1 = yes, 0 = no; using the binomial family and a logit link function) during any given month for each of the 12 months of the observation period. We report incident rate ratios (IRRs) for monthly counts of ED visits and odds ratios (ORs) for monthly ED visits (yes/no). We used independent sample *t*-tests to compare total number of ED visits, mean number of prescriptions on discharge (both opioid and nonopioid controlled substances), and longest consecutive period between ED visits. We also employed nonparametric alternatives to the independent samples *t*-test (i.e., adjusting for unequal variances) given potential assumption violations. We also utilized GEE for the secondary outcome of whether patients received an opioid in the ED or not. Using outcomes data from the PDMP, we calculated the prevented fraction (or proportion of incidents prevented by treatment in %) due to the intervention exposure compared to the control exposure using person-months for each group in the last observable uniform 1-month period (i.e., as noted above, month 10 of the intervention) (17,18). We utilized an alpha level of 0.05 (two-tailed) as the threshold for statistical significance in all tests. Stata 13.0 (College Station, TX) was used for all statistical analyses.

RESULTS

We evaluated 255 patients for inclusion in the study and excluded 90 that did not meet study criteria. The remaining 165 were randomized (Figure 1). Five participants were removed from the intervention group during the course of the trial: 2 due to suicidal behavior, 2 due to death, and 1 due to a new cancer diagnosis. Five participants were removed from the control group: 4 due to suicidal behavior and 1 due to death. One of the deaths was due to a tricyclic overdose and one death was due to hanging. The cause of the third death is unknown.

Table 1. Participant Characteristics at Baseline Across Study Groups, Citywide ED Care Coordination Trial, March 2012 to July 2013

Characteristic	Intervention Group (n = 79)	Control Group (n = 76)	*p*-Values
Age in years, Mean (SD)	37.82 (13.37)	37.12 (12.90)	0.74
Percent female, % (n)	68.42 (57)	72.15 (52)	0.61
ED visits in 2011, Mean (SD)	16.67 (6.76)	15.46 (5.60)	0.23
Number of opioid prescriptions from the ED in prior 12 months, Mean (SD)	3.97 (3.97)	3.65 (3.69)	0.61

ED = emergency department; SD = standard deviation.

The groups did not differ on gender, mean age, number of ED visits in the previous 12 months, or number of opioid prescriptions from the ED in the previous 12 months (Table 1). All 155 patients in the study had at least 11 ED visits during the 12-month period prior to January 2012, at least 50% of which were attributed to a pain complaint. We also compared the distribution of the primary reasons for participants being lost to follow-up due to study disenrollment (i.e., death, suicidality, terminal diagnosis). The groups did not differ with respect to the reason for loss of follow-up (data not shown).

Participants in the intervention arm of the trial experienced an approximate 34% decrease in the incidence of ED visits (IRR 0.663, $p < 0.001$; 95% confidence interval [CI] 0.569–0.775) relative to the control group across the 12-month treatment period (Table 2). The odds of making any visit to the ED were about 33% less in the intervention group compared to the control group (OR 0.673, $p < 0.001$; 95% CI 0.538–0.841) during treatment as well (Table 2). The overall likelihood of visiting the ED for all study participants went down during the 12-month study observation period by approximately 4% per month (OR 0.961, $p = 0.001$; 95% CI 0.932–0.991) (Figure 2). Lastly, the GEE analysis on whether or not participants received an opioid prescription from the ED provider (yes/no) during each 1-month period found an 80% decrease in the odds of those in the treatment group receiving an opioid prescription from the ED provider compared to those in the control group (OR 0.21, $p = 0.001$; 95% CI 0.122–0.353) over time (Table 2).

Participants in the intervention group visited the ED fewer times on average than those in the control group (Table 3). Participants in the intervention group received a significantly smaller mean number of prescriptions written on ED discharge per person compared to those in the control group. Nonparametric tests produced the same result for all of the above tests for our secondary outcomes (data not shown).

The number of opioid prescriptions written per participant was predictive of ED visit-free days ($B = -16.42$, $p < 0.001$) while controlling for treatment group assignment. For every opioid prescription written, there was an approximate 16-day decrease in an individual's longest consecutive ED visit-free days. There was no difference between the intervention group (M = 149.93, SD = 80.26) and the control group (M = 146.83,

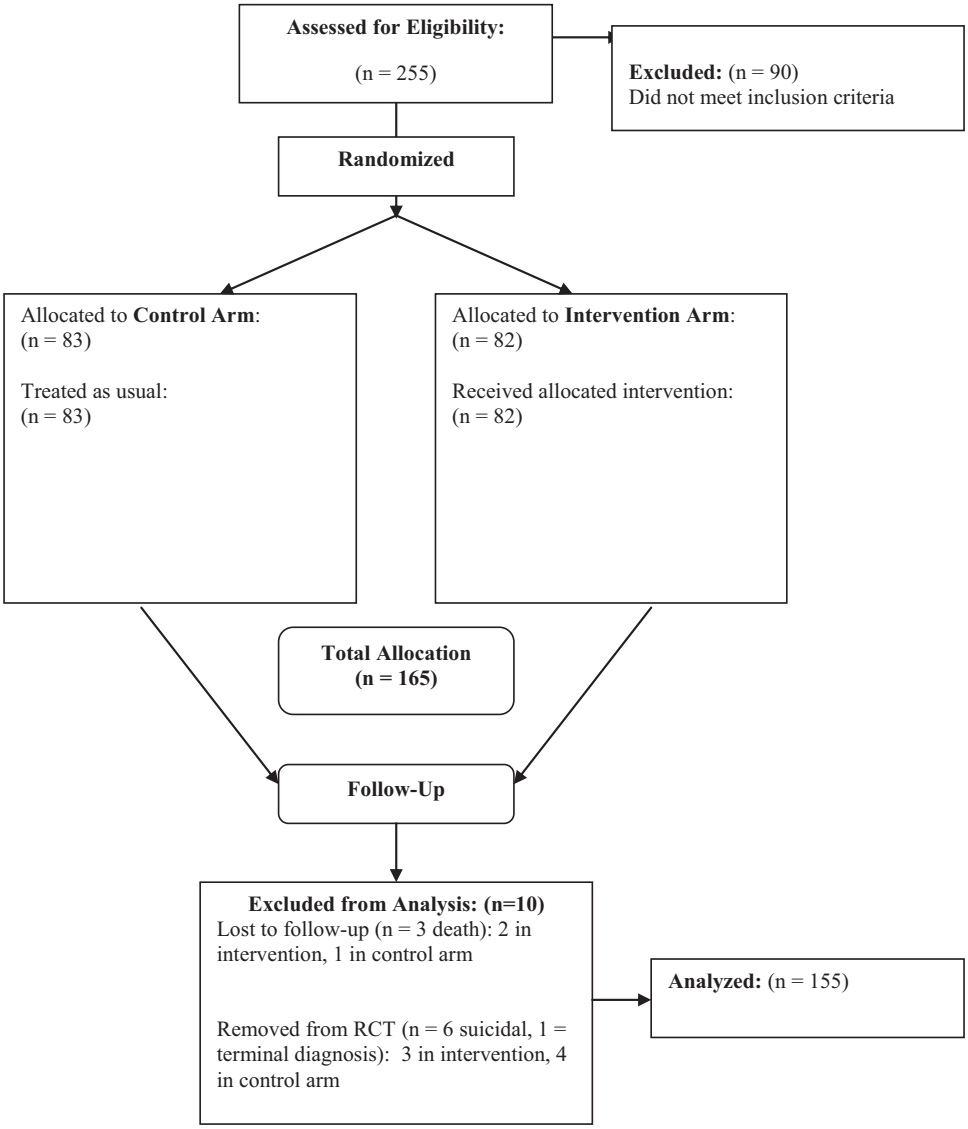

Figure 1. Consort diagram for eligibility assessment and randomization to one of two treatment arms for the clinical trial. Citywide ED [Emergency Department] Care Coordination Care Trial, March 2012 to July 2013. RCT = randomized controlled trial.

SD = 80.08; $t = -0.23$, $p = 0.815$) on an individual's longest number of consecutive ED visit-free days during the intervention (data not shown).

The two groups differed markedly by the last uniform observational month for this trial (month 10) (Table 4). The total number of pills dispensed, morphine milligram

Table 2. ED Visit and ED Opioid Prescribing Ratios for Intervention and Control Groups, Citywide ED Care Coordination Care Trial March 2012 to July 2013

	Treatment Effect (0 = Control Arm, 1 = Intervention Arm)			Time Effect (Per Month)		
Outcomes	Ratio	95% CI	*p* Value	Ratio	95% CI	*p* Value
ED visit incidence (count per month)	0.663*	0.569–0.775	<0.001	0.962*	0.942–0.982	0.001
ED visit (yes/no per month)	0.673†	0.538–0.841	<0.001	0.961†	0.932–0.991	0.001
Opioid incidence in ED (count per month)	0.208*	0.122–0.353	<0.001	0.983*	0.926–1.044	0.586
Opioid in ED (yes/no)	0.198†	0.120–0.325	<0.001	1.019†	0.967–1.074	0.490

ED = emergency department; CI = confidence interval.
* Odds ratio.
† Incident rate ratio.

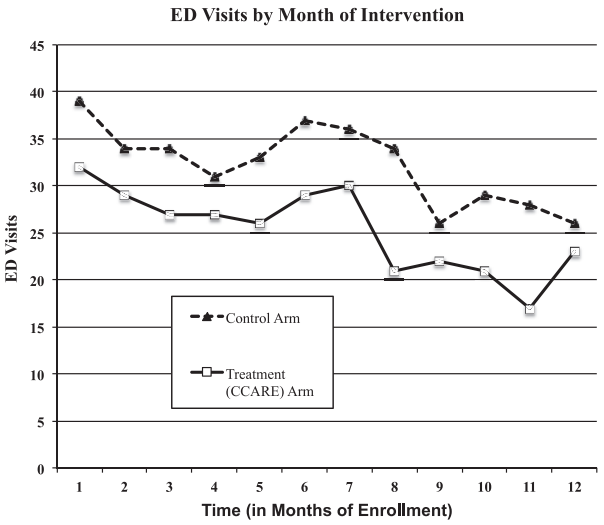

Figure 2. Emergency department (ED) visits across 12-month treatment period between control and treatment arms. Citywide ED Care Coordination Care Trial, March 2012 to July 2013.

equivalents, and opioid prescriptions filled in the treatment group statewide was nearly half that of the control group. The number of prescriptions for nonopioid schedule II and III prescriptions was two-thirds fewer for the treatment group (total = 28) compared to the control group (total = 84). The number of opioid prescriptions with a refill was four in the treatment group and 10 in the control group, which is the only nonstatistically significant finding from the PDMP outcomes. Lastly, there were a total of 23 unique prescribers in the treatment group and 40 in the control group.

DISCUSSION

This RCT has demonstrated that a citywide ED care coordination program combined with an ED care coordination information system can reduce ED visits and controlled substance prescribing by ED providers. Data from the state's prescription drug-monitoring program indicated that participants in the intervention group received fewer controlled-substance prescriptions and pills from all prescribers than participants in the TAU group.

A variety of other efforts to improve care and reduce visits of frequent ED users have been attempted. For example, "Patient Alert" lists have been used to reduce ED drug-seeking behaviors with limited success (12). The citywide ED care coordination program studied in this RCT was inspired by a program started in Calgary, Canada for frequent ED users with headache complaints that involved all four Calgary hospitals; however, the program lacked computerized information sharing and did not proceed to full implementation (19). A small study found that when ED patients were told they would be denied further narcotic treatment in their facility, patients received a prescription drug 93% of the time in another hospital and 71% of the time in the same hospital at a subsequent visit (20). The use of a strict non-narcotic protocol in the ED for chronic pain patients was found to reduce overall ED and other clinic visits in a select population (21). Research on intensive case management of individuals frequently using the ED has found mixed results. Findings from two reports suggest that case management may be effective, yet other studies have found no decline in, or increased utilization of, the ED (22–25). Sample sizes for each of these studies were relatively small (ranging from 24–70). A major limitation of these studies was the use of coordination in a single hospital or hospital system, and ED visits were not measured at all nearby EDs.

This study examined the combination of an ED care coordination program with timely data on patient prescription histories in all hospitals in one metropolitan area. A small study has suggested that immediate access to information from a PDMP could significantly affect the emergency physician's controlled substance prescribing (26). The availability of similar information to the ED provider in real time might be more effective when coupled with coordinated community care for the patients. Notably, in 2013 Washington State mandated the use of the information-sharing platform used in this study without mandating care coordination services, and found only a 10% reduction in ED visits per year after implementation (13,27).

Some of the declines in outcomes noted in both study groups might have been due to regression to the mean or to other interventions being introduced in Washington

Table 3. ED Visits and Controlled Substance Prescriptions From the ED Over 12 Months; Citywide ED Care Coordination Care Trial, March 2012 to July 2013

	Intervention Mean (SD)	Control Mean (SD)	*t* Value	*p* Value
ED visits	5.59 (4.65)	8.49 (7.02)	3.03	0.003
Opioid prescriptions from the ED	0.28 (0.74)	1.44 (2.05)	−4.80	<0.001
Nonopioid controlled substance prescriptions from the ED	0.39 (0.79)	1.69 (2.31)	−4.80	<0.001

ED = emergency department.

Table 4. Prescription Use From All Sources as Reported by the PDMP* by Intervention Group, During Month 10 of the Intervention; Citywide ED Care Coordination Care Trial, March 2012 to July 2013

Prescription Use in Schedules II and III	Intervention (n = 76)	Control (n = 79)	Prevented Fraction† of Use Due to Intervention (%) (95% CI)	*p*-Value
Pills dispensed	2682	5946	53.1 (51.0–55.2)	<0.001
Morphine milligram equivalents	3499	6459	43.7 (41.4–45.9)	<0.001
Total opioid prescriptions	60	128	52.9 (36.2–65.2)	<0.001
Nonopioid controlled substances	28	84	65.4 (47.9–77.0)	<0.001
Opioid prescriptions with a refill	4	10	58.4 (−27.8–86.5)	0.136
Unique prescribers	23	40	53.1 (52.6–57.8)	0.047

CI = confidence interval; ED = emergency department.
* Washington State Prescription Drug Monitoring Program.
† Calculated as the percent difference between the intervention and control group rates during month 10.

State during this time period (27). For example, in 2010, Washington State enacted a law (ESHB 2876) requiring rules on pain management to be adopted by practitioners. This bill outlined dosing criteria, consultation guidance, treatment review, continuing education requirements, and also cited exceptions to these requirements. Although most ED providers fell into the exception of managing acute pain caused by injury or surgery, their awareness of these rules may have affected their prescribing practices (28). The decline noted in the control group might also have been due, in part, to a spillover effect: sensitizing the local providers about the problem of opioid abuse during our communications regarding patients in the intervention group. Anecdotally, providers reported being more empowered to say "No" in prescribing these medications to any patients. However, one would expect the same influence to be exerted in the TAU group.

Limitations

This study has several limitations. Providing information as to whether or not individuals sought treatment via primary care and what type of care they received was not within the scope of this study. Patients might have gone to primary care providers instead of returning to EDs in the study area. Only ED visits made to the three metropolitan hospitals were measured, and it is unknown to what extent patients made ED visits outside the metropolitan area. However, the risk is estimated to be small, as the closest hospital is over 30 miles away. The PDMP data show a decrease in all dispensed controlled-substance metrics measured across the state. Another potential concern is that patients turned to other means to obtain opioids (e.g., theft, greater use of family or friends' medications), but we did not attempt to measure such behavior. It is also unknown whether patients might have filled prescriptions out of state to avoid being recorded in the Washington State PDMP. The closest Oregon town is 30 miles from the study area. Schedule IV controlled substances include many substances of abuse sought by frequent ED users, including alprazolam, lorazepam, and clonazepam. This study did not retrieve information on schedule IV controlled substances from the PDMP.

Finally, it is unknown whether the intervention had positive or negative effects on the management of chronic health problems in these patients or on their subsequent risk of health problems related to substance abuse, such as overdose. One study that reported a case management system for frequent ED users found both a reduction in ED use and an improvement in psychosocial problems (29).

CONCLUSIONS

To our knowledge, this is the first RCT to show the effectiveness of coordinating ED care across all hospitals in a metropolitan area using an ED care coordination information system to reduce ED visits and opioid prescribing among frequent ED users. Expanding the use of ED care coordination information systems would allow other hospitals to appropriately treat patients that they suspect are moving from hospital to hospital in an effort to obtain controlled substances. The goal should be not only to identify and treat these individuals appropriately in the ED, but also to provide follow-up care coordination so they can obtain the treatment needed for the long-term management of their condition(s). Sharing ED care plans between all EDs could result in patients receiving a consistent message from all emergency providers, which could lead to long-term behavior modification that results in healthier lifestyles. The effectiveness of this intervention could be extended to other frequent ED user groups with chronic conditions where the patient is resistant to long-term behavior modification, such as congestive heart failure, chronic obstructive pulmonary disease, and diabetes.

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ARTICLE SUMMARY

1. Why is this topic important?

Opioid abuse is a major cause of death and mortality in the United States. Frequent emergency department (ED) users tax the health care system.

2. What does this study attempt to show?

This study shows that an ED care coordination program operating in cooperation with all EDs within a community are effective.

3. What are the key findings?

ED visits by frequent ED users were reduced, and controlled substance prescribing was reduced by a community ED care coordination program.

4. How is patient care impacted?

Patients with frequent ED use for pain complaints should be referred to a community-wide ED care coordination program.