

Technical Assistance Guide

Prescriber Report Cards

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INTRODUCTION

PDMPs play a vital role in reducing and preventing prescription drug abuse and drug overdose. When used intelligently and proactively, a PDMP will have a measurable effect on the efforts to stem the drug abuse epidemic.¹ As a central depository of information on the prescribing and dispensing of controlled substances a major role of the PDMP is making the data available to authorized users. States generally fulfill this role by disseminating PDMP information to authorized users through two kinds of reports commonly referred to as solicited and unsolicited. A solicited report is generated at the direct request of an authorized person in carrying out their professional responsibilities. The majority of solicited reports are initiated by health care providers (physician, dentist, pharmacist, etc.) who make queries to the PDMP in the course of prescribing or dispensing a controlled substance to a patient. In contrast, unsolicited reports are initiated solely by the PDMP and sent to authorized users. Unsolicited reports may be sent to inform a prescriber or dispenser about patients who may be engaged in ‘doctor or pharmacy shopping’ or who may be at risk of adverse health events. PDMPs also send unsolicited reports to regulatory boards and law enforcement when a PDMP identifies questionable prescribing or dispensing activities.

A new kind of report emerging among PDMPs is what we will refer to as a ‘report card’. This type of report provides a summary of a healthcare provider’s own prescribing history, including their ranking compared to the ‘average’ prescriber of the same specialty, and a summary or graphical representation of their prescribing history. The report card may also include a condensed description of patient prescription records, risk status, and other clinically relevant information. The use of report cards is a promising practice that not only provides an opportunity for self-examination of a prescriber’s practice as it pertains to their prescribing of controlled substances, but also provides a more efficient method for reviewing patient prescription histories and associated risk. Depending upon the PDMP, a report card may be a solicited report requested by the prescriber or sent as an unsolicited report to a prescriber. This technical assistance guide (TAG) will present examples of both.

PURPOSE

The Bureau of Justice Assistance (BJA) is interested in continuously advancing and maximizing PDMPs’ utility and effectiveness. Providing a prescriber with relevant and accurate information can positively influence his or her prescribing of controlled substances. Informing health care professionals of their standing among their peers and providing insightful, concise data summaries of patients meeting risk criteria may also assist them with their treatment decisions. BJA, through the PDMP Training and Technical Assistance Program (TTAP), seeks to support and assist PDMPs who may be interested in initiating a report card program. This guide will provide information about existing report card programs, examples of the reports and the data they include, and suggestions for a ‘model’ report card.

The information for this guide was compiled from interviews with the PDMP Administrators from three (3) states that have implemented a report card program; Arizona, Kentucky, and Ohio. Additionally, four (4) physicians were consulted to get a prescriber’s perspective on the utility of the report and what elements should be considered for a ‘model’ report card (see Acknowledgement section).

¹ Office of National Drug Control Policy. Prescription Drug Monitoring Program Fact Sheet. April 2011.
https://www.whitehouse.gov/sites/default/files/ondcp/Fact_Sheets/pdmp_fact_sheet_4-8-11.pdf

ARIZONA

Background

In Arizona, the report card program was initiated by the Arizona Substance Abuse Partnership. The Partnership oversees substance abuse issues in the state and is comprised of representatives from the treatment community, regulatory boards, law enforcement, county coalitions, and local health departments. The Partnership encouraged the Arizona PDMP, which resides in the Board of Pharmacy, to develop the current report card program and suggested that it be piloted in several counties before expanding statewide. The goals of the pilot program were to reduce the number prescriptions issued for controlled substances by 10% and to reduce the overdose death rate by 2-4%. The pilot initially focused in four (4) counties (Yavapai, Pinal, Graham, and Greenlee) which were experiencing significantly high rates of deaths attributed to drug overdoses. One year into the pilot, a fifth county (Mohave) was added. The pilot was initially funded by the Arizona Criminal Justice Commission. Later, the Department of Health Services (DHS) provided additional funding to hire a program manager and a research analyst.

The report card program was developed in-house by the Board of Pharmacy utilizing one (1) staff person who was devoted full-time in the development of the program. Although dispensed prescription data is collected and made available to authorized users through a data vendor, this particular report is designed to be generated by the PDMP. The data vendor provides a file containing the previous quarter's prescription data to the PDMP. The PDMP staff compiles, creates, and mails the report card reports to the prescribers. Since the major expense to operate this program is mailing the reports to the prescribers, to save on mailing costs, the program plans to distribute the reports via email. Sending the reports via email has been made possible by the recent legislation requiring prescribers to obtain a PDMP account and provide their email address. If the email address is not valid or has changed, the program will contact the prescriber to obtain a current email account or the report will be mailed. There are plans to expand the program by adding an Administrative Assistant for data entry and a Marketing Manager to promote the report card program and to increase use of the PDMP. To date, the promotion of the program is included in the PDMP prescriber training courses.

Program Description

The report is generated and distributed by the PDMP every quarter and is only sent to prescribers who have issued at least one (1) controlled substance prescription during the previous quarter. Each prescriber receives a report specific to their prescribing history. According to the Drug Enforcement Administration (DEA), Office of Diversion Control, there were approximately 31,000 registrants with authority to prescribe controlled substances in Arizona². Approximately 26,000 (84%) prescribers in Arizona receive the reports. At the present time, prescribers are not permitted to request their own reports.

The report card categorizes each prescriber by specialty and similar specialties within a certain county. A prescriber's specialty was originally ascertained through a manual matching process with the cooperation of the state's medical board. The program is now using the National Provider Identifier (NPI) file, maintained by the Centers for Medicare

² Drug Enforcement Administration, Office of Diversion Control. Registrant Population by State and Business Activity.
<https://www.deadiversion.usdoj.gov/webforms/jsp/odrReports/odrStateReport.jsp>

and Medicaid Services, to obtain taxonomy codes for each of the specialties. The NPI file has almost 1000 taxonomy codes; however, more than half of them are not related to the prescribing and even fewer related to controlled substance prescribing. To ensure that all specialties were covered, the PDMP worked with the National Council for Prescription Drug Programs (NCPDP) to create a reference table. Their efforts identified 27 major specialties in which all prescribers were placed (see Appendix A). Prescribers who did not have an NPI number were contacted to obtain specialty information. If a certain county has a very small number of prescribers within a specialty, the program combines it with another related specialty in order to protect the identity of the prescribers.

The report card identifies five (5) major drugs: carisoprodol, benzodiazepines, hydrocodone, oxycodone, and other pain relievers. For each of these drug categories, the program counts the number of prescriptions and dosage units for solid, oral forms of these drugs. The report has several graphs showing the average number of prescriptions issued and doses prescribed in a given quarter for a specific prescriber with comparisons to others in the same specialty in the county where the prescriber practices and statewide (see Appendix B)

As mentioned above, the report card was piloted within five (5) selected counties. About a year into the pilot project, the program began using standard deviation when comparing the prescription and dosage numbers in addition to the actual numbers of prescriptions and dosage units. The report card categorizes the prescriber's prescribing as follows:

- NORMAL- values are near the mean
- HIGH- values are one (1) standard deviation above the mean
- SEVERE –values are two (2) standard deviations above the mean
- EXTREME- values are three (3) standard deviations above the mean

The report also includes:

- Total number of the prescriber's patients receiving over 100 morphine milligram equivalents (MMEs)
- Total number of patients to whom the prescriber issued multiple controlled substance prescriptions
- Total number of patients receiving prescriptions from other prescribers for more than one (1) type of controlled substance
- Total number patients receiving controlled substances prescriptions from five (5) or more prescribers or visiting five (5) or more pharmacies
- Total number of PDMP queries made (planned)

A letter is sent with the report explaining the program and emphasizing that the purpose is to promote appropriate prescribing for the selected drugs (see Appendix B). A link to the 'Arizona Opioid Prescribing Guidelines' is included as reference.

Initial feedback from the prescribers receiving the report cards has been mostly positive. The most common complaint concerned incorrect specialty group designation for the prescriber. The PDMP has seen evidence that more prescribers are querying the PDMP and have adjusted their prescribing habits. In Pinal County, the percentage of prescribers meeting the 'outlier' criteria for total dosage units fell 26% and prescriber PDMP usage increased 14% in just one year.³

³ PDMP Center of Excellence, Using PDMP Data to Guide Interventions with Possible At-Risk Prescribers, October 2014.
http://www.pdmpexcellence.org/sites/all/pdfs/Using_PDMP_Data_Guide_Interventions_at_Risk_Prescribers.pdf

KENTUCKY

Background

Kentucky's interest in report cards began after attending a presentation describing the Arizona program at the 2014 National Data Driven and Multi-Disciplinary Grantees Meeting sponsored by BJA and hosted by TTAP⁴. Kentucky originally patterned their program after Arizona's and had several discussions with the Arizona PDMP Administrator. Kentucky's PDMP, known as KASPER, originally intended to include a county-level report which compared a prescriber to other prescribers with similar specialties. However, during discussions with the KASPER Advisory Council and several prescribers in private practice, concerns were raised about the possibility that within counties that have few prescribers, the data could provide a misleading or skewed picture of the actual prescribing patterns. Thus, the report provides comparisons at the state-level and specialty-level. Kentucky's 'Prescriber Peer Review Report' was implemented in December 2015.

KASPER does all of its programming in-house. The development, testing, and production of the 'Prescriber Peer Review Report' totaled approximately 200 hours and cost approximately \$13,000. The entire project took approximately six (6) months to complete; four (4) months researching and obtaining approval for the project and two (2) months for development and testing. Information about accessing the report is provided under the 'What's New with KASPER' section of their website and included as part of their KASPER training. They are also collaborating with the various medical regulatory boards to promote the report card program. The Kentucky Board of Medical Licensure featured the report card in its Winter 2016 newsletter.

Program Description

Kentucky requires all in-state DEA licensed prescribers to register with KASPER. At the time a prescriber registers, they are required to indicate their specialty from a drop-down list. The list includes 27 specialty areas (see Appendix A). Once registered, a prescriber logs into the KASPER system and has the option to generate the 'Prescriber Peer Review Report'. Information for the report is based on the specialty noted by the prescriber at time of their enrollment with KASPER. It is important to note that prescribers may select any specialty area for comparison when generating this report. For example, a prescriber who designated their specialty as 'pediatrician' can choose 'oncologist' to see how their prescribing compares to that specialty. Authorization to request and receive the report is restricted to prescribers; delegates do not have that authority.

On a weekly basis, the prescription data is configured to count the number of prescriptions and dosage units dispensed for the previous 90 days (i.e., during the first week in April, data is pulled from the start of January through the end of March; during the 2nd week of April, data is pulled from the 2nd week of January through the 1st week of April). The data are placed in a 'proxy' table which becomes the source for generating the reports. The report is a single page which displays data for two (2) major categories: 'Prescription Counts' and 'Dosage Counts' (see Appendix C). Each category is displayed as actual numbers and within a bar chart. The drugs are divided into the therapeutic classes of benzodiazepines, opioids, sedatives and stimulants. These therapeutic classes are derived from the

⁴ BJA National Meeting on Data Driven Multi-Disciplinary Approaches to Reducing Rx Abuse National Meeting, February 25, 2015.
http://www.pdmpassist.org/pdf/PPTs/DataDrivenPilots/Arizona_2015_Project_Introduction.pdf

National Drug Code (NDC) Directory that KASPER uses. Prescription information is grouped and compiled based on the prescriber's DEA controlled substance registration number. The data for the two categories are shown as (a) the average for all Kentucky prescribers, (b) the average for prescribers within the selected specialty, and (c) the number for the requesting prescriber. Under consideration for enhancements to the report are the inclusion of the number of dosage units per prescription, morphine milligram equivalent (MME) calculations for a patient, and comparisons by a specific medication. The impact on KASPER system resources will be considered prior to implementing any enhancements.

These reports became available in December 2015 and, as of this writing there has been limited, but positive feedback on this new feature.

OHIO

Background

The Ohio PDMP, OARRS, does not allow prescribers to request a report of their prescribing history. However, in response to expressed needs of the prescriber community, the PDMP created a report called the 'Practice Insight Report'. The purpose of the report is to provide a brief summary to each prescriber of their prescribing patterns. Discussions about developing this type of report first surfaced at a meeting, held in October 2013, sponsored by the Association of State and Territorial Health Officials (ASTHO) where several State of Ohio agencies (Board of Nursing, Board of Pharmacy, Bureau of Workers Compensation, Department of Aging, Department of Health, Department of Medicaid, Department of Mental Health and Addiction Services, Department of Public Safety, State Dental Board, State Medical Board, and Governor's Office), along with TTAP staff were present⁵. Development of the Practice Insight Report required approximately one (1) month of work by the OARRS staff. The PDMP system did not need modifications; basic data queries were built to generate the report. The Board of Pharmacy publicized the Practice Insight Report in their monthly newsletter following its development. There are plans to create a video on the use of the report for prescribers. During the 18 months OARRS has been issuing reports to prescribers, there has been a new interest by the PDMP and prescribers to include a comparison of the individual prescribers to his/her peers or specialty in this report. The PDMP is currently working on this aspect of the report. As a condition of the Centers for Disease Control and Prevention (CDC) Prevention for States grant program, the PDMP provided the report, as an unsolicited report, to every prescriber. This report included a cover letter explaining how to interpret the report's contents and how the prescriber can generate the report from the PDMP website. The patient information is de-identified; however, the prescriber can obtain that information by requesting a patient-specific report or their personal Practice Insight Report.

⁵ PDMP Center of Excellence, Ohio Prescription Monitoring Workshop, October 30, 2013. <http://www.pdmpexcellence.org/content/state-public-health-agencies-project>

Program Description

A prescriber can access the Practice Insight Report from the OARRS website in the same manner they would request a Patient Prescription History Report. The prescriber selects 'Practitioner' instead of 'Patient' for the type of report; no other information need be entered. The report is compiled based on the prescriber's DEA controlled substance registration number and the information is compiled into four (4) sections (see Appendix D):

- Top 25 patients by number of other prescribers visited in the previous 12 months
 - Patients are listed in descending order by the total count of other prescribers visited
 - Patient's last name, first name, date of birth, and prescriber count are displayed
- Top 25 patients by active cumulative morphine equivalent (ACME) (Ohio's acronym for MME)
 - Patients are listed in descending order by their ACME
 - Patient's last name, first name, date of birth, and ACME are displayed
- Top 10 medications prescribed in the previous 12 months for the prescriber's entire practice
 - Pie chart representation
 - Medication name and percentage of total prescriptions issued are displayed
- A listing of the prescriber's patients issued a controlled substances prescription in the previous 12 months
 - Alphabetical listing of all patients receiving prescriptions from prescriber
 - Patient's last name, first name, date of birth, and date that the last prescription was written are displayed

The PDMP is considering several enhancements to the Practice Insight Report. These enhancements include:

- Adding peer comparisons by prescriber specialty
- Removing the pie chart of the top ten (10) medications prescribed as many prescribers have reported that it is confusing or little value to them
- Providing 'grouped' reports containing information from all prescribers within a group practice or hospital setting
- Limiting prescription data in report to solid oral medications to increase accuracy of computations
- Creating metrics based on published prescribing guidelines
- Developing functionality in report that will allow a prescriber to view patient-specific information or 'drill down' to specific prescriptions

Since the report's inception, the feedback from the prescribers has been positive. To date, there has not been any formal evaluation of the report's effect on prescribing. In addition to the implementation of the report, Ohio has developed prescribing guidelines, so it may be difficult to determine which has had more of an impact on prescribing practices.

PRESCRIBERS' PERSPECTIVE

Along with examining the three (3) PDMP programs, TTAP reached out to the prescriber community to obtain their perspective on the usefulness of report cards. Four (4) nationally recognized experts were interviewed: Drs. Andrew Kolodny (Phoenix House), Greg Terman (University of Washington, Department of Anesthesiology and Pain Medicine), Bob Twillman (American Academy of Pain Management), and Scott Weiner (Brigham and Women's Hospital) (see Acknowledgement section). Before the interviews, the physicians were provided with a copy of the Arizona Report Card and accompanying letter (see Appendix B). Three (3) of the physicians shared the report with their colleagues, including emergency room physicians and several physicians who are reviewing the newly-released CDC draft opioid guidelines. Below is a summary of the comments and recommendations made by the physicians about the report card program.

Comments

The physicians and their colleagues unanimously liked the concept of providing information in this manner to a prescriber and felt that such a report would be beneficial to the prescriber in evaluating their prescribing practices. Each physician emphasized that the report card should be concise and not exceed two (2) pages in length to avoid information overload. They also felt that comparisons to other prescribers within the same specialty group were of great value to accurately assess prescribing habits.

The physicians stressed the importance of an appropriately worded cover letter with the report card. To help ensure widespread acceptance and use, the wording should emphasize that the report card is simply a clinical tool for the prescriber's use and benefit.

Recommendations

The physicians offered recommendations of elements that would be beneficial to include in a 'model' report card program:

- The report cards should be sent by the PDMPs to every prescriber who has prescribed at least one (1) controlled substance, once or twice per year or, at most, quarterly.
- Prescribers should have the opportunity to request their own report online at their discretion.
- Allow the prescriber the option to select their specialty group when requesting their own report.
- Include information with helpful resources in the cover letter. For example, provide web links to information on prescribing guidelines, safe storage of medications, proper disposal of medications, etc.
- Provide detailed and complete explanations of the meaning of each element (e.g., chart, graph, table, number).
- Include a hyperlink with each report card element that allows the prescriber to obtain additional information about the patients associated with that element or, at a minimum, a hyperlink to retrieve a patient's complete PDMP report.
- Subject prescriber data that are determined to be outside the 'norm' should be clearly denoted. To accommodate individuals that have difficulty differentiating colors, use patterns in conjunction with colors on charts/graphs.

- Inform the prescribers of the number of patients they are treating who meet various risk factors and provide a method to easily retrieve PDMP information on those patients.
- Comparisons made to a prescriber's peers need only be at a statewide level; prescribing trends should not vary widely from one area of a state to another.
- Use a low threshold for patients with multiple provider episodes to alert prescribers of potential 'doctor shopping' and/or drug interactions (i.e., total number of patients issued prescriptions from two (2) or more prescribers).
- Use daily morphine milligram equivalents (MMEs) instead of dosage units when comparing prescribing practices. This will avoid issues associated with compiling the dosage counts of medications that have varying strengths.
- The CDC has indicated that patients receiving 50 MMEs to 90 MMEs or more per day are at an increased risk of overdose. It would be beneficial to provide incremental information on the amounts patients receive (i.e., 40 MMEs, 60 MMEs, 80 MMEs).

During the interviews with Drs. Twillman, Terman and Weiner, measuring effectiveness of the report cards was discussed. All agreed that it would be important to track the usage of the report cards and identify the impact on prescribing before and after a report card program was implemented.

SUGGESTED COMPONENTS OF A 'MODEL' REPORT CARD

The following suggestions are the result of using the three (3) state report card examples and input from the four (4) doctors as a guide. PDMPs are urged to review the components and determine which are feasible with their system's capabilities, implementable with current resources, and applicable to the needs of prescribers in their state. Note: inclusion below is not intended to imply that all participants agree with every component listed.

➤ **Peer Comparisons**

1. Compare the prescriber's number of prescriptions issued per month by therapeutic class code or by specific substances to peer averages by specialty throughout the state.
2. Compare the prescriber's number of milligrams prescribed per month by therapeutic class code or by specific substances to peer averages by specialty throughout the state.

➤ **Patient Risk Factors**

3. Total number of patients receiving 90 MMEs or more per day.
4. Total number of patients receiving opioid medications for 30 days or more.
5. Total number of patients receiving opioids and benzodiazepines medications at the same time.
6. Total number of patients issued more than one (1) controlled substance prescription from the subject prescriber or other prescribers.
7. Total number of patients issued prescriptions from three (3) or more prescribers (multiple provider episodes).
8. Total number of patients filling prescriptions at three (3) or more pharmacies (multiple provider episodes).
9. Total number of patients with controlled substance prescriptions whose dispensing dates overlap.
10. Total number of patients obtaining refills on their prescriptions more than one (1) week early.

11. Total number of patients at various 'Risk' levels. Risk levels can be determined by the number of risk indicators above (lines 3-10) that a patient meets. Risk levels range from 1 (patient meets the threshold for one risk indicator) to 8 (patient meets the threshold for all eight indicators). PDMPs should seek the guidance and expertise from the medical and treatment community or it's Advisory Council in establishing risk indicators and levels.

➤ **Utilization**

12. Total number of PDMP queries made by prescriber and a ratio of PDMP queries to the number of patients or prescriptions issued.

Data File Generation

In order to generate the data for these elements, some preparatory work should be completed to ensure accuracy, consistency, and processing efficiency:

- Patient information should be normalized and clustered. Information on the various methods to accomplish this are available:
 - [Patient Linking Software Options Guide](#)
 - [Webinar on Linking Patients in PDMP Data](#)
- Prescriber information should include their specialty. If this information is not part of the PDMP's prescriber file, there are other options:
 - Obtain the specialty from the appropriate regulatory/licensing board, if available
 - Include a specialty field as part of PDMP enrollment form
 - Use the specialty field from the [NPI file](#) and link to the existing prescriber file
 - Allow prescriber to select their specialty when report card is generated
- Categorize medications by class codes (i.e., benzodiazepines, opioids, sedatives, stimulants). The Food and Drug Administration (FDA) maintains a [National Drug Code \(NDC\) Directory](#) (note: NDCs can be obtained from other sources). Within the FDA NDC file, there is a Product File field (Pharm_Classes) which identifies the pharmacological class code for a medication. The above four (4) primary class codes are listed in many different ways; however, it is not difficult to identify and group them using a portion of the pharmacological class code definition string.
- Calculate the total milligrams prescribed or dispensed instead of quantity for comparisons to peers. Medications vary by strength and using the number of pills dispensed does not provide an accurate representation for evaluating the prescribing of a prescriber or the risk for a patient. For example, hydrocodone is available in 2.5mg, 5mg and 10mg tablets. A prescription for 100 tablets can result in a patient receiving 250mg, 500mg or 1000mg of hydrocodone. Within the FDA NDC file, there is a Product File which includes fields to identify the medication's strength: ACTIVE_NUMERATOR_STRENGTH and ACTIVE_INGRED_UNIT. To determine the total milligrams prescribed or dispensed, multiply the quantity by ACTIVE_NUMERATOR_STRENGTH (note: the ACTIVE_NUMERATOR_STRENGTH may need to be adjusted if the ACTIVE_INGRED_UNIT is not listed in milligrams).
- Base the comparisons of prescriptions issued and milligrams prescribed by calculating the prescriber's percentile ranking or variation (standard deviation) in relation to the 'average' prescriber (see Appendix E for definitions and examples).
 - Standard deviation shows the amount of variation there is from the "average" (mean).
 - Percentile rank refers to the percentage of values that are equal to or less than a given value; commonly shown in 'deciles' or 'quartiles'.

- Calculate the daily morphine milligram equivalents (MMEs) prescribed by the prescriber to each patient. Evidence suggests that a patient receiving more than 100mg MMEs is nine (9) times more likely to overdose, with 12% of those resulting in death⁶. To calculate MMEs, multiply the medication's strength by the quantity dispensed and the MME conversion factor, then divide the answer by the number of days the medication is taken. The Centers for Disease Control and Prevention (CDC) developed and TTAP has made available a conversion table and Statistical Analysis System (SAS) program to assist in calculating MMEs: [Calculating Daily Morphine Milligram Equivalents](#).
- Prescriptions are considered 'overlapping' when at least two (2) controlled substance medications (usually opioids or opioids and benzodiazepines) are being taken at the same time by a patient. Typically, the time frame for the overlap is seven (7) days. For inclusion in the prescriber report card, it is the number of patients with overlapping prescriptions; not the number of prescriptions. The length of time a patient should take a medication is calculated using the dispensing date and the 'days supplied' fields. If the prescriber does not indicate the number of days the prescribed medication should last, the dispensing pharmacist will determine the number of days based on the instructions for use indicated on the prescription or use an established formula within the pharmacy's software. In most instances this is accurate and reliable; however, when the prescriber indicates that the medication should be taken 'as needed', the accuracy and reliability are lessened.
- Refilling a prescription early implies that the patient may not be following the doctor's instructions for taking the medication. The quantity of medication prescribed will last a certain amount of time based on the instructions for use that a prescriber indicates. Patients are permitted to get the prescription refilled on or shortly before the medication runs out. For inclusion in the prescriber report card, it is the number of patients refilling at least one (1) prescription more than seven (7) days early; not the number of prescriptions that were refilled early. The method to determine which prescriptions were refilled early is the same as for overlapping prescriptions; based on the dispensing date and the 'days supplied' fields.

Report Distribution and Retrieval

The value of the report cards will not be realized unless they are obtained and used by the prescriber. There are two (2) methods by which prescribers can obtain their report card; ideally, the PDMP should employ both methods.

- PDMP-Generated – The reports should be generated at least once or twice a year and emailed to all prescribers who have issued at least one (1) controlled substance prescription during the report's time frame. It is recommended that the reports be generated and sent no more than quarterly to avoid overwhelming the prescribers with too much information. It is recommended that these reports be generated in addition to other unsolicited reports or alerts that the PDMP may send.
- Self-Generated – A prescriber should have the capacity to retrieve their own report card. This could be a separate report or included with their prescribing history report, if permitted under state law, administrative code, or policy. Self-generated reports would require the user query screen to be modified to include this type of report, but would be far less burdensome on the PDMP's resources than PDMP-generated report cards. If possible, it would be beneficial to allow the prescriber to set the parameters for some of the components, e.g. number of MMEs a patient is receiving, number of different prescribers issuing prescriptions to a patient, number of different pharmacies filling prescriptions for a patient).

⁶ Dunn et al, Opioid Prescriptions for Chronic Pain and Overdose. Ann Int Med 2010; 152:85-92.



To lessen the impact on PDMP functionality and reduce processing time, it is recommended that a separate data file be generated nightly or at least weekly which contains the previous three (3) to six (6) months' data based on the date the medication was dispensed.

Report Guidelines

An aesthetically appealing and organized report card may improve the likelihood that the prescriber will readily review and quickly understand the report. Below are some suggestions for the layout and appearance:

- The report card should be brief to avoid overwhelming the prescriber with too much information; ideally one (1) to three (3) pages.
- The prescriber report card should include contextual information to ensure proper interpretation of the data. It is recommended to state that the report is a tool for the prescriber's use and benefit.
- Disclaimer language should be added stating the record source, statutory authority, dissemination of information, data limitations, etc.
- The elements included in the statistical analysis and compilation of the prescriber's data should be explained to avoid misinterpretation.
- The information on the report card should be arranged to allow for effortless review. The most important elements (i.e., patients at risk of adverse health events, multiple provider episodes) should be formatted to indicate various levels of concern (i.e., large or bold print, differing colors or patterns, asterisks).
- If the PDMP has the capability, pop-up text boxes or hyperlinks should be included so that the prescriber has the option to view more specific data associated with a report element; such as, patient information, prescription details, etc.

ACKNOWLEDGEMENTS

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Dean Wright holds a Bachelor of Science degree in Pharmacy from the University of New Mexico, College of Pharmacy. Dean worked in retail and long-term care pharmacy settings until 1991 when he became a Compliance Officer for the Arizona State Board of Pharmacy. As a Compliance Officer, he conducted compliance visits at regulated facilities, investigated complaints and violations of state and federal drug laws. In 1994, in addition to his regular duties, Dean became the Board's rule writer. In August 2007, he left compliance and moved into the Board office to become the Director of the Board's Prescription Monitoring Program.

Dave Hopkins is the Program Manager for the Kentucky All Schedule Prescription Electronic Reporting system also known as KASPER. KASPER is operated by the Office of Inspector General in the Kentucky Cabinet for Health and Family Services. In this position, he is responsible for KASPER training; managing federal Prescription Drug Monitoring Program Grants that provide funding support for the program; and for analysis and research using KASPER data. Mr. Hopkins graduated from The Ohio State University with a Bachelor of Science in Computer and Information Science, and has over 30 years' experience in Information Technology consulting and project management. Mr. Hopkins is a member of the National Association of Drug Diversion Investigators, National Association of State Controlled Substances Authorities, and Vice-Chair of the RxCheck Governing Body.



Chad Garner is the current Director of OARRS, the Ohio prescription monitoring program. He has been employed by the Ohio State Board of Pharmacy since 2006, serving as the OARRS Database Administrator, the agency's Chief Technical Officer and now the Director of OARRS. Over the past 7 years, Chad has contributed to the efforts of the BJA/IJIS Prescription Monitoring Information Exchange (PMIX) subcommittee, the NABP Prescription Monitoring Program Interconnect (PMPi) steering committee and the Ohio Governor's Cabinet Opiate Action Team (GCOAT) Professional Education working group. Chad received his Bachelor of Science degree in Computer Science from Mount Vernon Nazarene University in Mount Vernon, Ohio.

Andrew Kolodny, M.D., is the Chief Medical Officer of Phoenix House, a nonprofit addiction treatment organization and he is a senior scientist at the Heller School for Social Policy and Management at Brandeis University. Dr. Kolodny is also the Executive Director and co-founder of Physicians for Responsible Opioid Prescribing (PROP). Dr. Kolodny was previously the Chair of Psychiatry at Maimonides Medical Center in New York City. He has a long standing interest in Public Health. Prior to his position at Maimonides, he was the Medical Director for Special Projects in the Office of the Executive Deputy Commissioner for the New York City Department of Health and Mental Hygiene. For New York City, he helped develop and implement multiple programs to improve the health of New Yorkers and save lives, including city-wide buprenorphine programs, naloxone overdose prevention programs and emergency room-based screening, brief intervention and referral to treatment (SBIRT) programs for drug and alcohol misuse.

Bob Twillman, Ph.D., is the Executive Director for the American Academy of Pain Management. In that capacity, Dr. Twillman is responsible for overseeing federal and state pain policy developments and advocating for those supporting an integrative approach to managing pain. He also serves as Chair of the Prescription Monitoring Program Advisory Committee for the Kansas Board of Pharmacy. Dr. Twillman received his Ph.D. in Clinical Psychology at the University of California in Los Angeles, and maintains a volunteer faculty appointment as Clinical Associate Professor of Psychiatry and Behavioral Sciences at the University of Kansas School Of Medicine in Kansas City, KS. Prior to taking his current position, Dr. Twillman was a full-time faculty member at the University of Kansas Medical Center, where he founded and directed the in-patient pain management program and was a co-founder of the hospital's Palliative Care Team. He has been actively involved in pain policy through his work with the Alliance of State Pain Initiatives and the American Pain Society for many years.

Gregory Terman M.D., Ph.D., is professor of anesthesiology and pain medicine at the University of Washington based primarily at the University of Washington Medical Center (UWMC). He is currently director of the Acute Pain Service at UWMC. Dr. Terman earned his bachelor's degree at the College of William and Mary in Virginia. He completed his Ph.D. in behavioral neuroscience in the Department of Psychology at UCLA and his M.D. at the University of Miami. He completed his anesthesiology internship and residency, as well as pain medicine and pharmacology research fellowships at the University of Washington before joining the anesthesiology and pain medicine faculty. He is also a member of the University of Washington Graduate Program in Neuroscience and has run an NIH funded laboratory studying pain mechanisms since joining the Graduate Faculty. Nationally, Dr. Terman has served as president of the American Pain Society and is a special government employee for the FDA.

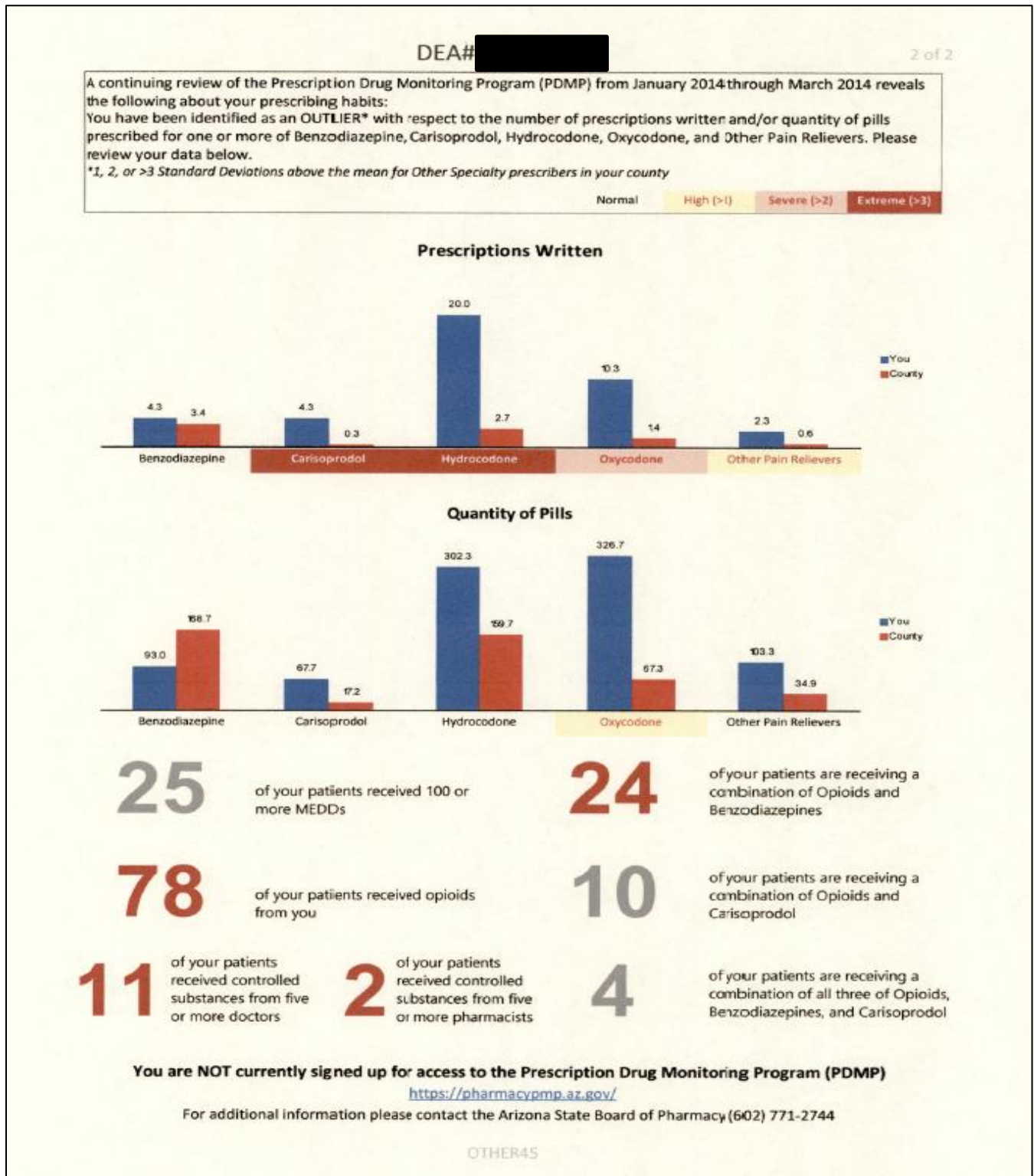


Scott Weiner M.D., MPH is an Assistant Professor of Emergency Medicine at Harvard Medical School and an Attending Emergency Physician in the Department of Emergency Medicine, Division of Health Policy Translation, at Brigham and Women’s Hospital. Dr. Weiner completed medical school at the University of California, Irvine. He finished his residency training at the Harvard-Affiliated Emergency Medicine Program at Beth Israel Deaconess Medical Center in Boston and, subsequently, got his MPH degree at the Harvard School of Public Health. He serves as the Associated Fellowship Director for the Emergency Medicine Health Policy Research and Translation Fellowship at Brigham and Women’s Hospital. Dr. Weiner’s research focus is on identification of substance use disorder in the emergency department, particularly as it relates to prescription opioids. He has studied the effects of prescription drug monitoring programs (PDMPs) on prescribing behavior, in comparison to clinician gestalt and in relation to opioid risk-screening tools. His recent research evaluates opioid-prescribing behavior from the ED. He is also interested in implementation of prescribing guidelines and technological innovations that improve the care of ED patients presenting with pain. Dr. Weiner has authored more than 40 peer-reviewed papers over a decade of clinical and research experience. He has been funded by the NHLBI and was named as the 2015 Emergency Physician of the Year by the Massachusetts College of Emergency Physicians.

Appendix A – Specialty Groups

MEDICARE SPECIALTY GROUPS (related to prescribing of controlled substances)		
Anesthesiology Assistant	Physician/Family Practice	Physician/Orthopedic Surgery
Audiologist	Physician/Gastroenterology	Physician/Osteopathic Manipulative Medicine
Certified Clinical Nurse Specialist	Physician/General Practice	Physician/Otolaryngology
Certified Nurse Midwife	Physician/General Surgery	Physician/Pain Management
Certified Registered Nurse Anesthetist (CRNA)	Physician/Geriatric Medicine	Physician/Pathology
Chiropractic	Physician/Geriatric Psychiatry	Physician/Pediatric Medicine
Nurse Practitioner	Physician/Gynecological Oncology	Physician/Peripheral Vascular Disease
Occupational Therapist in Private Practice	Physician/Hand Surgery	Physician/Physical Medicine and Rehabilitation
Optician	Physician/Hematology	Physician/Plastic and Reconstructive Surgery
Optometry	Physician/Hematology-Oncology	Physician/Preventive Medicine
Oral Surgery (Dentist only)	Physician/Hospice and Palliative Care	Physician/Psychiatry
Physical Therapist in Private Practice	Physician/Infectious Disease	Physician/Pulmonary Disease
Physician Assistant	Physician/Internal Medicine	Physician/Radiation Oncology
Physician/Addiction Medicine	Physician/Interventional Pain Management	Physician/Rheumatology
Physician/Allergy/ Immunology	Physician/Interventional Radiology	Physician/Sports Medicine
Physician/Anesthesiology	Physician/Maxillofacial Surgery	Physician/Surgical Oncology
Physician/Cardiac Surgery	Physician/Medical Oncology	Physician/Thoracic Surgery
Physician/Cardiovascular Disease (Cardiology)	Physician/Nephrology	Physician/Urology
Physician/Colorectal Surgery (Proctology)	Physician/Neurology	Physician/Vascular Surgery
Physician/Critical Care (Intensivists)	Physician/Neuropsychiatry	Podiatry
Physician/Dermatology	Physician/Neurosurgery	Psychologist, Clinical
Physician/Diagnostic Radiology	Physician/Nuclear Medicine	Psychologist, Clinical
Physician/Emergency Medicine	Physician/Obstetrics & Gynecology	Speech Language Pathologist
Physician/Endocrinology	Physician/Ophthalmology	
ARIZONA SPECIALTY GROUPS		
Addiction Medicine	Naturopath	Pediatrics
Anesthesiology	Neurology	Physical Medicine & Rehab
Dentists-General	OBGYN	Podiatry-General
Dentists-Orthodontics	Oncology	Podiatry-Surgical
Dentists-Surgical	Optometry	Preventive Medicine
Emergency Medicine	Other PA-APN	Psychiatry
Family Medicine	Otolaryngology	Radiology
Hospice	Pain Medicine	Surgery
Internal Medicine	Pathology	Urology
KENTUCKY SPECIALTY GROUPS		
Allergy/Asthma	Nephrology	Pediatrics
Anesthesiology	Neurology	Physical Medicine/Rehabilitation
Cardiology	Nurse Practitioner (includes nurse anesthetist, nurse midwife, clinical nurse specialist, nurse practitioner)	Podiatry
Dental/Oral Surgery	Obstetrics and Gynecology	Primary Care (includes family practice, hospitalist, internal medicine)
Dermatology	Ophthalmology	Psychiatry
Emergency Medicine	Orthopedics/Neurological Surgery	Pulmonary Diseases
Gastroenterology	Otolaryngology	Radiology
Hematology/Oncology (includes radiation oncology)	Pain Management	Surgery (includes general, facial plastic, and vascular surgery)
Hospice/Palliative	Pathology	Urology

Appendix B – Arizona Report Card Sample





Arizona State Board of Pharmacy
Controlled Substances Prescription Monitoring Program
1616 W. Adams, Suite 120
Phoenix, AZ 85007

January 19, 2016

«Prescriber_Name» «Degree»

«Address»

«City», «State» «Zip»

Dear «Prescriber_Name» «Degree»:

The Arizona State Board of Pharmacy, in collaboration with the Arizona Substance Abuse Partnership, is participating in an initiative to address the growing concern over prescription drug misuse and abuse in Arizona. The Rx Initiative involves stakeholders from the Arizona Department of Health Services, the Arizona Criminal Justice Commission, the Governor's Office of Youth, Faith and Family, and local substance abuse prevention coalitions.


A major focus of the Rx Initiative involves promoting responsible prescribing and dispensing practices among medical professionals in Arizona. In an effort to help you monitor your own prescribing habits, please find an attached report card that details your prescribing patterns related to the types of prescription medications of interest to the Initiative. These medications were chosen based on data that identified them as the most commonly prescribed and the most commonly misused by youth and adults. Additionally, these drugs account for the majority of drug-related Emergency Department visits and poisoning deaths in Arizona.

The data provided by the report card is for your information only.

Please take a moment to review the report card to compare your prescribing practices to those of your colleagues, and help us promote responsible prescribing in Arizona. If you are an outlier (i.e., prescribing at least 1 Standard Deviation above the mean compared to your colleagues), we encourage you to consider if your prescribing practices follow best practice guidelines for your medical specialty. You can find the Arizona Opioid Prescribing Guidelines on the Arizona Department of Health Services website at <http://azdhs.gov/audiences/clinicians/index.php#guidelines-recommendations-rx-guidelines>. We also encourage you to educate your patients about the risks of Rx drug misuse and proper storage and disposal methods. Locations of permanent drop boxes can be found at www.dumpthedrugsaz.org.

If you have not yet done so, please go to the website below to sign up for access to the Prescription Drug Monitoring Program (PDMP) database: <https://pharmacypmp.az.gov/>. The PDMP is an essential tool for checking your patient's medication history, for monitoring their drug therapy, and for minimizing misuse. If you have any questions, please do not hesitate to call the Arizona State Board of Pharmacy at 602.771.2748 or 602.771.2732.

Appendix C – Kentucky Report Card Sample



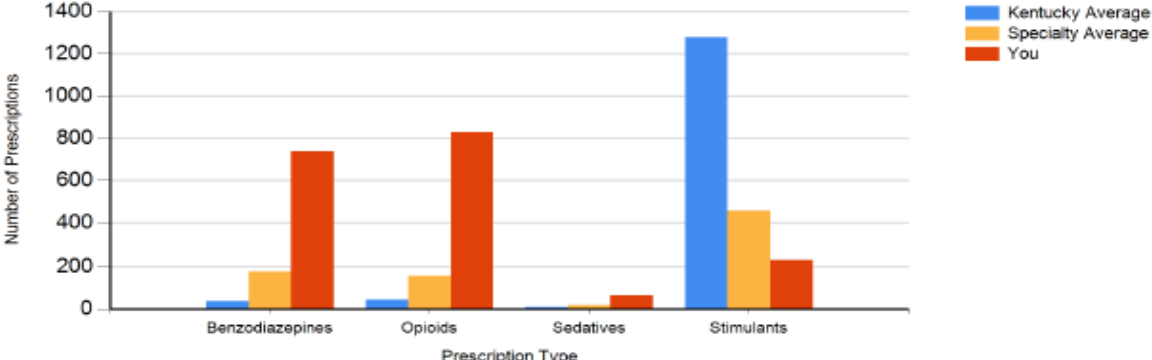
CABINET FOR HEALTH AND FAMILY SERVICES
 Commonwealth of Kentucky
 275 East Main Street
 Frankfort, KY 40621-0001
Drug Enforcement Branch - KASPER
Peer Review Report - Prescribing Comparisons

Below is a 90 day comparison of the number of your prescriptions and doses that were dispensed in Kentucky and reported to KASPER along with the average for all Kentucky prescribers and for the specialty area: Primary Care

Prescription Counts

	Benzodiazepines	Opioids	Sedatives	Stimulants
You	737	831	63	231
Specialty Average	177	157	17	457
Kentucky Average	37	44	9	1278

Count Comparison of Prescriptions Written

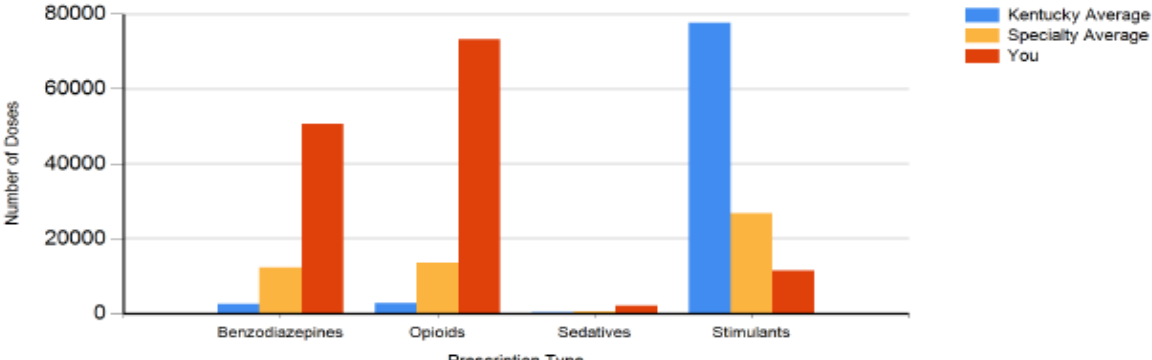


This bar chart compares the number of prescriptions written for four categories: Benzodiazepines, Opioids, Sedatives, and Stimulants. The y-axis represents the 'Number of Prescriptions' from 0 to 1400. The x-axis represents the 'Prescription Type'. For each category, three bars are shown: Kentucky Average (blue), Specialty Average (yellow), and You (orange). In the Stimulants category, the Kentucky Average is significantly higher than the Specialty Average and You. In the Opioids category, 'You' has the highest count, followed by the Specialty Average, and then the Kentucky Average.

Dosage Counts

	Benzodiazepines	Opioids	Sedatives	Stimulants
You	50721	73325	2011	231
Specialty Average	12258	13582	642	457
Kentucky Average	2543	2772	317	1278

Count Comparison of Doses Prescribed



This bar chart compares the number of doses prescribed for four categories: Benzodiazepines, Opioids, Sedatives, and Stimulants. The y-axis represents the 'Number of Doses' from 0 to 80,000. The x-axis represents the 'Prescription Type'. For each category, three bars are shown: Kentucky Average (blue), Specialty Average (yellow), and You (orange). In the Stimulants category, the Kentucky Average is the highest, followed by the Specialty Average, and then You. In the Opioids category, 'You' has the highest count, followed by the Specialty Average, and then the Kentucky Average.

Appendix D – Ohio Report Card Sample

Sample Report - Information is redacted

Ohio Automated Rx Reporting System

77 South High Street, Room 1702; Columbus, OH 43215-6126

-Equal Opportunity Employer and Service Provider-

TEL: 614/466-4143 E-MAIL: Info@ohiopmp.gov Fax: 614/844-8556

TTY/TDD: Use the Ohio Relay Service: 1-800/750-0750 URL: <http://www.ohiopmp.gov>

Dec 13, 2013

Prescriber Practice Insight Report

Prescriber: XXXXXXXXXX

DEA #: XXXXXXXXXX

Top 25 Patients by # of Prescribers in past 12 months

Last Name	First Name	DOB	# of Prescribers
Log In For Full Report	Log In For Full Report	Log In For Full Report	23
Log In For Full Report	Log In For Full Report	Log In For Full Report	16
Log In For Full Report	Log In For Full Report	Log In For Full Report	13
Log In For Full Report	Log In For Full Report	Log In For Full Report	7
Log In For Full Report	Log In For Full Report	Log In For Full Report	7
Log In For Full Report	Log In For Full Report	Log In For Full Report	6
Log In For Full Report	Log In For Full Report	Log In For Full Report	6
Log In For Full Report	Log In For Full Report	Log In For Full Report	6
Log In For Full Report	Log In For Full Report	Log In For Full Report	6
Log In For Full Report	Log In For Full Report	Log In For Full Report	6
Log In For Full Report	Log In For Full Report	Log In For Full Report	6
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	4
Log In For Full Report	Log In For Full Report	Log In For Full Report	4

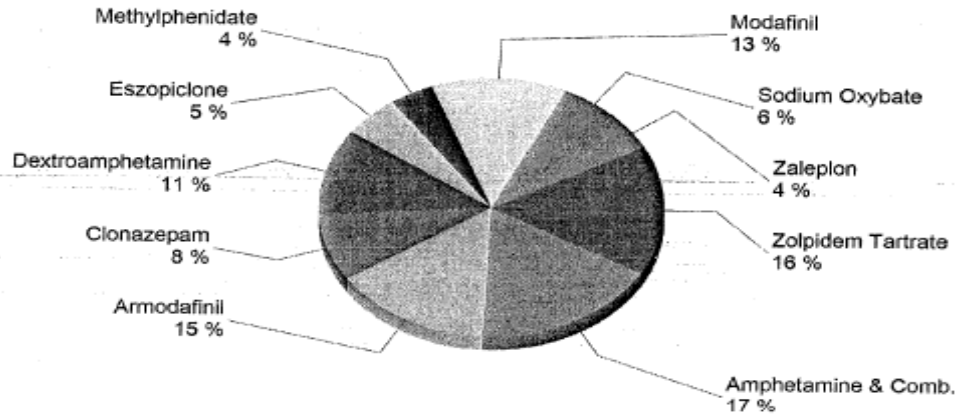
Sample Report

Top 25 Patients By Active Cumulative Morphine Equivalent (ACME)

Last Name	First Name	DOB	ACME
Log In For Full Report	Log In For Full Report	Log In For Full Report	480
Log In For Full Report	Log In For Full Report	Log In For Full Report	180
Log In For Full Report	Log In For Full Report	Log In For Full Report	120
Log In For Full Report	Log In For Full Report	Log In For Full Report	90
Log In For Full Report	Log In For Full Report	Log In For Full Report	60
Log In For Full Report	Log In For Full Report	Log In For Full Report	50
Log In For Full Report	Log In For Full Report	Log In For Full Report	45
Log In For Full Report	Log In For Full Report	Log In For Full Report	45
Log In For Full Report	Log In For Full Report	Log In For Full Report	45
Log In For Full Report	Log In For Full Report	Log In For Full Report	45
Log In For Full Report	Log In For Full Report	Log In For Full Report	36
Log In For Full Report	Log In For Full Report	Log In For Full Report	30
Log In For Full Report	Log In For Full Report	Log In For Full Report	30
Log In For Full Report	Log In For Full Report	Log In For Full Report	30
Log In For Full Report	Log In For Full Report	Log In For Full Report	30
Log In For Full Report	Log In For Full Report	Log In For Full Report	20
Log In For Full Report	Log In For Full Report	Log In For Full Report	20
Log In For Full Report	Log In For Full Report	Log In For Full Report	15
Log In For Full Report	Log In For Full Report	Log In For Full Report	10
Log In For Full Report	Log In For Full Report	Log In For Full Report	5
Log In For Full Report	Log In For Full Report	Log In For Full Report	0
Log In For Full Report	Log In For Full Report	Log In For Full Report	0
Log In For Full Report	Log In For Full Report	Log In For Full Report	0
Log In For Full Report	Log In For Full Report	Log In For Full Report	0
Log In For Full Report	Log In For Full Report	Log In For Full Report	0

Sample Report

Top 10 Drugs Prescribed By You in the Past 12 Months



Patients you have prescribed to in the past 12 months

Last Name	First Name	DOB	Last Prescription Written
Log In For Full Report	Log In For Full Report	Log In For Full Report	11/26/2013
Log In For Full Report	Log In For Full Report	Log In For Full Report	11/15/2013
Log In For Full Report	Log In For Full Report	Log In For Full Report	9/25/2013
Log In For Full Report	Log In For Full Report	Log In For Full Report	10/9/2013
Log In For Full Report	Log In For Full Report	Log In For Full Report	2/19/2013
Log In For Full Report	Log In For Full Report	Log In For Full Report	8/30/2013
Log In For Full Report	Log In For Full Report	Log In For Full Report	7/22/2013
Log In For Full Report	Log In For Full Report	Log In For Full Report	6/28/2013
Log In For Full Report	Log In For Full Report	Log In For Full Report	5/24/2013
Log In For Full Report	Log In For Full Report	Log In For Full Report	11/19/2013

Appendix E – Statistical Formula Examples

Standard Deviation

To calculate the standard deviation, the mean and variance must be calculated. Variance is a measure of how the data are clustered around the mean. Standard deviation is found by taking the square root of the variance of the data sample.

- 1) The mean is determined by adding all the numbers in the data set, then dividing by the total number of values (n).
- 2) The variance is determined by subtracting the mean from each of the numbers in the data set, then computing the square for each, and adding the squared numbers together (called 'sum of squares').
- 3) To determine the standard deviation, divide the sum of squares by the number of values in the data set (n) and calculate its square root. Standard deviations are determined by the number of square root values above or below the mean.

Example: There are 5 prescribers who have issued 22, 37, 64, 81, and 138 prescriptions.

Step 1: $(22+37+64+81+138)=342$

Mean: $(342/5)=\mathbf{68.4}$

Step 2: $(22-68.4)=-46.4; (37-68.4)=-31.4; (64-68.4)=-4.4; (81-68.4)=12.6; (138-68.4)=69.6$
 $(-46.4*-46.4)=3229.44; (-31.4*-31.4)=985.96; (-4.4*-4.4)=19.36; (12.6*12.6)=158.76;$
 $(69.6*69.6)=4844.16$

Sum of Squares: $(3229.44+985.96+19.36+158.76+4844.16)=\mathbf{9237.68}$

Step 3: $(9237.68/5)=1847.54$ $(\sqrt{1847.54})=\mathbf{42.98}$

One Standard Deviation: $(42.98*1)+68.4=\mathbf{111.38}$ (≥ 68.5 and ≤ 111.38)

Two Standard Deviations: $(42.98*2)+68.4=\mathbf{154.36}$ (≥ 111.39 and ≤ 154.36)

Three Standard Deviations: $(42.98*3)+68.4=\mathbf{197.34}$ (≥ 154.37 and ≤ 197.34)

The prescribers who issued 64 and 81 prescriptions are within one (1) standard deviation above the mean; the prescriber who issued 138 prescriptions is within two (2) standard deviations above the mean.

Deciles

Deciles are percentiles which divide a data set into ten (10) equal sections. There are nine (9) deciles in each distribution of values which correspond to the 10th, 20th, 30th,...90th percentiles.

- 1) Divide the total number of values by 10 to get the number of values within each decile.
- 2) Sort the values in the data set from smallest to largest.
- 3) Separate the values in the data set in groups of the number calculated in step 1.
- 4) The values within the highest 10th are considered within the 9th decile; the values within the lowest 10th are considered within the 1st decile.

Example: There are 15 prescribers who have issued 7, 13, 22, 37, 48, 51, 64, 79, 81, 96, 103, 128, 138, 144, and 151 prescriptions.

Step 1: $(15)/10=1.5$
 Step 2: 7, 13, 22, 37, 48, 51, 64, 79, 81, 96, 103, 128, 138, 144, 151
 Step 3: Each decile has 1.5 values within it.
 1st decile=1.5 2nd decile=3.0 3rd decile=4.5 4th decile=6.0 5th decile=7.5
 6th decile=9.0 7th decile=10.5 8th decile=12.0 9th decile=13.5 10th decile=15

The prescriber who issued 7 prescriptions is in the 1st decile; which means that 90% of the prescribers issued more prescriptions. The prescribers who issued 13 and 22 prescriptions are in the 2nd decile; which means that 80% of the prescribers issued more prescriptions. The prescribers who issued 144 and 151 prescriptions are in the 9th decile; which means they issued more than 90% of the prescriptions.

Quartiles

Quartiles are percentiles which divide a data set into quarters; the first quartile (Q1) is the 25th percentile, the second quartile (Q2) is the 50th percentile or the median, and the 75th percentile is the third quartile (Q3).

- 1) Divide the total number of values by 4 to get the number of values within each quartile.
- 2) Sort the values in the data set from smallest to largest.
- 3) Separate the values in the data set in groups of the number calculated in step 1.
- 4) The values within the quarter are considered within the 3rd quartile; the values within the lowest quarter are considered within the 1st quartile.

Example: There are 15 prescribers who have issued 7, 13, 22, 37, 48, 51, 64, 79, 81, 96, 103, 128, 138, 144, and 151 prescriptions.

Step 1: $(15)/4=3.75$
 Step 2: 7, 13, 22, 37, 48, 51, 64, 79, 81, 96, 103, 128, 138, 144, 151
 Step 3: Each quartile has 3.75 values within it.
 1st quartile=3.75 2nd quartile=7.5
 3rd quartile=11.25 4th quartile=15.0

The prescribers who issued 7, 13 and 22 prescriptions are in the 1st quartile; which means that 75% of the prescribers issued more prescriptions. The prescribers who issued 37, 48, 51 and 64 prescriptions are in the 2nd quartile; which means that 50% of the prescribers issued more prescriptions. The prescribers who issued 128 or more prescriptions are in the 3rd quartile; which means they issued more than 75% of the prescriptions.