Using SAS Analytics to address Neonatal Abstinence Syndrome

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3. BRIEF DESCRIPTION OF EXPERIENCE PROVIDING SIMILAR SCOPE OF SERVICES OR CLINICAL CARE

   SAS has engaged many state and local government organizations around the opioid epidemic, which has permeated the lives of an unimaginable number of Americans. Discussions have revolved around prescription drugs, illicit drugs, effective and efficient healthcare, substance abuse prevention and treatment, physical and mental health outcomes, and law enforcement, to name just a few topics that dominate the conversations.

   While prevention and treatment services are a critical piece to addressing Neonatal Abstinence Syndrome (NAS), many states are having difficulty in determining the who, the when, and the where with respect to program delivery and effectiveness. The lack of reliable, meaningful data is frustrating for state health officials, who must make critical decisions based on incomplete information. This is where conversations have turned to big data and analytics to provide the necessary insights to help address the opioid problem. Many state governments have realized the value of technology solutions in helping fight the epidemic.

   SAS is working with states across the US to generate insights into the opioid epidemic by applying a technology solution to help identify high risk recipients, providers and dispensers. Identifying these high risk populations enables states and organizations to take steps to address the problem earlier in the cycle. Whether it’s treating patients that have a tendency to over medicate and steering them away from abuse, or helping educate providers who tend to over-prescribe, the use of an advanced analytic platform and applied domain knowledge has been able to make a difference. SAS looks forward to having thoughtful discussions with TennCare around how we can partner to prevent and reduce NAS.
### ADDITIONAL CONSIDERATIONS

(please limit written responses excluding supporting documentation to < 500 words per question)

1. What programs or approaches have been successful in encouraging appropriate opioid prescription and utilization for both the acute and chronic conditions? Please support all program recommendations with any available research or documentation.

Data analytics is an emerging approach to encouraging appropriate opioid use. TennCare can use data that is already collected by the State to:

- determine risk factors for Substance Use Disorder,
- identify specific citizens who are at risk, and
- uncover the prescribers and dispensers who enable inappropriate opioid use.

Today, Tennessee collects a wealth of data that can provide insight into whether opioids are used responsibly. Data sources include:

- **Medical claims** – TennCare collects data from claims/encounters on the diagnosis codes assigned and medical procedures performed by a provider. This data gives you the ability to identify who has a chronic or acute condition (including pregnancy).

- **Opioid Prescriptions** – The Department of Health collects data on opioid prescriptions dispensed into Tennessee, through the Controlled Substances Monitoring Database. This data tells you who is getting prescriptions for opioids, how much they have received, and who prescribed/dispensed.

- **Arrest records** – The Tennessee Bureau of Investigation collects data on arrests in Tennessee and the reason for arrest. This data tells you who has been arrested for opioid related offenses – both prescription and illicit opioids.

- **Drug convictions and treatment programs** – Drug courts in Tennessee collect data on convictions and assignment to drug treatment programs. This data gives you the ability to know who has been convicted of opioid-related offenses and the assignment to a treatment program.

- **Birth and death records** – The Office of Vital Records collects data on births and deaths in Tennessee. This data gives you the ability to know who has died and the cause of their death. It also gives you the ability to identify recent births, allowing you to deduce who has been pregnant.

- **Prescription drug inventory data** – The US Drug Enforcement Administration (DEA) monitors the flow of controlled substances from their point of manufacture to point of sale at the retail level. In short, DEA has robust inventory data on opioids. This is a publically available data set.

- **Prison census data** – The Department of Corrections maintains information on prisoners and their health records. This data gives you the ability to know release dates for prisoners and which prisoners have been treated for Substance Use Disorder.
**Why does this data matter?** Hidden within these data sources are key insights into addressing opioid abuse.

Massachusetts has combined death records, prescription records, and prison records to identify key risks factors for opioid overdose deaths. They found that a prisoner who is released from jail has a 56X greater chance of overdose death than the general public. Today, Massachusetts is developing pre-release programs to educate prisoners on opioid use.

California analyzes prescription records to identify patients who have high risk of opioid abuse (e.g. 90+ days of opioid use, concurrent use of opioids and benzodiazepines). California provides such analysis to physicians, who can then make a better informed decision on whether to prescribe.

Knowing that this data is highly protected, these states have addressed privacy concerns through strict controls and by anonymizing data for certain uses.

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2. **What options could TennCare consider to increase prescriber accountability for opioids?**

   Additionally, what opportunities exist to ensure responsible opioid utilization in women of child bearing age? Please support all program recommendations with any available research or documentation.

   TennCare can use data analytics to increase prescriber accountability for opioids. This practice would follow in the steps of the Tennessee Department of Health, which in 2016 adopted data analytics to assist in prosecutions of prescribers. Using data analytics for prescriber accountability is an emerging practice that other states – such as New York and North Carolina – are adopting.

   TennCare can analyze its own claim/encounter data to increase prescriber accountability. TennCare can answer questions such as:

   - Which providers are prescribing an unusually large amount of opioids?
   - Which providers are prescribing an unusually large amount of opioids for their given medical specialty?
   - Which providers are prescribing opioids for diagnoses/procedures that are not usually associated with pain?
   - Which providers are prescribing opioids without a corresponding claim for evaluation and management (a “naked” prescription)?
   - Which providers are prescribing opioids for extended periods of time (such as greater than 90 days)?

   TennCare can enhance this analysis by adding prescription data from the Controlled Substances Monitoring Database (to account for opioid prescriptions that are paid in cash or by another payer). TennCare can also enhance this analysis by adding death data from the Office of Vital Records (to identify those providers who have prescribed an opioid to a person who later dies of an opioid-related overdose).

   Having this analysis gives TennCare a wealth of options for increasing prescriber accountability. For example, TennCare can refer providers to a Health Professional Board for investigation. TennCare can
set standards that would allow removal of a provider from the Medicaid program. TennCare can also take a softer approach of sending education letters to providers. The specific intervention that TennCare takes is less important than the fact that data analytics will give you the ability to enact any number of policy solutions to increasing provider accountability.

The Tennessee Department of Health has already adopted a data analytics approach for the Controlled Substances Monitoring Database (CSMD). The Office of General Counsel uses data analytics to provide information to epidemiologists, investigation, and legal staff, to prevent prescription drug misuse, abuse, and overdose deaths. The solution provides a preliminary view of Practitioner, Pharmacy, Patient, and Prescription information to more efficiently direct the investigating staff to perform further research on a provider.

New York is also using data analytics for prescriber accountability. The Bureau of Narcotic Enforcement (BNE) in New York uses data analytics to identify suspicious patterns of behavior by prescribers. BNE does this by using data from the state’s prescription drug monitoring program. Prescribers who exhibit irresponsible prescribing patterns are referred for investigation and potential sanction.

North Carolina and California are also adopting data analytics. Those states search for irresponsible prescribing patterns by both providers and patients. These states have opted to take more of a public health approach to the opioid crisis.

If TennCare elects to take the same hybrid approach to data analytics, then you have the ability to promote responsible opioid use by women of child-bearing age.

3. What evidence-based programs or policies will encourage successful prevention and/or treatment to improve outcomes for Neonatal Abstinence Syndrome and for mothers who are at risk for delivering babies with NAS? Please support all program recommendations with any available research or documentation.

Prevention of Neonatal Abstinence Syndrome (NAS) offers mothers and their babies with the best outcomes. Numerous programs can offer effective prevention – including better preconception and prenatal healthcare, as well as education for both patients and providers about appropriate prescription drug use during pregnancy. We offer no opinion on which prevention programs are more/less effective than others.

We do know, though, that any given prevention program works only when you can identify – on a timely basis – those mothers who are at risk of having a baby with NAS. Success requires active identification of at-risk mothers, combined with aggressive outreach to such individuals. Quite simply, a program built on a passive model is ineffective.

Data analytics can help you enact an active prevention model. To be clear, this identification is at the individual level, not the population level. Here’s how:

- **Who is pregnant?** – Using your claims and encounter data, you can determine who is pregnant from procedure codes and diagnosis codes.
**Who is pregnant AND at risk?** Once you know who is pregnant, you can assess who has risk factors for NAS. Using CSMD data, you can identify pregnant women who have a prescription for an opioid (based on the CDC finding that up to 22% of women in the US filled an opioid prescription during pregnancy¹). You can also use CSMD data to determine if there are opioids prescribed to other household members. Using TBI data, you can identify who has been arrested for opioid related offenses. Using court data, you can identify who has been sentenced to complete drug treatment programs. In short, you can combine numerous data sources to identify woman who have known risk factors that place their babies at high risk for NAS. Once you know who is pregnant, and who has NAS risk indicators, you can identify a specific program or intervention for segments of high-risk groups. Examples include:

- **Inform the provider** – The ideal approach to prevention is to provide timely data to providers, who can use that data to make a well-informed decision on whether to prescribe an opioid. TennCare can inform prescribers when a patient is pregnant and/or is pregnant and has high risk factors for NAS. You can provide this notification through the CSMD (at the point when a prescriber consults the database before prescribing), and/or you can send letters to the providers who care for the mother.

- **Inform/educate the mother** – Concurrently, you can adopt targeted programs for at-risk mothers. Mothers who are at risk because of a previous stint in prison? Create a targeted program through probation/parole officers. Mothers who are at risk because of a previous stint in a drug treatment center? Structure a targeted prevention program through TennCare case managers.

A NAS prevention program is effective only if it targets the right individuals. Data analytics gives you the ability to precisely target the individuals who will best respond to each program.

4. **If you are a company or vendor providing information about your specific product offering, please provide any supporting evaluation and outcomes for your company’s product.**

SAS has been working with state and local governments to address opioid-related problems by generating insights from an advanced analytical and data management platform. Superior analysis capabilities, along with domain expertise and institutional knowledge that SAS brings to the table and organizations share, have been able to identify high-risk recipients, prescribers and dispensers.

State governments collect information in a multitude of systems related to patients, doctors and pharmacies. This includes medical treatments, prescriptions, and other services delivered. The challenge that these organizations face is effectively collating and consolidating this information to obtain a more holistic view of the entities of interest. Resolving entities across these disparate data sources continues to present challenges. The SAS solution provides not only data quality, cleansing and governance, but also provides robust entity matching/resolution capabilities that can allow organizations to see the prescription history of a patient along with their medical treatments, interactions with law enforcement and courts, and substance abuse treatment where the information is available.

SAS has deployed solutions that employ these data management capabilities, which ultimately provide a holistic view. One deployment integrated data from over 20 data sources to create a single view of an entity that was made available to over 30,000 users via a web interface. Another deployment integrated and anonymized data from several social service programs so the organization could understand service patterns.

While integrating the data is necessary to understand the touchpoints with a client, advanced analytics applied to this combined data allows us better insights into the clients we service and the services we provide. SAS deploys a variety of analytical techniques to identify risk and manage outcomes. A combination of business rules, anomaly detection, predictive modeling and link analysis provides a robust risk identification platform while predictive modeling and optimization techniques help us find the best solution for a given client.

SAS has deployed analytics to help organizations identify high risk patients receiving and high risk doctors prescribing opioid medications. Over 30 different analyses have helped organizations better monitor prescription drugs and take actions to educate, deter and even prosecute when necessary.

Advanced analytics have also been used to promote the best outcomes in juvenile justice and mental health organizations. Client attributes are compared against previous clients and services provided where the desired outcome was reached. In these instances, the most effective programs are identified, and future program needs are better forecasted.

5. If you are another state agency or contractor of a state agency implementing programs targeting appropriate opioid prescribing and utilization, prescriber accountability, or preventing and improving outcomes for Neonatal Abstinence Syndrome, please describe your approach.

In April 2016, the Tennessee Department of Health engaged SAS to develop a visualization and reporting solution for the Controlled Substances Monitoring Database (CSMD). The Office of General Counsel uses this solution to provide reporting capabilities to epidemiologists, investigation, and legal staff, to prevent prescription drug misuse, abuse, and overdose deaths. The solution provides a preliminary view of Practitioner, Pharmacy, Patient, and Prescription information to more efficiently direct the investigating staff to perform further research on a Practitioner. This solution went live in November 2016.