A Statewide Prescription Monitoring Program Affects Emergency Department Prescribing Behaviors

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Study objective: Ohio recently instituted an online prescription monitoring program, the Ohio Automated Rx Reporting System (OARRS), to monitor controlled substance prescriptions within Ohio. This study is undertaken to identify the influence of OARRS data on clinical management of emergency department (ED) patients with painful conditions.

Methods: This prospective quasiexperimental study was conducted at the University of Toledo Medical Center Emergency Department during June to July 2008. Eligible participants included ED patients with painful conditions. Patients with acute injuries were excluded. After clinical evaluation, and again after presentation of OARRS data, providers answered a set of questions about anticipated pain prescription for the patient. Outcome measures included changes in opioid prescription and other potential factors that influenced opioid prescription.

Results: Among 179 participants, OARRS data revealed high numbers of narcotics prescriptions filled in the most recent 12 months (median 7; range 0 to 128). Numerous providers prescribed narcotics for patients (median 3 per patient; range 0 to 40). Patients had filled narcotics prescriptions at different pharmacies (mean [SD] 3.5 [4.4]). Eighteen providers are represented in the study. Four providers treated 63% (N=114) of the patients in the study. After review of the OARRS data, providers changed the clinical management in 41% (N=74) of cases. In cases of altered management, the majority (61%; N=45) resulted in fewer or no opioid medications prescribed than originally planned, whereas 39% (N=29) resulted in more opioid medication than previously planned.


See page 20 for the Editor’s Capsule Summary for this article.

INTRODUCTION

Pain is the one of the most common chief complaints among emergency department (ED) patients.1 Appropriate pain management is a fundamental part of the art and the science of the practice of emergency medicine. The Joint Commission established pain assessment and management as essential aspects of health care.2,3 The American Pain Society has also affirmed the importance of prompt recognition and treatment of pain and quality improvement programs.4 Despite the current emphasis on adequate pain control, numerous studies have demonstrated inadequate pain management for ED patients.5-11 Although there is general agreement that appropriate pain management is important, for the practicing clinician this is tempered by the significant problems of drug dependence and diversion in the United States.12

This increase in the abuse of prescription drugs far overshadows the increases in abuse of illicit substances, including marijuana, cocaine, and heroin. It has been reported that approximately 6.4 million Americans use prescription psychotherapeutic drugs nonmedically. Seventy-three percent of those drugs are pain relievers. Nonmedical use of prescription drugs among young adults was estimated at 6.3% in 2005.13-16 One example cited in frequent use among younger patients is the agent OxyContin (oxycodone hydrochloride), which has been associated with street transactions and obtaining drugs from multiple sources.17 During the period of 1999 and 2005, the number of US deaths due to poisoning nearly doubled, largely attributable to overdose deaths involving prescription opioid agents.18 Thus, it is not surprising that a subset of ED patients with complaints of pain are opioid dependent.

Diversion of these medications to illicit channels (street sale, trading, or personal distribution) is a significant public health
and law enforcement problem.\textsuperscript{19,20} Physicians believe the 3 main sources of obtaining medications for diversion to be “physician shopping” (when patients obtain controlled substances from multiple physicians), patient deception/manipulation of physicians, and forged or altered prescriptions.\textsuperscript{14} To limit prescription fraud and abuse, many states have created prescription monitoring programs. As of November 2008, 38 states had enacted legislation that required prescription monitoring programs. Of these programs that track prescriptions for controlled substances, 32 are currently operating and 6 are in the start-up phase.\textsuperscript{21-23}

In October 2006, Ohio initiated a statewide prescription monitoring program titled the Ohio Automated Rx Reporting System (OARRS). The registry tracks prescription drugs in schedules II, III, IV, and V, carisoprodol products, and tramadol products. The system is operated by the Ohio State Board of Pharmacy. Prescription information is collected from pharmacies and distributors twice a month, and this information is available to pharmacists, law enforcement, and prescribers who have registered with the Board of Pharmacy. Data on more than 18 million prescriptions from 2,846 dispensers are collected annually.\textsuperscript{24} Reports obtained from a secure Web site contain patient-specific prescription data and are transmitted through an encrypted channel as a portable document format in real time during the patient encounter. The report includes the following information: previous controlled prescriptions in the specified period (defined by the health care provider making the query), substance prescribed, amount and date dispensed, names of prescribers, names of pharmacies used, and different addresses used by the patient.

This study was undertaken to examine the influence of the data from a statewide prescription monitoring program on clinical management of ED patients with pain and to identify factors associated with changes in clinical management.

**MATERIALS AND METHODS**

**Study Design and Setting**

This prospective quasi-experimental study was conducted at the University of Toledo Medical Center ED, an academic, suburban center with an annual census of 31,000, during June and July 2008. The study was approved by the University of Toledo Institutional Review Board.

**Selection of Participants**

Eligible participants included patients aged 18 years and older, with a chief complaint of painful conditions, including dental, neck, back, head, joint, or abdominal pain.

Patients were considered ineligible if symptoms were self-reported to the triage nurse as being from an acute injury, if research assistants judged patients to be acutely ill or injured, or if there was incomplete data collection.

Enrollment was based on a convenience sample, conducted in real time, when research assistants were available. The bulk of the data was collected between noon and midnight on all 7 days of the week. Research assistants, who were second-year medical students, were trained in human subject research, HIPAA, and the specific study objectives and protocol. Subjects were identified only by the research assistants who reviewed the triage information after the patients were placed in the treatment area. Neither ethnicity nor sex was a factor in selection. Patients were not aware of the study and did not provide consent. The participating providers did not provide consent.

After examination of the patient by the provider, the research assistant administered the survey to the provider about the likelihood that he or she would query the OARRS database for each patient, likelihood he or she would prescribe the patient a controlled substance (home-going medication), and if so, which drug and the quantity. Providers selected “low,” “medium,” or “high” likelihood or “unsure.” After the 3 pre-OARRS data survey questions were answered, the OARRS data for the patient were presented to the physician. After the intervention, the research assistant again administered the survey and recorded any change in prescriptions, as reported by providers, from that which was predicted and specific information from the OARRS database that influenced the physician’s decision. In addition, providers also were asked to identify other factors that influenced opioid prescriptions written, including physical examination findings, patient appearance, patient demeanor, or patient statements.
Data Collection and Processing

All data were collected and recorded by trained research assistants, including age group, ethnicity, region of residence in the greater Toledo area, occupational status, insurance status, sex, chief pain complaint (dental, neck, back, head, joint, or abdominal pain), significant medical history, chronic pain history, allergies to medications, and medications currently taken (Appendix E1, available online at http://www.annemergmed.com). Strict confidentiality of patient records was maintained throughout the study. No personal health information was recorded on any of the data collection sheets, and patients were assigned a sequential number. All patient identifiers, including the actual OARRS report, were placed in ED HIPAA-compliant disposal units at the end of each day.

Outcomes Measures

The primary outcome measure was change in opioid prescription writing from predicted before database use. Secondary outcome measures included reasons for change in clinical management, including information from the OARRS database (number of prescriptions, number of addresses, number of prescribing physicians), physical examination findings, patient appearance, patient demeanor, or patient statements.

Primary Data Analysis

Statistics are descriptive in nature without hypothesis testing. Binary data are presented as frequency (percentage). Count data are presented as median (mean [SD]). When the characteristics of the patients in the study are described, the unit of analysis is the patient (N=179 patients). When providers’ pre-OARRS assessment and providers’ change in patient management are described, data are presented both overall (combining over all providers and ignoring provider-specific dependencies) and by provider (collapsing data from patients treated by the same provider into one by-provider percentage). Data were analyzed with SAS (version 9.0; SAS Institute, Inc., Cary, NC).

RESULTS

A total of 199 patients were enrolled in the study. Twenty patients were eliminated from the study because of incomplete data collection, with 179 patients completing the study. None of the patients were acutely ill or acutely injured and none were admitted. Seventeen ED attending physicians and 1 nurse practitioner are represented in the patient data. One physician treated 30% (N=54) of the patients in the data set. This physician is the lead author, who worked the most hours during the time the research assistants were present. Three other providers each treated a significant fraction of patients (12%, N=22; 11%, N=20; and 10%, N=18). Demographic information of patients is depicted in the Table.

For each patient, the provider indicated the likelihood that he or she would query the OARRS database. In a minority of cases, providers indicated a high (47%; N=84) probability; 36% (N=65) indicated a low likelihood that they would query the database. Before access to the OARRS database, providers predicted a wide range of likelihood that a controlled substance would be prescribed, including high likelihood (32%; N=57) moderate likelihood (26%; N=47), and low likelihood (36%; N=65).

OARRS data indicated high use of prescription narcotics within the most recent 12 months. The range of prescriptions per patient in a 1-year period was 0 to 128 (mean 18.9 [SD 26.6]). The range of different providers writing prescriptions in a 1-year period was 0 to 40 (mean 5.6 [SD 7.6]). The range of different providers writing prescriptions in a 1-year period was 0 to 40 (mean 5.6 [SD 7.6]). The number of pharmacies used to fill controlled substances was 0 to 20 (mean 3.5 [SD 4.4]), and the range of number of different addresses used by patients was 0 to 14 (mean 1.8 [SD 1.9]).

After review of OARRS data, overall (combining across providers) opioid prescribing was altered for 41% (74/179) of patients. In cases of altered management, the majority (61%; n=45) resulted in fewer or no opioid medications prescribed compared with pre-OARRS assessment. Conversely, 39% were prescribed more pain relief than originally planned, after review of the OARRS data.

Overall (combining across providers), the most common reasons that the providers stated for change in management related
to OARRS data were number of previous prescriptions filled (41%,
or 30 of the 74 patients for whom the physician changed
management), number of physicians writing prescriptions (31%;
n=23), number of pharmacies filling prescriptions (26%; n=19),
and the number of addresses listed (16%; n=12). Factors that
influenced management changes that were not specific to OARRS
data included physical examination results (25%; n=18) and
patient statement (15%; n=11). Examples of physical examination
and patient statement findings that influenced management
included provider assessment of pain, demeanor, truthfulness of
patient statements compared with OARRS data, and patients who
insisted on a specific medication.

LIMITATIONS

This study was performed at a single institution and the
results may not apply to other settings. The design is not
balanced; that is, the number of patients treated by each
physician is not the same. The lead physician treated nearly one
third of the patients in the data set, and 3 others accounted for
another third. Therefore, results are influenced by the practice
of a few providers. Providers and research assistants were not
blinded. The study did not track pain medications given in the
department. Documentation of prescriptions was by provider
self-report, not by direct observation of prescription writing.
Because providers were studied as they were making decisions,
the study itself may have affected behavior.

Data posted to the OARRS report are delayed by 3 weeks,
and the most recent opioid prescriptions may not be reflected in
the report. In cities (such as Toledo) close to a bordering state,
state registries may not reflect opioid prescriptions filled in the
neighboring state.

DISCUSSION

In the past decade, increased emphasis has been placed on
the appropriate management of pain in the ED.25

Concurrently, the use and abuse of opioid drugs have grown
rapidly, particularly among the teenage demographic.26,27
Opioid abuse occurs in 9% of patients with chronic pain,
particularly those involved in motor vehicle crashes.28 Among
patients cared for in pain management clinics, the prevalence of
opioid abuse ranges from 20% to 50%.24 It has been estimated
that Americans use 80% of the world’s supply of opioids.29

In addition to legitimate painful conditions, emergency
physicians frequently encounter a subset of patients who engage
in deceptive practices to obtain opiate medications. These
patients may be dependent on opiate medications and may also
divert these drugs for street sale.30 Identification of such patients
may have a significant effect on clinical management.31

Our study shows that a prescription monitoring program can
be a useful tool for making decisions about prescribing
controlled substances. It provides a pattern over time but not a
measurement of today’s or yesterday’s activity. The physician
can identify patterns of substance abuse or rule out such
identifiable patterns in conjunction with the patient’s physical
examination results, medical history, and demeanor.

An example of a patient who demonstrated a history of
prescription opioid abuse is a man who gave an address from a
southern state and claimed to be in town on business. The OARRS
report for this patient showed 16 prescriptions from 15 physicians,
filled in Ohio at 12 pharmacies, and listed 8 Ohio addresses.

Equally important is the possible finding that a patient has
no documented recent history of narcotic use. As demonstration
of this point, this study showed that when there was a change in
treatment, 39% of those resulted in providing more pain relief
than initially planned.

Some EDs have attempted to address the problem of
frequent opioid prescription abuse by keeping patient logs or
notebooks.32 This practice has come under criticism because of
possible HIPAA violations or undue bias against patients who
may have a legitimate need for pain control. A readily available
prescription monitoring program eliminates the need for
departments to keep such records. The OARRS reports are
usually available to the physician within 15 seconds of request.

Although a prescription monitoring program is useful in
identifying patterns of behavior that can be construed as
inappropriate, such programs are less useful in determining the
management of patients with chronic noncancer pain. For a variety
of reasons, including cultural, sex, fear by physicians of inducing
addiction, and suspicion by physicians of the motives of the
patient, pain is undertreated in the emergency setting.33 Patients
with chronically undertreated pain, also called pseudoaddiction,
can be more difficult to identify. Such patients may have a long list
of medications filled, but perhaps use only one address and one
physician. Like a laboratory test, a prescription monitoring
program should be used as an adjunct to all the information gained
in the clinical encounter. This information should be used
judiciously before a decision is made about pain control.

Because not all states have a prescription monitoring program,
there is a problem with patients shifting their illegal activity to
border states. The Integrated Justice Information Systems Institute,
in conjunction with the Bureau of Justice Assistance, is currently
working with the Ohio Board of Pharmacy to create a centralized
system for exchange of information between states.

The use of data from a statewide narcotic registry frequently
altered providers’ prescribing behaviors for patients with
nontraumatic pain complaints. In addition to information from the
registry, information from the physical examination results and
statements by the patients also altered management in some cases.

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REFERENCES

CORRECTION NOTICE
In the April 2010 issue, in the article by Kanwar et al (“Confusion About Epinephrine Dosing Leading to Iatrogenic Overdose: A Life-Threatening Problem With a Potential Solution,”; pages 341-344), the caption for Figure 1 is incorrect. The IM dosage should have said, “0.3 mg of 1:1000 concentration IM dose.”
Appendix E1. Clinical Applications of the Ohio Automated Rx Reporting System (OARRS) in the Emergency Department.

Patient # _____  Doctor # _____  Research assistant # _____

**Patient Demographics**

<table>
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<th>Age category (circle one)</th>
<th>Gender:</th>
<th>M</th>
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<td>26-30</td>
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<td>76-80</td>
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<td>81-85</td>
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<td>Over 85</td>
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</table>

**Ethnicity:** Cauc  AfrAm  Hisp  Asian  MidEast  Other

**Region of Residence:** N  S  E  W  Central  Suburban  Other

**Occupational status:** Employed  Unemployed  Retired  Disabled

**Insurance status:** Medicare  Medicaid  Commercial  Self

**Pain complaint:** Dental  Neck  Back  Head  Joint

Other __________________________

**Sig. PMH:** Sickle cell  Fibromyalgia  Depression  Arthritis

Alcoholism  Other addiction  Smoker  Chronic pain________

Other __________________________

**Allergies:** NSAID  Ketorolac  Tramadol  APAP  Any opiate

**Medications:** Hydrocodone  Oxycodone  Codeine  Propoxyphene

NSAID  Ketorolac  Tramadol  Fentanyl  Oxycontin  Methadone
Antidepressant Antipsychotic

Other

**Pre-OARRS Physician Assessment:**
What is the likelihood that you would query the OARRS database for this patient?
Low moderate high unsure

What is the likelihood that you will prescribe a controlled substance to this patient?
Low moderate high unsure

What controlled substance do you believe you will prescribe, and quantity?

Drug: None Hydrocodone Oxycodone Codeine Propoxyphene
Other

Amount: ___

**OARRS Data (12 months)**

# Rx ___ # Doctors ___ # Pharmacies ___ # Addresses ___

**Physician Management (post OARRS data review)**

**Drug(s) prescribed:** Hydrocodone Oxycodone Codeine Propoxyphene
NSAID Ketorolac Tramadol Fentanyl Oxycontin
Other

**Quantity:** (draw line to drug) ___ ___ ___

If management changed based on the OARRS data, name the most important factors?
(Circle all that apply)

# Rx ___ # Doctors ___ # Pharmacies ___ # Addresses ___
If management changed, what other factors affected your decision change?  
(Circle all that apply)

Physical exam  Pt appearance  Pt demeanor  Pt statement

Clinical Applications of the Ohio Automated Rx Reporting System (OARRS) in the Emergency Department

**Zip Code Categories**

**North:** 43611, 43612, 43613, 43623

**South:** 43607, 43609, 43614

**East:** 43605, 43616, 43619

**West:** 43606, 43615, 43617, 43628

**Central:** 43602, 43604, 43608, 43610,

**Suburban:** 43460, 43537, 43560