SAMHSA's Center for the Application of Prevention Technologies (CAPT)

Preventing the Nonmedical Use of Prescription Drugs: Using the PDMP and Other Strategies for Success

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[Gisela Rots]: Thank you for all joining us today. We are going to go ahead and get started, just because we have a lot of ground to cover. Thank you all for filling out the poll very much. I appreciate that.

Again, you are here this afternoon on this CAPT webinar on preventing the nonmedical use of prescription drugs, and using the PDMP, or the Prescription Drug Monitoring Program, and other strategies for success. We are joined today by some esteemed colleagues whom I will introduce in just a moment.

My name is Gisela Rots. I'm the coordinator for the CAPT's Northeast Resource Team and I am thrilled to be here with you all today. I see so many familiar names in the chat box. Thanks for joining us.

This is being brought to you as a part of the CAPT Services Task Order from the Substance Abuse and Mental Health Services Administration. Today's objectives, while there are only three of them—they will take us a good hour and a half to get through, so we are going to start by identifying a few categories of strategies for preventing the nonmedical use of prescription drugs, and then we will be spending a lot of time on this second objective around how we can leverage our PDMP data to address the nonmedical use of prescription drugs at multiple levels.

Again, we will be using PDMP as a short version of Prescription Drug Monitoring Program and we will finish up today's webinar by talking a little about some of the limitations of PDMP data. And as we go along, I certainly encourage you to enter your questions into the chat box. As I mentioned earlier, we've got quite a few people who

have joined us today, so we will probably be keeping folks on mute for much of the webinar, but we certainly encourage you to ask questions in the chat box. We'll try to get to them as they come in, but if we can't, we will make sure we follow up on them, as well. So, just know that there is a team of folks looking at that chat box and keeping track of the questions you are all asking.

In terms of today's road map, we are going to start by talking a little bit about strategies to address the nonmedical use of prescription drugs. Then we will be talking about the use of PDMP in substance abuse prevention, and we will be spending a good solid amount of time on that today. And then we are going to finish up by talking about some key recommendations for PDMP use and thinking about the next step.

In terms of our presenters, as I said, I have been joined today by a group of esteemed colleagues. I'm really excited to see so many folks with us today. First of all, we've got Tom Clark, who is the manager of the PDMP Center of Excellence Clearinghouse, and Tom has extensive experience in managing, evaluating, and researching PDMPs. His current work includes determining PDMP best practices, identifying innovative uses of PDMP data in a broad range of applications, as well as developing the evidence base for PDMP effectiveness. So, Tom, would you like to say “hi” today?

[Thomas Clark]: Yes, I would. Gisela, thanks for that introduction, and I'm very pleased to be here today. Thanks.

[Gisela Rots]: Great. Thanks, Tom. Next, we are joined by Josh Esrick, who is a policy analyst at Carnevale Associates. Josh brings experience and expertise in the current literature on preventing the nonmedical use of prescription drugs. He is the key contributor to the CAPT’s recently-revised suite of tools on prescription drug misuse. We often call them the decision-support tools, and he’s very knowledgeable about what's in there. Josh, would like to say “hello” today?

[Joshua Esrick]: Thanks, Gisela. Hi, everyone. I'm looking forward to the presentation today.

[Gisela Rots]: Great. Thanks, Josh. And, finally, we've Melee Kim, who is a project consultant, also with the PDMP Center of Excellence, and Melee conducts research and evaluation on community- and state-level programs aimed to prevent substance use and misuse, and other health and behavioral-health problems. She is currently working on a project that explores opportunities for using PDMPs to evaluate initiatives to facilitate safer prescribing of controlled substances. Melee, would you like to say “hello” today?

[Melee Kim]: Yep, hello everyone. I'm very glad to be here.

[Gisela Rots]: Great. Thanks so much! So, before we dive right into our material, we wanted to make sure we kind of took a step back and just—a reminder to folks that everything that we do around preventing the nonmedical use of prescription drugs should be aligning with the work that we do under the Strategic Prevention Framework. There are always some key considerations that we need to take into account when selecting strategies. And so, what we talk about with best practices and making some key recommendations has obviously happened in a broader context that has to be taken into consideration in these factors—along with these factors that appear on your screen. Right?

So, making sure that we are aiming to implement strategies that align with our staff capabilities and capacity: cultural competence is a piece of that, our lived experiences, familiarity—all of that is an important part of ensuring that we are linking up the strategies that we are selecting and what our own internal capacity is, as well as thinking about the training and technical assistance component of that.

So, if we are going to be recommending that some of our sub-recipients implement certain strategies related to data or the use of the PDMP, we just need to make sure that we are providing them with training and technical assistance that aligns with that.

Of course, that goes for us too—at the state level—ensuring that you are receiving the appropriate training and technical assistance to implement those strategies, and, of course, ensuring you have stakeholder support, the organizational leadership, and the evaluation and feedback to ensure that what you are doing is effective.

In addition, we want to make sure that anytime we are implementing strategies related to substance abuse prevention, we want to make sure we are aligning our interventions with our selected risk or protective factors. And so, we covered in a webinar a few weeks ago some of the key steps to the first three components of the SPF—so, needs assessment, capacity building, and planning—and we talked in there about the need to prioritize our risk and protective factors and then to ensure that however we develop our plans, we are lining up those interventions that we select with the steps of the SPF that came before.

This is just a reminder, again, that this happens in a much broader context and that we want to be selecting strategies and interventions that cross those socioecological levels that we often talk about in substance abuse prevention. So, just wanted to lay out that groundwork a little bit for you.

We are going to jump right into talking about different kinds of strategies that impact the nonmedical use of prescription drugs. We are going really quickly today because we have a lot of material to cover. We do encourage you to ask questions in the chat box as we go, but before we jump into the prescription drug monitoring program-related strategies, I want to take a step back and identify those strategies that can be effective in addressing the nonmedical use of prescription drugs more broadly. And so, in order to do that, I'm going to invite Josh to walk us through what the categories of strategies are. So, Josh, over to you.

[Joshua Esrick]: Thanks, Gisela. Hi, again, everyone!

So, I'm going to briefly talk about the different categories of other strategies to address the nonmedical use of prescription drugs, or NMUPD, as I'll be saying for the rest of the time I'm talking. Many of these strategies can be supported by prescription drug monitoring programs. Others are a little more a part of it, but this is just some context for the PDMP strategy.

So, we are going to talk really quickly through these categories, and then there are other CAPT tools available for individuals who want to find out more information about the other strategies. Hence, the bulk of this presentation will be on PDMP.

So, with that said, most strategies for addressing NMUPD fall into one of four categories identified in the President's plan to address prescription drug abuse, and these are: education, enforcement, disposal, and tracking and monitoring. And then we also have the SPF category up there that we are showing you: multicomponent strategies, which are strategies that can combine elements from multiple different types of the other categories, as well as elements of coordinating and improving some of the other strategies.

So I am just going to briefly go through each of these categories, talk about them and some examples of strategies that are in them, then, go from there.

So, first is education strategies, which are strategies to increase awareness and understanding of the dangers of the nonmedical use of prescription drugs, and these are strategies that can be communitywide or targeting specific populations, depending on what you determine is appropriate, based on what is happening in your community. And some examples of types of education strategies are patient education, which is about informing patients about the dangers of NMUDP use and about how they properly and safely use and store their prescription drugs, and it's a type of education strategy that is

often directly provided by health care providers. Prevention can collaborate with those providers to improve that education.

Then there are prescriber education campaigns, which are about educating prescribers about the benefits and risks of opioids and the dangers of NMUPD and best practices in prescribing, and can also include elements of how to engage in patient education.

Then there are social marketing campaigns and information dissemination campaigns, which are the use of commercial marketing techniques to increase awareness of NMUPD in the broader community. And these are the types of strategies people really think of when we think of education strategies—multimedia campaigns or in-person events, things of that nature.

Then we also have the *Prescription Safe Campus Initiative*, which is an example of partnering with local colleges and universities—meaning campuses in your community—to ensure that you are including them in your assessment of the local community and that you are working with them to address NMUPD on campus. The *Prescription Safe Campus Initiative* itself is an initiative led by a partnership between The Clinton Foundation and The Jed Foundation, but it's just one type of that kind of strategy engaging with campuses.

Moving right along, we also have enforcement strategies which are strategies to prevent NMUPD through law enforcement action against agencies or organizations that are violating relevant laws surrounding prescription drugs. Obviously, law enforcement can play a very large role in addressing NMUPD beyond just what these strategies are. These ones that we have up on the screen are the ones specifically fitting that definition. Law enforcement can also be involved with other types of strategies that we are talking about later such as disposal strategies and tracking and monitoring strategies.

So, tip and reward programs are programs run by law enforcement or third party organizations that allow individuals to provide tips, sometimes anonymously and sometimes for monetary rewards, about NMUPD-related crimes, and then law enforcement can investigate those crimes. Examples of those are Rx PATROL and Rx Safety.

Then another type of strategy is just ensuring that law enforcement is receiving adequate training on supply reduction strategies and techniques, which can be facilitated or funded by the federal government, state government, or local government. It can also be provided by nonprofit or for-profit third party organizations, which are often led by former law enforcement officials.

A counterpoint to this strategy is providing training to law enforcement on harm reduction, which will be strategies surrounding general release of Naloxone and other things of that nature that can reduce the consequences of NMUPD.

And then also law enforcement being involved with enforcing the laws against doctor shopping and pill mills, which they use PDMP data to further enforce these laws.

Next we have multi-component strategies, which as I mentioned at the top are strategies that combine multiple approaches to address NMUPD, including the consequences of use, and they also often include initiatives to coordinate or improve other strategies that are existing in the community.

For instance, a classic example of a multi-component strategy would be the local community coalition itself, which intrinsically is a strategy since it is facilitating and coordinating local stakeholders throughout the community and providing a community-wide view of the issue and potentially also taking more concrete steps such as being a funding mechanism and implementing additional strategies on its own.

Then, there are also strategies surrounding partnering with colleges and universities and an example of that would be PROSPER. These types of strategies involve accessing the expertise of researchers on campus in your community and getting them involved with your prevention efforts.

Another example is harmful legal product prevention project, which was implemented in Alaska. It was a multi-tiered strategy where they implemented a community readiness model to assess the impact of harmful legal products, which included prescription drugs, as well as paint thinners, inhalants, other things that are legally obtainable but potentially abusable. After they did that assessment they implemented a home environmental strategy to provide parental education and student education since they are targeting specifically youth, and they implemented *Think Smart* which is a curricular strategy based on life skills training.

Another example of a strategy would be an overdose prevention program, possibly the most famous example of this strategy would be *Project Lazarus,* which would be strategies to prevent and reverse overdoses often implemented with other component strategies related to coalition building, raising community awareness, doing data monitoring, and things of that nature.

For all these multi-component strategies a common theme is that they involve collecting local assessment data to determine what kind of other strategies may be feasible to

implement, or components of strategies that you want to be implementing. In addition, common themes include a need for building capacity, engaging with key stakeholders and developing relationships with those stakeholders and everyone else in the community that would be involved, and then implementing whatever strategies that you determine are feasible and relevant. Examples of these are school-based curricula or parental education, patient education, prescriber education, law enforcement training, other community interventions, and things of that nature.

The next category of strategies is disposal strategies which are strategies to reduce the supply of unwanted or unnecessary prescription drugs in the community that may otherwise become diverted. Examples of these strategies are take-back programs and events, and permanent drop-off sites often at public agency locations, such as law enforcement or firehouses, and also potentially pharmacies. There are also mail-back programs where one can secure an anonymous envelope.

In addition, there are temporary events hosted by DEA or by your state or even by local agencies potentially (as long as they are following all DEA-approved steps around ensuring that only authorized personnel have access to the prescription drugs and that the drugs are being disposed of in the proper manner). Something that is important to note about the disposal strategy is that in reviewing research into their effectiveness, they may potentially be more effective at building relationships and being combined with other strategies rather than being implemented on their own.

Oftentimes an issue with disposal strategies is that many of the drugs that are disposed of are not actually controlled substances, so you hear things like “9000 pounds of drugs” being destroyed. However, even if 9000 pounds of drugs were collected, most aren’t actually relevant to NMUPD. So a disposal strategy might be more effective when you are using it to build up those relationships with other stakeholders.

Finally, we have tracking and monitoring strategies which are strategies to prevent NMUPD through improved tracking and monitoring of prescribers, dispensers, and patients. Examples include requiring health care providers to conduct physical exams prior to issuing prescriptions and educating them around the need to do that—that is, telling them about why this is best practice through education. Also, requiring or educating prescribers about the importance of having providers conduct follow-ups prior to renewing prescriptions and requiring or educating pharmacists about checking patient IDs prior to dispending prescriptions.

Finally, we have prescription monitoring programs and their mandatory usage, which you will be hearing much more about shortly. So, with that, I'm going to turn things back

over to Gisela.

[Gisela Rots]: Awesome! Thanks, Josh! Thanks for that really high, 50,000-foot overview of those strategies. We know that that was a lot of information, but we wanted to make sure we kind of gave you the high-level overview before we jump specifically into the PDMP-related strategies.

So, with that, we are going to be going to a quick poll, actually, two quick polls. We are interested in knowing if there are any of these strategies that you might be interested in learning more about and that's the question on the left-hand side. The question on the right-hand side is asking about which of these strategies are your grantees already implementing, or if you are a local-level person, which ones of those strategies might you already be implementing.

We are seeing some great responses! Lots of people interested in tracking and monitoring strategies, which is fantastic because you are in the right place today! Also seeing a lot of people interested in the multi-component strategies, which make a lot of sense because they can get at those different levels that we're talking about. It looks like we've got a lot of folks already implementing education strategies as well as disposal strategies—some of those strategies that are easier to implement. A couple of folks doing some multi-component strategies and that's great!

So, this is actually really, really helpful for us. Thanks for participating in this poll. And if you have any questions we certainly encourage you to type those in the chat box as we continue to move along. It looks like folks are done filling out those polls. Again, we've got a lot of folks who are interested in tracking and monitoring strategies. You are in the right place today! Then we have others who are already implementing both the education strategies and the disposal strategies. That is incredibly helpful for us!

Great! So, now we will move back to the main room and we are going to start to go a little more in-depth into those tracking and monitoring strategies. I'm going to invite Melee and Tom to lead us through these many types of strategies and some of their benefits and examples of how they are being implemented. And, again, as Melee and Tom are presenting we encourage you to put some questions in the chat box. We will be paying attention to those and be pausing for questions as we have time. So, Melee, over to you.

Melee Kim: Thank you! Hello everyone. Again, my name is Melee Kim. Tom Clark and I are researchers at Brandeis University Institute for Behavioral Health and we spend a majority of our time studying PDMPs. And so we are very excited to share with you how

PDMPs are being used and can be used for Partnerships for Success prevention programs.

So, for today, Tom and I will talk about these general topics and we will try to make this as interactive as possible in a webinar that has over 100 people. So, just bear with us as we try to address any questions that you might have along the way.

One other thing that I want to acknowledge is that while PDMPs have been around for decades and, in fact, the first one was established by California back in 1939, they are relatively new to healthcare practitioners and even more so to the prevention field. And so while we have a number of tribal communities who are absolutely critical in integrating efforts to address prescription drug use and abuse (and, of course, their associated consequences like overdoses), there aren't a lot of examples that we can draw from yet about how tribal communities are actually using PDMP data for prevention purposes. On the other hand, the examples that we provide today can very well be applied to tribal communities, and in addition, Tom and I can put folks who are interested in contact with our contact person at the Indian Health Services, so you can just send us a note.

Now, I realize there are some folks on this webinar who are very familiar with prescription drug monitoring programs, especially their state's PMDP. But just to help ensure that we are starting from a safe baseline of information, I am going to try to provide an overview rather quickly.

So, this map shows that there are currently 49 states and the US territory of Guam that have an operational PDMP, meaning that not only do they have legislation enabled to have such a system, but they are also collecting information onto a PDMP system. And there's a lot of variation across state PDMPs. In the next few slides, we are just going to highlight some of those differences. And the reason why I like to highlight some of those differences is because it's really important for us to understand the context in which a state PDMP exists, because it helps us to understand why a PDMP can and can't do certain things with their data.

So, for example here, many PDMPs are housed within a state department of health, which makes it a little bit easier to share data across the different departments. For example, an injury prevention department can easily generate some kind of internal MOUs with the PDMP. However, there are also PDMPs that are housed within a pharmacy board or a licensing board, which might make it a little bit more difficult to establish MOUs without data-use agreements. Then there are even some PDMPs that are housed within a law enforcement agency, which has a slightly different mission than

the public health department.

Now, there are 33 state PDMPs that collect all controlled substances, meaning schedules II through V, but there are also 16 states that only collect schedules II through IV. So, there are some states that have PDMPs that don't collect schedule V.

Also, the frequency with which the prescription information are being collected also varies from real-time (which is Oklahoma), to within 24 hours, to two weeks from the time that the prescription was dispensed. This impacts how the data can be used for real-time clinical decision support. So, you know as a primary end-user that state grantees are interested in advocating for increased utilization around the healthcare provider community. Just something to keep in mind.

Finally, the major source of funding varies from grants, usually from a federal entity, to some type of user-licensing fee. Naturally, one thing to consider as we think about sustainability is, you know, if a state PDMP is primarily funded from federal grants it's not exactly an ideal situation.

So, despite the variation across PDMPs, there are also quite a bit of common elements. Typically what's in the PDMP system are the prescription information, which includes the patient's name, the patient's date of birth, gender, address, and sometimes it also includes patient's phone number (which can be used in part in developing an algorithm to identify unique individuals). Also typical across PDMPs are the prescriber and pharmacy information, which would include the DEA number. So, it's pretty easy to identify unique prescribers and unique pharmacies. There is also the drug information itself, which would include the date the drug was dispensed, the date that it was prescribed, a unique prescription number, the national drug code for the drug that was dispensed, the quantity and days supplied, and how it was paid for (whether it was paid via a private insurance or whether it was self-paid).

And I put a note that PDMPs don't include the patient's diagnosis. This is important to note because if we are going to advocate for PDMPs to be used primarily as a clinical decision-support tool it's important for us to think about how to link PDMP data systems to other clinical information, say, within an electronic health record system. I say this because of all the states that have a PDMP the primary end-users are currently clinicians.

And also, for Partnerships for Success grantees, I would think that there would be some interest in the fact that some states do allow substance abuse treatment providers and drug courts to utilize the data system, but this is an area that can be further developed.

We tend to use the public health model for how PDMP data can be used because as we all can agree substance abuse is a public health problem. By using the four public health pillars (epidemiological surveillance, prevention, early intervention, and education) we can use PDMP data to determine the incidence and prevalence of certain medical and nonmedical uses of these controlled substances state-wide, but we can also look at it drilled down by county, region or city, and also over time.

Also the PDMP data can be used to facilitate more-informed prescribing decisions not just by healthcare practitioners, but also it can help to make better informed decisions by prevention practitioners as well. By that I mean being able to identify certain areas where interventions and programs are needed. And I noticed at the beginning of the poll there was quite a bit of interest in how PDMP data can be used to target interventions, so we hope to talk a little bit more at length about that in a little bit.

And, so here, just to recap, the PDMP data can help practitioners identify individuals as well who might be in need of substance abuse treatment or some other intervention. And then finally, PDMPs can help educate stakeholders about the prescription drug abuse epidemic.

Now, we know that PDMP data as part of its great strength is its robustness in terms of its availability. It’s available in a more timely manner than other health data and as we know many health-related data are available, say, two years after the fact. Also, whether it's for clinical or public health surveillance purposes, PDMP data contains detailed information about the prescription drug, say *who prescribed it*, *who dispensed it*, *who was it written for*, *who came to the pharmacy to pick it up* and, of course, more detailed information about the drug and how much of it was dispensed.

Just one thing to reiterate is the beauty of having PDMP data available, not just based on time, but also by space—and by that I mean we can try to apply some metrics to explore certain risk factors. So, say just as an example if there is a pattern of patients traveling quite a long distance between where the prescription was prescribed and where the prescription was dispensed. And say we’re looking at buprenorphine and one of those locations is also quite a bit of a distance from the patient's home, we can use this as an indicator for a need for more treatment providers in certain geographic areas.

On the next several slides I am going to try to provide some examples about how PDMP data can be used for epidemiological purposes, but keeping in mind that applying epidemiological analyses can help us figure out the needs assessments in a community as well.

Some of the examples that I will be drawing upon are from a project that we had a Brandeis University called PBSS: it stands for the Prescription Behavior Surveillance System. It's funded by the CDC and the FDA through the Bureau of Justice Assistance and its primary purpose is to create a de-identify database of state PDMP data for public health surveillance and state evaluation purposes.

And currently we have twelve states participating in PBSS. I'll just quickly name them: California, Delaware, Florida, Idaho, Kentucky, Louisiana, Maine, Ohio, Texas, Virginia, Washington state, and West Virginia. For those who are interesting in seeing some reports that are based on the PBSS data there are some products that we have on our center's website that we've developed that may be of interest to the prevention states.

So, as one example, here's your opioid prescription rate per 1000 people within those states for just 10 of the 12 states that are participating in PBSS. There are studies that have shown that there is quite a bit of variation among states and the number of prescriptions that are being dispensed. Here we see that there is a range across the 10 states, anywhere between 150 to 300 opioid prescriptions per 1000 state residents. You see that there's a little blip in the quarter 3 of 2014. To understand that blip, you have to take into account that Tramadol became a controlled substance IV and so that's a factor that we need to think about when we see an increase in opioid prescriptions over time. I say that just to put things into context.

At one point, there was *a lot* of interest in multiple provider episodes, aka doctor- or pharmacy-shopping activities. There is still some interest in it now as one measure of how effective a PDMP is. There is *less* emphasis in using this measure to see if a PDMP is effective. But, if we look at it from the standpoint of an indicator for possible treatment needs, it becomes a pretty decent method to keep in our toolkit.

In our case, in the PBSS project we define a multiple provider episode as an individual, meaning the patient, who received a controlled substance with five or more prescribers and fve or more pharmacies within a three-month period. While we can't compare the doctor and pharmacy shopping rates between states because the state has different methods for identifying a unique individual, we can compare the trend. So, we see here that overall there is a decline in multiple provider episode rates, but we all see that there is sharper decline in some states than others (in particular, in Kentucky and Ohio). There has been some evidence that mandatory requirements for prescribers to actually query the PDMP system prior to actually prescribing the opioid (or some other controlled substance) has made some positive impacts.

Here is a graph showing patterns by age groups—so another way of sort of cutting the data, if you will. This is looking at the overall increases of opioid-prescribing rates, which is defined as the number of opioid prescriptions per 1000 state residents, with increase in age. What we see here is that in half of these states there is a pattern for the group of people who are over 64 years old then for the other half of the states, where prescribing rates decline actually for the last age group. So, again, another variation that can be very telling in trying to a develop drug intervention.

Here we are looking at differences between males and females by age group for just seven of the states. Note that the relative prescribing rates for females are highest for the 18- to 24-year-old age group and the 25- to 34-year-old age group in all of these states. Just to be a little bit more specific, the differential of prescribing to females ranges from 33% to 76% for the 18- to 24-year-olds and the range is between 29% and 52% for the 25- to 34-year-olds. Just another way of looking at PDMP data for targeting interventions.

Another way to cut the PDMP data is by looking at space, so the next few slides are trying to get us to think about how to apply PDMP data to explore community needs or resources, even outcomes data, based on spatial information. I've listed here some of the states that we are drawing information from based on a number of PDMP projects that we've done at Brandeis.

Here, there are many states looking to disseminate clinical guidelines around safer opioid-prescribing practices for chronic non-cancer pain patients. So, one example that PDMP can be used for is by looking at the dosage in MME, or Morphine Milligram Equivalents. Here we see that for states it had a relatively high mean daily dosage in 2012 and that by 2015 the mean daily dosage decreased quite a bit, indicating more cautious prescribing of opioids across those states that we see here.

Here's an example of another state. By looking at the state at the county level, it says here that the state average in fiscal year 2010 was two prescriptions written per person. I want to mention with this slide is that if we look at it from the perspective of who actually received controlled substances during that same timeframe, that number jumped to 5.9 controlled prescriptions per average patient. So this is just to say, depending on which denominator we use can change the scope of the problem underneath.

Now, neonatal abstinence syndrome has been a very serious issue over the past few years. It's gotten a lot of attention nationally and locally. In Kentucky, what they did in their area development district, which were basically geographic catchment areas for

economic development, was used geographic areas to look at neonatal abstinence syndrome rates. Here we see that the darker color indicates the higher the rate of neonatal abstinence syndrome for those captioned areas.

Now, the next slide shows using the prescription drug monitoring program the rates of opioid prescriptions that were dispensed. What you see is (and here I'm just going to go back and just show you the colors between the two slides) a higher association between those two slides. Again, in this slide the darker the color means the higher the rate of opioid being dispensed in those geographic-captioned areas.

In a similar line of thought, we have here looking at towns. This is in Massachusetts and here we see opioid-related overdoses and, again, the darker the colors the higher rates of overdoses. We look here at questionable activity (another term for multiple provider episodes or doctor- and pharmacy-shopping activity) and we see here the darker the color the higher the rate of multiple provide episodes. I'm just going to go back to the previous slide and you will see again the high association between those two—the overdoses and the multiple provider episodes.

Now, we get to a finer granular level. Here, we are looking at zip codes within California and again we are looking at multiple provider episodes (again the darker the colors the higher rate of multiple provider episode that show up). Not only do you see variation across the state, but what I wanted to point out here is if you zoom in on a particular area (this is of the greater Los Angeles area) you will see that even within that urban area there is great diversity in the rates of multiple provider episodes.

So, all this is to say that PDMP data has the capability to provide information at this detailed geographic level which can be extremely helpful for local prevention practitioners and coalitions.

I'm going to hand it over to Tom now who will talk a bit more at length about using PDMP data for specific targeted interventions. Tom?

[Tom Clark]: Great, thank you, Melee. Again, I’m very pleased to be here and thanks for joining us today. I would encourage you should you have any questions to type them out in the chat box. We will try to get to those. So feel free to ask a question at any point as we go through this.

I'm going to get into, as Melee said, a little more detail about how PMDP data can be used for targeted interventions. Of course, what Melee just went through, the high-level epi data can also be used. You just have to get to, more granular, so everything she

mentioned in the previous section applies pretty well here, but we will get into some more specifics.

You've heard of *Project Lazarus* and here's one instance in which PDMP data were actually presented to a community group. Wilkes County was very aggressive in trying to increase prescriber use of the PDMP and the way they did was that they held a community meeting and actually showed the rate of prescriber use of the PDMP and other data (PDMP data on doctor shopping and prescribing rates) and as the presentation went on it was drawn to their attention that health outcomes are partially a function of PDMP utilization.

So in showing the rate of utilization they suggested to the community that this rate could be increased and therefore could help to improve health outcomes in Wilkes County. Indeed, what happened was because of the community meetings using these data, that prescriber utilization actually increased in Wilkes County. The resulting outcome (and we will see a slide of this later on) that with an increase in utilization by prescribers and a decline in doctor shopping there was a reduction in overdose deaths in that county.

One thing I'll mention before proceeding is that an important issue here is actually getting prescribers to use a PDMP. That's one intervention that can be, I think, very important in terms of preventing nonmedical use of prescription drugs. What we are trying to do here is change prescriber behavior in two respects. One respect is to actually get them to use PDMPs and then as a function of that use to actually see prescriber behavior change so that they see a reduction in, say, doctor shopping, a reduction in appropriate prescribing, and then eventually a reduction in overdose deaths, hospitalizations, and other outcomes related to the inappropriate nonmedical use of prescription drugs.

Arizona prescriber report card is another instance of using PDMP data to target intervention. What Arizona did (and many of you might have heard of this) is that they sent postcards to prescribers on a quarterly basis. They piloted this in four counties and they showed each prescriber where they stood in relationship to their peers as determined by the specialty that they are in. And, you can see some of the measures were prescribing for muscle relaxants, carisoprodol, benzodiazepines, hydrocodone, oxycodone and other pain relievers, and then a prescriber getting this report card identified as an outlier if she or he with one or two or three standard deviations about the mean on prescribing measures.

To being informed of this status on the targeted prescriber report card had the function of increasing PDMP enrollment in those counties where it was first rolled out and

utilization of the PDMP. What they saw was a reduction in outlier status as well. So, these reports cards had quite an impact on prescriber behavior, which is, of course, what we were looking for.

They are now expanding the report cards to the entire state and that's actually a very good technical assistance guide at the training and technical assistance center describing the Arizona report cards in two other states who are doing report cards now, Tennessee and Kentucky. The only issue here that you need prescriber specialty to link the PDMP data and that's something that can be problematic for some states, but it's an opportunity to improve your data-linking which we will get into in other cases as well.

Here's a prescriber report card. It's a little hard to see, but the blue bars are the actual individual prescriber who is being reported to and the red bars are their peer group. You can see this particular prescriber was an outlier in many respects, both in the number of prescriptions written and the second that is the quantity of pills. So that's one instance of an effective intervention using PDMP data targeted at prescribers generally.

Here we are going to look at interventions of at-risk prescribers and, again, what we are doing here as opposed to a universal educational campaign we are looking at more targeted intervention. As we will see shortly, the prescribing volume by prescriber decile (that is the top 10% of prescribers) is much higher than it for any other decile. So what's happening is that the top prescribers in a state or in a county are usually responsible for a much higher proportion of opioids than those on the lower deciles. We actually have a briefing, and I think the URL for this will be posted for the group, on interventions of at-risk prescribers—so check that out.

Here's a slide showing in California the proportion of prescriptions for opioids written per prescriber decile and you can see it drops off very rapidly. The top 10%, or top 20% of prescribers are prescribing just about 80% of opioid prescriptions. Now, this doesn’t mean the prescribing is necessarily inappropriate or illicit, but it does suggest that in targeting interventions when we want to change prescriber behavior we might want to target the top prescribers and, indeed, that's what we will see.

Tennessee has got an intervention, they do this annually, where they send letters to the top 50 prescribers as analyzed out of PDMP data. This started in 2012. The health department actually is mandated to send these letters and the prescribers are asked to reply in writing to justify their prescribing within 15 days and the outcomes, perhaps not surprising, is that we see a reduction in the opioid prescribing among these top 50 prescribers. In one bit of data 18 of the top 50 back in 2013 no longer were among the top 50 a year later. So, this did have an effect, and they are planning to expand this

program to the top 10 prescribers in county regions, not just for the state overall.

So, this is an easy analysis to conduct. You just looked at your PDMP data, find the top 50, send them the letters. But on the other hand the possible issue with this is that you are burdening a legitimate prescriber in that top 50 to have to justify their prescribing practice which they probably don't appreciate.

But, for another example, in North Carolina Chris Ringwalt did an initiative in which they use risk measures within PDMP data to identify prescribers who have prescribed to opioid overdose decedents within 30 days of their death. What happened was they found the prescribers who had prescribed to these decedents and then validated these measures by seeing which of these prescribers met the particular risk measures. Some of the more predictive risk measures were: *Had they prescribed over 100 MME daily? Did they prescribe simultaneous opioid and benzodiazepine prescriptions to the decedents? Or did they prescribe overlapping prescriptions?* And if the prescriber met these risk criteria, they were much more likely to have prescribed to these decedents, which gives you a clue that perhaps prescribing practices are risky, having resulting in these deaths.

So, the bottom line was that prescribers meeting these criteria are being targeted for investigation by the licensing board. The program is being evaluated and an interesting question is what proportion of the prescribers identified by meeting these risk measures are actually engaged in legitimate practice? In other words, how many false positives did this intervention turn up? Because obviously you want to minimize false positives and how we use PDMP data to intervene with possible at-risk prescribers.

Next, we will look at PDMP data for needs assessment and evaluation and, again, I will simply remind you that Melee in her epi slides already previewed some of what we will be talking about here. But a few more examples, specific examples, coming up. Again, if you have any questions, just let us know through the chat box.

So, here we've got a slide of PBSS states. I think 10 of them. And what we are looking at is the percent of patients receiving opioids, who were getting over 100 MME per day which is a risk measure for possible overdose, hospitalization, and death. This is an outcome measure in that we'd like to see the percent of patient who are receiving this daily dosage decline. And, indeed, that's what we are seeing here among PBSS states.

But, we also see a differential between states which can help target an intervention and that's of interest as we look at this data. So in evaluating a program in what you are doing in terms of prevention you can see by looking at this particular risk measure as a

possible outcome, an intermediate outcome, that would say that you are on the right track for reducing nonmedical use of prescription drugs and its negative health outcomes.

Here, we are back to *Project Lazarus* in Wilkes County and what we are looking at here is a nice linking of PDMP and other data. And what we've got is a “pre-post” showing the number of prescriptions from prescribers in Wilkes County and those who died from overdoses. You'll see that there was quite a steep decline in how these prescribers were prescribing to decedents starting in 2008 as *Project Lazarus* intervention unfolded. What should be done is to see what more recent data shows, is that, *how has that line progressed?* If it stayed at zero, it would be interesting to see.

Another example from Florida of an outcome to track and assess what you are doing in terms of an intervention. Here we've got prescribing rates of three different drugs (all opioids) but what we see is with Methadone and Oxycodone LA (long-acting) flattened out and declined somewhat after the introduction of their PDMP in 2011, quarter 4 of 2011. Simultaneously what we see is an increase in Buprenorphine prescribing which is probably a reasonably good surrogate or indicator of increased treatment using Buprenorphine for medical-assisted treatment of opioid use disorder, or some of it is for pain perhaps as well. But this rise in Buprenorphine prescribing, we've seen this in other states. A consistent trend is a positive indicator of a good response to prescription opioid and other opioid misuse and people getting into treatment.

So those are three examples, and here's a fourth. This is a little hard to read, but what we are seeing here out of Kentucky is from an evaluation that the University of Kentucky did of House Bill 1 in Kentucky which mandated prescriber’s use of the prescription monitoring program, among other parts of the law, but what we are focusing here are two measures. On the left you see queries to the PDMP, which are the blue dots within each county and the color of the country is the prescribing rate. So, as we move from 2010, which is before the mandate was put in place, to 2013, you will see that the blue dot, which are the queries to the PDMP, have increased quite a bit throughout the state and this is what we want to see.

The intervention in this case was the mandate to use the PMP. As a result, prescriber behavior changed and that they were querying the PDMP a lot more because they were required to so, which is not a surprise. So, that's a positive intermediate outcome, which might get you to less doctor shopping, and lower prescribing of opioids. But what we also see is much of a change in prescribing, which is the color for East County. We see a little darkening in the eastern portion of the state, so actually prescribing might have gone up somewhat, which is evidence *against* the chilling effect because of the

increased use of the PDMP. So, interesting way to track an intervention, here, in this case, a mandate to show that prescriber behavior has changed and indeed HB1 found *other* effects subsequent to the mandate (decline in doctor shopping, declines in prescribing of opioids and benzodiazepines) but not too much an overall decline all told.

Okay, that wraps it up for the targeting interventions and assessment and evaluation, and I think we now have a poll so I'll turn it back to Gisela.

[Gisela Rots]: Thank you so much, Tom! Actually, I'm going to keep us here for just a moment because we've had a good series of questions coming in so if you don't mind I think it might be a good time to answer those.

Bring us back to the Kentucky slide because we have a question that appeared when you were talking about Kentucky, Tom. In this particular case, *are prescribers getting a real-time flag that a person is doctor shopping? Or does the pharmacy get a real-time flag? Can you talk a little bit about what that looks like from a prescriber perspective?*

[Tom Clark]: I think what Kentucky is doing is they are making it so when a prescriber logs into their account they are going to be able to see if a particular patient is meeting a threshold. I could be a threshold for whether they are being prescribed over 100 MME a day, or if it's a doctor shopping threshold, but some states are doing that. They are giving immediate feedback to the prescribers on whether a patient meets a risk threshold or not.

Kentucky is moving in that direction. California is definitely moving in that direction. They report five different patient risk measures that a prescriber can see when logging into their PDMP, so that is something very much that states should consider as a way of improving their PDMP capability.

[Gisela Rots]: That's great. So, in a nutshell, in this particular case, if they have real-time flags, a prescriber logs in, looks at a particular patient and if they are at risk for doctor shopping they should get a notice immediately. But in some cases if the system is not set up for real-time, it might take, I think Melee said, up to 30 days for that kind of behavior to appear in the system. Is that correct?

[Tom Clark]: Well, a prescriber looks carefully at the data, they can see the prescription history there and they can scan the data and see what the recent history of the patient is and see how many prescriptions they've prescribed, how many prescribers they've been to, and that will give the prescriber immediate feedback. But of course it does require prescribers to go into the data specifically and look carefully at the prescription history,

so, yes, that's certainly possible in real-time, but it does take work on the part of the prescriber to see. What they can also do is give feedback to prescribers on the overall rates of multiple provider episodes and that's what PDMPs do quite a bit these days.

[Gisela Rots]: Great. And, I think there is a question about, would the same kind of principle apply for a pharmacy that was logging in, is that correct?

[Tom Clark]: Yes. Looking at a patient's data, they can see in some cases very quickly depending on hospital the PDMP presents the data who has also prescribed for the patient and what pharmacies they've been to and once they look at that data, well, they'll be in a much better position to responsibly issue the prescription or not.

[Gisela Rots]: Great. Thanks for that! And I hope that got to that question. We also, Tom, have a question about whether there was any correlation between which agency at the state level was operating the PDMP and prescribing behavior. So, say, *if the Board of Pharmacy was in control of the PDMP, does that have an impact on the way that prescribers prescribe versus, say, a law enforcement agency being the oversight agency for PDMP?* Is there anything in there that you've noticed any differences in?

[Tom Clark]: That's something I think we should probably defer for a follow-up.

[Gisela Rots]: Okay.

[Tom Clark]: The influence of the housing agency on PDMP policy is an interesting question and it certainly can affect the impact of the PDMP and eventually prescribing behavior, but I think it's a bit far afield for this discussion.

[Gisela Rots]: Okay. Great. Thanks for that. So, we will work to follow-up on that question. We also had a couple of questions that might be more appropriate for Melee to answer. One of them was how did you determine the ranges or the cusp points for the rates you reported in relation to the hotspots and this is when you were talking about Kentucky and Massachusetts. *How did you determine what would become a hotspot?* Melee might be on mute. Maybe we've lost her. Can you talk to that, Tom?

[Tom Clark]: Well, what we saw was circles around darker areas and I think that was an eyeballing of what looked to be concentrations of overdoses and doctor shopping rates. Those were the two slides that were being compared. But that, of course, can be formalized in data analysis when we do that, but you could see sort of Springfield, southeastern Massachusetts and three or four other places that concentrations sort of were overlaid. You could have overlaid those two slides and seen the association

similarly for Kentucky with the NAS cases and the opioid prescribing.

[Melee Kim]: Tom, this is Melee. Can you hear me now?

[Gisela Rots]: I can hear you now. Yep. We gotcha.

[Melee Kim]: Okay. So, yeah, the hotspots were just simple groupings of whatever data value that we looked at. So of all multiple provider episodes they got grouped equally into, size by ranges, so I hope that answered your question.

[Gisela Rots]: Alright. And, Megan, if you have a follow-up question, I invite you to stick that in the chat box. One of the other questions that we received is *why are patient diagnoses not collected?*

[Melee Kim]: Yeah, so prescription drug monitoring programs were only set up to track where the controlled substance goes from the retail pharmacy. So, you have the DEA that issues a DEA number for each controlled substance that goes from the manufacturing company to the pharmacies and then the PDMP system picks up where that controlled substance goes from the pharmacy to the patient.

So, it was never set up as a health information technology system. So this is why it's good to know about the history and the context of these systems and why they can't do certain things. So I think some of the states are very well-aware of the SAMHSA-funded grants for interoperability of PDMP programs. And so there are actually a number of pilots going on across the country that are linking PDMP data to a health information technology system. Most of them are within a hospital setting, but technologically speaking it’s absolutely feasible to link PDMP data to an electronic record.

[Gisela Rots]: Okay. Great. That is helpful. Which might be a good lead into another question, which is *is participation in a PDMP now mostly required or voluntary?* I imagine that depends on the particular setup, so let's say we are talking specifically about prescribers and pharmacists.

[Tom Clark]: Well, I can speak to that a little bit. We've done a briefing on mandatory use by prescribers at the COE (Center of Excellence) and so you can find that on our website. I think it's nearly 30 states have some kind of requirement that prescribers and in some cases dispensers query the PDMP under various circumstances. About 12 states have what you might say are fairly comprehensive requirements, in other words require prescribers to query the PDMP in advance of prescribing at least opioids, if not *any* controlled substance.

Kentucky, Tennessee and Ohio have very strong mandates and other states have followed suit with fairly strong mandates. Others have very relaxed ones or that only apply to opioid treatment programs and other sort of marginal cases. But the trend certainly is for states, at least recently, over the last five or six years is to institute some kind of prescriber mandate and in some cases dispensaries as well.

This is a moving target and it's an interesting issue. It certainly can be considered a best practice. If you want to get prescribers to use the PDMP, then it's a very effective way to do that is to require them to use it.

[Gisela Rots]: Great. Thanks for that clarification. Two more quick questions before we move on—well, they might not be quick—but one of the questions, Melee, when you were talking about the different rates of frequently prescribed opioids, *are there specific opioids that are more frequently being prescribed to females than males? There was one slide where it seemed to insinuate that there were some differences and we are just wondering whether there was a type of opioid that females were more likely to be prescribed than males?* Oops. We may have lost Melee again.

[Tom Clark]: This is Tom. I'm not sure about that. But an interesting question. This is certainly something that we get into and find out looking at PDMP data and so we will try to get back to you on that.

[Gisela Rots]: Awesome. And then one last question about the PDSS, *is that ongoing and will more states be included in the future?*

[Tom Clark]: Yes, it is ongoing and we hope to have more states join. The invitations are out there. We have more states signed up that are not contributing data quite yet. The 12 states that are now contributing we hope to be joined by other states fairly soon, but right now the 12 states that are included in PDSS I think make up about a third of the population of the country. We've got Florida and California, Ohio. We've got some big states, but I think New York will be joining us soon, so that will be good.

[Gisela Rots]: That's great. So, in the interest of time, we see some more questions coming in, and we will try to get to those either today or we will work them into a follow-up. We want to go ahead and move to a poll and so here you have the opportunity to kind of share with us whether your state has used PDMP data to target or evaluate interventions. Tom talked a lot about how that could be done and different examples of that and we are just wondering whether anyone on the line has had the opportunity to do that and, if so, if you'd be willing to share that. So would see on the right-hand side of

your screen is what we call a “short answer poll.” You can just type into that box where it says type your answer here and as you type in you can hit enter and it will show us the results. So we will just give folks a moment to fill that out.

Sounds as though this is definitely something that we want to kind of follow-up again on and focus in on today. So some folks do know that there are some prescriber and pharmacy reports, but there is no follow-up. We do have someone from a tribal community which Melee talked a bit about at the beginning about how we might need to think about doing things slightly differently.

We've got some folks working with healthcare agencies and organizations in this state to plan interventions. Folks aren’t able to access the data, which is certainly a challenge. Oh, we have someone who is using it doctor shopping and overprescribing, so it certainly sounds like this is an opportunity to be thinking about how we can enhance the use of our PDMP overall. I see some more folks entering in. We've got Maine, who has used the PDMP outcome measures as part of an overall evaluation, beginning now and will be developing in the future.

This was very helpful. Thank you all for sharing this information and in the interest of time I'm going go ahead and move us back into the main room. Again, as we continue with the presentation please feel free to enter some of your questions into the chat box. We will be keeping track of them and we will certainly try to get to as many as we can today, so Melee and Tom, back to you.

[Tom Clark]: Thanks, Gisela. I just wanted to mention very quickly that as folks may not know, Indiana had an outbreak of HIV in a couple of southern counties in Indiana, and what could have happened, and should happen in the future, is to look at PDMP data because it turned out that the HIV outbreak was related to the injection of an opioid called Opana (if that’s how you pronounce it).

So, had that been tracked, what we know now, that tracking that kind of prescribing *could be* an early warning of HIV injection drug use and, therefore, HIV. So, I just wanted to mention that as a way of using PDMP data to target and to have early warning of possible problems.

Other uses of PDMP data and I will go through this quickly and turn it back to Melee for the last part. We talked about drug take-back days and drop boxes and what PDMP data can do in terms of both looking at prescribing rates, hotspots in terms of overall prescribing and in doctor shopping might be a way to target where to locate drop boxes and that kind of thing and educational efforts for people to clear out their medicine

cabinets. And, then public awareness campaigns can certainly use PDMP data to notify people about where these hot spots are in terms of prescribing, doctor shopping, that sort of thing. This happened in Norfolk County in Massachusetts.

So, other examples, and we have reports from these at the Center of Excellence website, are notes from the field, that's what NFF means. The first example here is using PDMP data for drug courts. In Kentucky, they are using PDMP data to monitor participant abstinence from inappropriate use of prescription drugs and other states are now moving to that use too. Kentucky notes from the field talks about that, drug court uses of prescription monitoring data.

Medical examiner use of data—we've got a Virginia notes from the field on that. Using the PDMPs to help determine the cause of death by seeing what drugs a patient was prescribed and also just seeing whether the drugs that the decedent had were actually prescribed to him or her or to another person. That's important information to have.

CMS (Medicaid and Medicare) and worker's compensation use PDMP data in many applications, both looking at prescribers and at patients—one application being to monitor patients who are in lock-in programs. Patients are locked in to using just one prescriber and one pharmacy and Washington State is a notable example. We have a notes from the field on their use in both Medicaid and worker's compensation of use of PDMP data.

And the last one I'll mention here is the use of prescription monitoring data by opioid treatment programs (OTPs). We've got a briefing on that as well, fairly recent. Medication-assisted treatment programs want to make sure that their patients are only using prescription drugs that they've been legitimately prescribed and so PDMP data are obviously crucial to keep patients safe and using only the prescription drugs that they should be using including the buprenorphine or methadone that is being prescribed or using for their opioid use disorder.

That covers that and I will now turn it back to Melee.

[Gisela Rots]: Tom, I think Melee might be having some technical glitches.

[Tom Clark]: Yeah, well, I can certainly proceed and Melee will jump in as she is able to. So, some recommended PDMP key practices. We have a 2012 white paper on best practices in PDMPs on our website and we've just finished up a white paper with PEW charitable trusts that is going to be out soon on best practices on encouraging prescriber use of PDMPs, so you can look for that sometime probably this summer.

Here are some recommended PDMP key practices: data quality, completeness, accuracy and timeliness. We want good data coming into the system. The Training and Technical Assistance Center, TTAC, has a very good technical assistance guide to data quality so check out their website for that.

We want to integrate PDMP data with health information systems. This is a crucial element to make the data easily accessible, so when a prescriber logs in to their account they would see the PDMP data as integrated into their patient's health record. We really want to make progress on that, so if we are looking to improve the PDMP that's one important way to go.

Patient data summaries—I mentioned this earlier with respect to what California is providing prescribers. When they log into their account, the new QR system in California shows five different risk measures, data summaries of patients who meet these risk thresholds, so the prescriber is immediately informed of which patients are having a problem.

And we talked about the prescriber report cards. Prescribers getting feedback on how their prescribing is doing and how that can change their behavior.

And, of course, that's the bottom line: changing prescriber behavior if they are looking at data summaries or their own prescribing. We have talked about mandates to create a database. This is probably the most efficient way to get the PDMP used by prescribers. We have a briefing on that, so have a look at that.

Recommended key practices, proactive alerts, and unsolicited reporting. I'm sure many of those on this webinar will know about that. We have a guidance document on unsolicited reporting. That is proactively getting a message out to a prescriber or dispenser or law enforcement that there is an issue with the patient or prescriber. A very important use of PDMP data that can help in prevention.

Cross-border integration and cooperation. What we are talking about here is interstate data sharing of prescription monitoring programs across state lines. If you are like Tennessee you've got 5 or 6 bordering states (same with Kentucky and West Virginia)—you want to know what your patient is doing in other states, not just your own state. So this is a crucial bit of cooperation between PDMPs that's fortunately becoming much more commonplace these days. It's a long way to go if your state is not sharing data with their neighbor. It's something definitely you could be working on.

I think Melee mentioned up front getting secured funding for prescription monitoring program is a key element. Because if you are not securing your funding you are not going to be able to carry out your operation in all the respects that we've talked about today. So, you get through legislation or working with stakeholders to try to ensure that your PDMP is secure going forward.

And, then, of course, we've talked today about using data in public health surveillance and policy evaluation. We've looked at the PBSS system as one very good example of how, in this case, de-identify data can be used for public health surveillance and at the state level and at the county level for targeting interventions and for assessing them.

And, HB1 (that's Kentucky, again) was an evaluation which looked using the prescription monitoring data to evaluate how their mandate and other policies the house adopted in HB1. What was the impact of that law was on prescribing in terms of doctor shopping, prescribing rates, utilization of the PDMP and then to the later outcomes of actually reduced prescribing and reduced doctor shopping and ultimately to overdose deaths related to prescription drugs? That has been the news coming out of Kentucky and also out of Florida from their use of the PDMP and they have a good paper on that.

So, some recommended key practices and then if Melee is here she can certainly talk about the limitations, but if she is not, I will just run through this.

PDMP data, like all data sets, are not perfect and they can be improved and we are working on improving them, but there are current limitations that have to be kept in mind. Getting a fix on who the patient is in PDMP data is an ongoing issue so linking records to identify unique patients in PDMP data is an ongoing process. Different states are doing different things, which is why we can't right now compare patient multiple provider episode rates because the way patients are identified in different states are different. They may not be comparable. So, we want to find a gold standard for linking records to identify unique patients and that's actually something that PBSS project is working on. So, that's all on one limitation. We don’t know who the patient necessarily is. Often we do, but not always.

Another limitation is that we rely on pharmacies to give us data and often that data is not as accurate as it could be. There are processes in the works that states are doing to try to improve the data quality coming out of pharmacies both in terms of getting it out on time and making sure the data fields are filled in properly. And there are data error correction procedures that are followed. Again, best practices need to be developed for this to improve the data.

Another limitation is data quality procedures—so there is linking pharmacy submission and data correction do vary by state and we need to develop best practices for ensuring data quality.

And, then recording of this last issue, a particular data field is that seeing the actual number of pills per prescription. The daily dosage can be a matter of a pharmacist discretion, so this particular data field has to be viewed with some caution.

So, those are some limitations.

Here are resources if you want to be in touch with us. We are just out of time here, so I will refer you to the PDMPassist.org site, a true wealth of information for getting in touch with your PDMP administrator. A huge amount of information on the status of each of your state's PDMP, what they are doing, and many technical assistance guides that are very much worth your while, so I highly recommend you go to PDMPassist.org.

We got the PDMPassist.org and then you've got the PDMPexcellence.org website, which I've talked about as being the repository of many guides and briefings and notes from the field on what we've talked about here today.

And, then I want to mention our federal partners, the Bureau of Justice Assistance, the CDC and FDA, who have all so generously funded our centers and, of course, they are helping to fund some of your work as well. Without them, we will be nowhere, so thanks to them.

And here's our contact information. If you want further information we would certainly be happy to help. Don't be shy. Do write us at these addresses and if we can answer any of your questions, we will be very happy to do so.

So, I think we are just about out of time and I'm going to turn it back to Gisela, but thanks everybody for your attention today. It is certainly good to be with you.

[Gisela Rots]: Great. Thanks, Tom! And, I'm going to move us onto our evaluation slide. For all of you participants who are here today, we ask you to just take a moment, click on this link to give us some feedback on how this was. We inserted a lot of additional questions, everything from state laws and what are prescribers have to respond if they suspect doctor shopping, best practices in different states, etc.

So one of the things that we will be doing is we will be going back through the chat box and looking at all those questions. We will be working with Tom and Melee to put

together some responses.

We certainly appreciate everyone's participation. It certainly made it helpful and as you getting ready to leave if you still have a burning question please feel free to put it in the chat box. We'd be happy to try to get some more information out to all of you.

On behalf of the CAPT, I'd like to thank Tom, Melee and Josh for joining us today and for giving us their expertise and lending hand. As a reminder, everyone will be receiving these slides via email through the CAPT Connect system in the next few days. It might take us a little longer to kind of pull all those follow-up resources together, but we are going to do that the best that we can and it's a 1 past the half of the hour, so we are out of time. We will leave the room open for just a moment and wish everyone a wonderful afternoon and thank you again for joining us.