Data and Analytics to Combat the Opioid Epidemic

JEN DUNHAM, Principal Solutions Architect, Global Security Intelligence Practice, Government & Health and Life Sciences Team, SAS Institute

STEPHEN E. KEARNEY, JR., PharmD, Medical Director, State and Local Government, SAS Institute

THE BIG IDEAS

- Physicians and their patients, medical policy makers and licensing boards, pharmaceutical companies and pharmacies all must work together to stem the opioid epidemic and achieve the fundamental objectives of reducing addiction and deaths.
- With so many players and data sources, today's information is partial, fragmented, and often not actionable. We don't have the data to understand what's happening, to adjust policy, and to motivate physicians and patients to change their behaviors.

- Better data and analytics can help develop better treatment protocols, both for pain in the first place and for remediation when patients are becoming dependent on the drugs.
- Large hospital systems, licensing boards, and public health agencies need the ability to benchmark providers by specialty and determine where and how to educate them.
- Analytics should enable all of these players to be more forward-looking and predictive, and to avoid unanticipated consequences of well-intentioned initiatives.

The Opioid Epidemic

On an average day, 78 Americans die from opioid overdose. Last year's total was almost 30,000 deaths, roughly two-thirds involving prescription opioids (including Percocet, Vicodin, Hydrocodone, Oxycodone, Oxycontin), the rest involving heroin. The United States, with about 5 percent of the global population, consumes 80 percent of the prescription opioids. The problem affects people of all backgrounds and across the socioeconomic spectrum; the Center for Disease Control (CDC) has officially declared it an epidemic.

Opioid use grabs headlines when important celebrities overdose. Prince is sadly the most recent. But the problem is persistent and pervasive. The marginally good news is that the number of opioid prescriptions written started to decline last year. Overdose deaths, however, continued to rise. Also in the news have been lawsuits against pharmaceutical companies and distributors for helping to create the astounding oversupply of opioids, but the root causes go deeper. Physicians and their patients, medical policy makers and licensing boards, pharma companies and pharmacies all have played roles. And all must work together to stem the opioid epidemic and achieve the fundamental objectives of reducing addiction and deaths.

How We Got Here

In the late 1990s, medical organizations officially designated "pain" as the fifth vital sign. The most readily available treatment was synthetic opioids, and the medical community thought they were much safer than they actually turned out to be. Opioids counteract pain, but they also cause euphoria and become an addiction that is very hard to break. After the third or fourth prescription, many patients have to start titrating up higher and higher doses. Too many accidentally overdose because they don't understand that high doses can cause respiratory depression. There is case after case of someone titrating to a very high dose then trying to quit and starting back on that same high dose one night and not waking up the next morning.

Extended release opioids like Oxycontin compounded the problem. They contain much higher doses. People could crush them, ingest by other methods, and get a stronger dosage faster. Pharma companies are working on abuse deterrent formulations that can't be crushed, but they're playing catch-up.

Is today's epidemic a matter of unintended consequences – or a self-fulfilling prophecy? Physicians were taught to assess pain on a 0 to 10 scale as reported by patients. We've learned now that they should be assessing pain on a functional scale – what can the patient actually do and not do? With the 10-point scale, patients are conditioned to always come in at an 8, because otherwise they might not receive the treatment for quick relief.

With the limited amount of time that physicians typically have to assess the patient, they can't conduct real functional assessment of pain. Most treatment options, starting with physical therapy, are more long-term. But patients don't want to hear, "Your pain probably will remain a 4 until you work through some of these functional things." Opioids are immediate, and so the path of least resistance and highest demand is for the physician to prescribe them.

Complex Challenges

Fighting the epidemic is a highly complex challenge in several ways. First is the number and variety of players. The CDC and SAMHSA (Substance Abuse and Mental Health Services Administration) try to see the big picture and set guidelines. State medical boards and public health agencies set local policy and standards for physician education. Pharma companies, distributors, and pharmacies constitute the physical supply chain. Insurance companies and government services pay for the prescriptions – and don't know what the epidemic is costing them.

Treatment centers are at the front line of assisting the addicted. And at the individual level, it's up to the physician to prescribe carefully and up to the patient to be informed and sensible in consuming strong medications.

By the way, in U.S. medical schools, the average number of hours devoted to pain education is nine; in Canada, it's double that, and for Canadian veterinarians it's 87.

With so many moving parts, it's probably not surprising that the data about opioid use is both extensive and fragmented. An estimated 21.5 million Americans age 12 or older have a substance use disorder, but we don't really know how many are dependent upon or addicted to prescription pain relievers. The data's not there. Nobody can understand the full problem, and that makes it impossible to devise and test comprehensive solutions.

A lot of effort has gone into Prescription Drug Monitoring Programs (PDMP), databases of prescriptions written and filled plus online portals for accessing that data. In the aggregate, these systems have made a difference in identifying and shutting down "pill mills." However, at the individual physician and patient level, their value is limited. Other data, including electronic health records and emergency room records, needs to be looked at simultaneously. When a patient is seeing three specialists and using more than one pharmacy, the PDMP's simple list of prescriptions can get difficult to decipher, and the prescription is just one piece of the puzzle. Often the most important data is contextual: What caused the pain to begin with? What is the treatment plan (or possibly conflicting plans)? What's the family context, and does the patient have someone who can provide support and monitor usage? It's shocking that 53 percent of youngsters who get their hands on opioids

and use them recreationally get them from a relative or friend, or find them in the medicine cabinet.

So prescribing physicians have access to data that is useful but incomplete. But they often don't refer to it because working with a PDMP doesn't fit their workflow. Given the confidential nature of their information, PDMPs have extensive access controls. With the web portal already open, it still takes three-to-seven minutes to look up the patient and evaluate the records. If the physician has only 15 minutes with the patient, that's too long. Some physicians start their days early to look up all the patients they're going to see. But many others take the stance, "I can judge patients based on what I know without looking in these systems."

PDMP systems are mandatory in 49 states, but only 22 require prescribing physicians to use them, and compliance is far from perfect. A *Health Affairs* survey in March 2015 found that only 53 percent of physicians were using PDMPs regularly. In some areas of the country, utilization estimates are as low as 20 percent. Pharmacies can also access the data and report back to the provider when a patient has multiple prescriptions, but the systems are difficult for them to use as well. The most consistent usage is in emergency rooms, where situations may be life-threatening and staff members are assigned to check the PDMP.

Addressing the causes of the opioid epidemic entails a complex information management problem. Today's information is partial, fragmented, and often not actionable. We don't have the data to understand what's happening, to adjust policy, and to motivate physicians and patients to change their behaviors. Without having much more information stitched together, we really can't make more informed decisions. Meanwhile, it remains too easy for dependent patients to obtain multiple prescriptions

for synthetic opioids, and too easy for them to turn to street drugs if the prescription supply is curtailed.

Opportunities with Data and Analytics

Daunting as the information management challenge may be, we have no choice but to redouble our efforts to gather and organize available data and use analytics to generate insights. Here are some examples:

- Most fundamentally, better data and analytics can help develop better treatment protocols, both for pain in the first place and for remediation when patients are becoming dependent on the drugs. Physicians want to know how their treatments and results compare with those of their peers, as well as what specific patterns give early warning of addiction or overdose. The CDC has issued guidelines about reevaluating chronic pain patients after three months, and Schedule 2 drugs (those with high potential for abuse or dependency) cannot be automatically refilled. But many patients demand opioids and are provided them by the system in unsafe quantities for long periods of time. Analytics help the physician recognize patient scenarios, prescribe correctly, and focus on the best overall outcome.

- Large hospital systems, licensing boards, and public health agencies need the ability to benchmark providers by specialty and get a better picture of where and how to educate them. These organizations are in the best position to aggregate data – PDMP, emergency room, hospitalization, medical examiner – and give providers that peer-to-peer comparison. Analytics can inform treatment guidelines, educational initiatives, and resource allocations, including treatment centers and community prescription drug take-back programs. These organizations can also be better

positioned to inform and influence policy makers at the state and national levels.

- Data and analytics should enable the organizations charged with leadership and policy to see more of the big picture and accelerate their decisions. Today, the data gathering and interpretation effort for community, state, and national studies can take a year or more. The FDA is looking at how they can expedite non-opioid treatments for pain and using advanced analytics to measure and assess results.

- Pharmacies need to know how they compare by geography, payment source, provider and patient mix. Data and analytics are needed to identify anomalies of distance and dispensing behaviors.

- The states struggle right now with where to appropriate funding for treatment facilities based on the combination of local need and which facilities have the best outcomes. Analyzing the populations in treatment for opioid dependence can inform medical decisions (such as when to prescribe Naloxone to counteract respiratory depression), suggest how to keep patients in the health care system (rather than transitioning to heroin), and indicate which facility is likely to best fit the patient's needs. Many providers are unaware of what specialists and treatment facilities have the capability to take these patients.

Analytics should enable all of these players to be more forward-looking and predictive, and to avoid unanticipated consequences. For example, legislation behind PDMPs cut down on doctor shopping and multiple prescriptions, but the consequence had people who were seeking only maintenance doses turn to street drugs. In retrospect, it would have been better to anticipate that eventuality and ask if that's what we really want. A more balanced approach would have curtailed prescriptions while increasing addiction treatment referrals.

More Comprehensive Approaches

Bringing the data together helps the various constituencies work together. It helps them see and understand a bigger picture, as well as clarify and focus on the outcomes we want. Everyone is aligned around the outcome of saving lives, but there are different approaches and combinations. Reducing the availability of illegal street drugs would take a massive enforcement strategy. Improving emergency room methods can literally save lives that have reached a point of crisis. If the desired outcome is reducing the number of addicts, then a lot more emphasis goes to patients, families, communities, treatment centers, and education. What are the effects of such initiatives? We need better data and analytics to answer that question.

Any approach should start at the root of the problem, which is patients getting prescriptions for opioids. We need to recognize and study the patterns and problem spots in the systems of care, train physicians on better ways to assess pain, and give them the information that will inform and shape their diagnosing and prescribing behaviors for the better. "What's the best outcome for this patient with this type of pain? How has that outcome been achieved for other similar patients? If this is an issue of addiction or other types of problems, how can we get the patient plugged into the right treatment options?"

As organizations get better at assembling and managing the data, they should invest in automating that process. Use analytics to prepare the data. Automate the generation of standard reports and file exchanges. Streamline the user interfaces for PDMPs and other systems. That allows the analysts and medical informatics staff to spend less time working on the data itself and more time enabling and

encouraging its use with predictive modeling and what-if scenario capabilities.

Actions Needed

To summarize the situation, we have conditioned patients not only to expect opioids for pain relief, but to utilize more and more of them, and the addiction is both psychological and physical. To remedy the situation, a lot of policies and practices and behaviors must change around how the health care system approaches pain. But we do not yet have the data and analytics we need to determine what specifically to do at the patient level or the policy level.

It's not enough to say, "Let's improve the current PDMPs so that providers will use them." That's just one piece of the puzzle. The opioid epidemic presents a much broader data management challenge. We need to have more and better data, we need more and better analytics, and we need to look at nontraditional ways of working together, across agencies and across information systems, to be able to determine outcomes and effect change.

There are encouraging signs, including the drop in opioids prescribed. People are having a dialog, and the agencies understand that they have to work together to fully understand and address the problem. Congress has taken action, recently passing the Comprehensive Addiction and Recovery Act of 2016. Hal Rogers, the House Appropriations Chair, has been championing the cause. But when we spoke with him, he said we were the first who had talked about data and advanced analytics as essential to any approach.

Resource allocation remains a huge challenge on both the medical and educational fronts, and we're not talking about one-time appropriations. There is no quick fix. We need to be able to really look at the data and make good choices and set a course over time. The resources to do that comprehensively are not available nationally or in any state. However, with the resources that are available, we recommend three priorities:

- Educate physicians and provider institutions across the health care system. Do that with data, because when they see that they are negative outliers in terms of methods and results, they change behavior.

- Hold licensing boards accountable. Again the best way is to give them the data and analyses to make good decisions. Where provider education falls short, clear policies around standards of care can fill the gaps.

- Share information with the public health groups, community coalitions, and substance abuse treatment centers that are on the daily front lines of assisting people with opioid addiction. Help these organizations improve their operations, measure their results, and contribute valuable data of their own to the larger cause of saving lives.

Additional Information

To learn more, please visit www.sas.com

About the Authors

JEN DUNHAM

As a Principal Solutions Architect within the Security Intelligence Practice at SAS Institute, Jen is focused on providing subject matter expertise and assistance to Government teams across the world in addressing various security risks such as Insider Threat, Targeting, Analytic Lead Generation, Cyber Crime, All-Source (Fusion) Analysis and similar applications of the SAS Security Intelligence Foundation. As a Certified Fraud Examiner (CFE), she also assists Government teams with traditional fraud challenges with a focus area in Occupational Fraud, Procurement Fraud, and Prescription Drug Monitoring Analytics.

Jen served as an all-source intelligence analyst in the United States Army for seven years, since then working closely with security organizations around the world. She has a unique and comprehensive view within the global Defense, Intelligence and Law Enforcement community and the varying tradecraft and missions of these organizations. Jen has experience working in mission areas such as investigations, counterterrorism, counterespionage, counternarcotics, and all-source intelligence analysis.

Jen's contributions while serving in various roles have earned her numerous accommodations such two Army Commendation Medals, two Army Achievement Metals, the NATO metal, and a Certificate of Appreciation from FBI Director Robert Mueller for assistance in a Major Case investigation.

STEPHEN E. KEARNEY, JR.

Dr. Kearney is the Medical Director for SAS State and Local Government where he works with a world renowned team to help solve the most complex healthcare challenges utilizing advanced analytical solutions. Prior to joining SAS, he was a Director in the Medical Outcomes Specialists group for Pfizer Global Medical where he worked for 17 years integrating clinical, HIT, health outcomes and policy for states, integrated delivery networks, payers, providers and patients. During that time, he served on the NC Governor's Task for Heart Disease and Stroke Prevention and The Behavioral Health Subcommittee for NC Medicaid. Most recently he served on the NC Chronic Pain Advisory Board and led the Pfizer effort as part of the Project Lazarus initiative.

Prior to joining Pfizer, he was a Clinical Pharmacist for Durham Medical Center (a Duke University Clinic with 11 internal medicine physicians), Clinical Assistant Professor at the University of North Carolina at Chapel Hill School of Pharmacy and Assistant Director for Pharmacy Education for the Non-Affiliated AHEC.

Dr. Kearney has received numerous awards including the 2005 Quality Pyramid Award for his work with North Carolina Medicaid and the 2006 Customer Recognition Award.

IIANALYTICS.COM

Panel III

Kenneth J. Martz, PsyD MBA
Special Assistant to the Secretary
Department of Drug and Alcohol Programs
Office of the Secretary