

Just Rapidly Identifying Drugs Involved in Suspected Overdoses

Introduction [00:00:01] RTI International's Justice Practice Area presents Just Science. Welcome to Just Science, a podcast for justice professionals and anyone interested in learning more about public health, innovative technology, current research, and actionable strategies to improve the criminal justice system. In episode two of our Community based solutions for Substance Use Challenges season Just Science sits down with Bill Barbour, fatal overdose surveillance program manager at King County Medical Examiner's Office to discuss his team's methods for rapid toxicology results after a suspected overdose death. For many medical examiners and coroner offices across the country, it can take several weeks to receive results for postmortem toxicology reports, which leads to outdated drug trend data and an inability to efficiently address and prevent overdoses in the area. In response to this issue, the King County Medical Examiner's Office in Washington applied for funding to implement the Fatal Overdose Surveillance Program, which takes a multi-pronged approach to quickly screen for drugs after suspected overdose. Listen along as Bill discusses the goals of the Overdose Surveillance program, the challenges of implementing drug screening technologies, rapid death certification, and how the King County Offices uses their findings to educate the community on emerging drug trends and prevention opportunities. This Just Science season is supported in part by RTI Award number 15NIJ-21-GK-02192-MUMU, awarded by the National Institute of Justice and by award number 15BPJA-23-GK-02250-COAP awarded by the Bureau of Justice Assistance. Both are agencies within the Office of Justice Programs, U.S. Department of Justice. Here's your host, Doctor Lawrence Mullen.

Lawrence Mullen [00:01:52] Hello and welcome to Just Science. I'm your host, Doctor Lawrence Mullen, with the Forensic Technology Center of Excellence, a program of the National Institute of Justice. We are here today to talk challenges of tracking emerging drug trends that work for low implementation of drug screening technologies for rapid death certificate certification. Here to help us with the discussion from the King County Medical Examiner's Office is Bill Barbour. Welcome, Bill.

Bill Barbour [00:02:16] Thank you.

Lawrence Mullen [00:02:16] Can you tell the listeners about your background and what led you to your current involvement in the King County Overdose Surveillance Program?

Bill Barbour [00:02:23] Sure. Glad to. I started with the King County Medical Examiner's Office back in 2001 as a forensic autopsy technician. I did that work for about two and a half years before switching over to become a forensic death investigator doing field response at the medical examiner's office. I did that work for an additional 18 years, and then about three years ago, I transferred into the overdose surveillance program. I worked on various projects in the overdose surveillance program, and I now manage the section here.

Lawrence Mullen [00:02:52] Kind of going more into the meat of the discussion here. Can you tell us what led to the creation of the King County surveillance program?

Bill Barbour [00:02:59] So prior to the start of our overdose surveillance program, this would be back in about 2017, our postmortem toxicology reports averaged between 3 to 6 months for us to get results. And aggregated data was usually two years old at its most current. We knew that this delay in learning these toxicology results led to a hindrance in our ability to understand and respond to an increasing number of overdose deaths. At that

time, our chief medical examiner took it upon himself as a challenge to do more than just catalog the test. We tried to use our position and leverage technology to better understand how the overdose epidemic would unfold here in King County. We were also, at that time, aware of experiences in other part of the country where fentanyl had already dramatically increased overdose deaths, and we knew we were likely to experience a similar increase here. So we wanted to be able to do just more than track this loss of life. So we looked in ways to increase the rate at which we could identify the drugs contributing to the rise in overdose deaths, and then take that information to families, the community, public health experts and the criminal justice.

Lawrence Mullen [00:03:57] Now, can you elaborate a little bit further on the importance of the program?

Bill Barbour [00:04:01] This is a unique program. I'm not familiar with many other medical examiner's office throughout the country that do this, but what it does is it provides us a unique insight to not only the drugs responsible for fatal drug overdoses, but how they're being used, what form their found in, and how that changes over time. It also provides new data about trends among fatal overdose victims, including their demographics like age, gender, race, housing, veteran status, but also how are they currently interacting with their overdose prevention and intervention systems, and how we can use those contacts in proximity to a fatal overdose to try to get education and prevention resources into their sphere?

Lawrence Mullen [00:04:37] Can you tell us how long the program has been going on for?

Bill Barbour [00:04:40] Yeah, we started the initial efforts in 2017, but really got going in 2018. So it's about, six and a half years now.

Lawrence Mullen [00:04:47] All right. Kind of like changing gears a little bit here and to give more perspective. Can you walk the listeners through the medical examiner's workflow of a suspected overdose death?

Bill Barbour [00:04:57] Generally begins with the notification of death to our investigative section. Usually it will be a call that comes in from law enforcement out in the field. The investigators from our office will respond to the scene of death, and during the investigation, they'll gather any narcotics or paraphernalia that they're able to locate and will collect that as evidence. They'll transport that evidence back to our office along with the deceased, where an examination of the deceased will take place by one of our forensic pathologists. During this examination, the forensic pathologist will collect blood serum in urine, and the urine will be tested for, you know, screening test for the presence of common drugs of abuse. And the blood serum will be analyzed in one of our machines or Randox multi staff that will also check for common drugs of abuse. We will then also take the drug evidence that was collected will photograph it, examine it, itemize it and then depending on what item it is and what's available, we'll run it through a battery of different tests that we have available to us in our lab. The results from each one of these testing categories, whether it's the blood, the urine or the evidence, will be then compared in conjunction with the findings from the pathologist exam, will allow us for to rapidly determine the drugs suspected of causing the death. We can often do this the same day of the autopsy.

Lawrence Mullen [00:06:03] So further in line with that question, types of rapid screening technologies in their use. Do you use any of those particular items in any of your testing or any of your surveillance?

Bill Barbour [00:06:13] Yeah. So we do have two Randox multi stat machines that do blood serum analysis for us. They offer a qualitative and semi quantitative testing options for common drugs of abuse. That'll help us. Let us know at the time of death what's in the individual's blood system. We'll also use a multi drug urine cup that will screen for urine or similar drugs of abuse. Give us an idea of what they might have used recent to their death or historically. And then for the evidence testing we have five different testing modalities. We have fentanyl test strips, which are our most basic. This is just dissolving, either a swab or a small amount of a substance of the water and then being able to use a fentanyl test strip to dip it in there for a positive negative result. We find that to be really sensitive for fentanyl. And quite quite useful. We also then have two Ramsn spectrometry devices. What these devices allow you to do is basically shoot a laser light at a substance. And then based off of the way that light responds or the molecule responds to that laser light, they can compare to their active database and give you a suggested possible identification for the substance, particularly useful for white powders, pills, things like that. We also have a portable mass spectrometer, that we use. This one is great for trace evidence analysis. If you've ever been through like an airport screener where they swabbed your hands checking for explosives. It's the same idea. But rather than swabbing people's hands, what we're doing is swabbing pipes, empty bags, items of paraphernalia, looking for trace evidence of narcotics. One of the ramen spec kits. Also the two Narc device also has a H kit for suspected heroin or tar like substance substances that you don't necessarily just want to shoot a laser at because of their fluorescence. They'll actually begin to cook the material and create smoke so you can dissolve it in this compound and then do a test that way to also see what that substance is or what it may contain.

Lawrence Mullen [00:08:00] What is something that's needed to report a drug on a death certificate. So if you're using modalities.

Bill Barbour [00:08:05] Yeah. So for the rapid certification process what we're going to want to do is identify drugs. And at least two of those different two of those three different areas. So if we can match a drug in the blood serum and a drug found on the deceased or at the scene of the death, that would be enough for us to indicate that as a drug contributing to death in the absence of any other external or internal cause of death identified. So, number one, we have to have an exam that suggests there is no other cause of death identified. Number two, you're going to want to identify a particular drug in either the blood and the urine, the blood in the drug evidence or the urine and the drug evidence. And when we have two matching tests and we'll go ahead and list that as one of the drugs, contributing ideally with blood serum is the one that we're really looking for but not always available given decomposition and post mortem changes. Sometimes getting blood samples or urine samples can be difficult, but once we have those results, we'll go ahead and list it. But we're also going to send the samples to the crime lab for additional testing and confirmation. They'll often be able to not just tell us what's present, but at what levels. And that can lead to a further interpretation or the adding of additional items to the death certificate down the road. Right now, our toxicology can run anywhere from about 40 weeks. What will then update the death certificate with additional findings.

Lawrence Mullen [00:09:19] Okay, so the types of rapid screening technologies are those testing modalities are then kind of like backed up with traditional confirmation testing along with them. And you can then still make changes to the medical death certificate as well.

Bill Barbour [00:09:31] Yeah. Yeah. So you know, especially when it comes to things where the levels are important, like alcohol or therapeutic drugs like methadone and paper, where you're going to want an idea of how those levels play. And prescription medications are also something that aren't always caught on screening. So knowing those levels and getting those identified later and sort of vetting out how they contributed or played a role in the death also be considered.

Lawrence Mullen [00:09:52] So how does the King County MEC provide information out to the community and other agencies within and around King County?

Bill Barbour [00:10:00] We take regular part in communications with the Seattle King County Public Health Overdose and Response Overdose Prevention Response group, known as OPR. The other ways. We create a weekly bulletin where we send this out with real time data from the previous week of the number of cases that we've investigated, the ones that we suspected were fatal overdoses, information on the evidence that we've tested, the drugs that we've identified, whether it's in the serum, the urine, and or in the drug evidence. And then we put that into a context of aggregated data for this year and years previous. And this is just a way to keep everybody in our community aware of what we're seeing and what we're testing. And of course, alert them to any changes. We'll provide these bulletins to public health individuals, people in policymaking positions, treatment agencies, criminal justice agencies, really anybody who has interest in enhanced knowledge of our sort of local landscape will be able to receive this. We also have a online dashboard available through the Overdose Prevention Response Group that's updated daily with statistics on overdose deaths. Here in King County Interactive. It allows you to screen by location and drug types, age, gender, racial demographics. And so we support the data for that, keeping that data accurate, cleaned and updated. And then of course, as a medical examiner's office, we have annual reports that come out every year where we document sort of different types of deaths we investigated, the different drugs contributing to overdose deaths, and then really a lot of direct communication with our community partners, with the hospitals, board of housing agencies, law enforcement, public health, and just anybody who has an interest or is on that sort of care and contact continuum with people who use drugs. We'll work with them to make sure that they understand how their patients outcomes play into their treatment goals, and how we can all better sort of roll in the same direction towards preventing fatal drug overdoses.

Lawrence Mullen [00:11:46] Has the program been able to capture, like some of the community responses. How does the community actually like interact with this information and how they find it useful.

Bill Barbour [00:11:53] Our main goal is to get the information out there, and exactly how the agencies use it is, is not always going to be evident to us, but making sure everybody's sort of operating from the same base knowledge of what is going on, what isn't going on. I do know that, you know, when we detect things like a significant change in opiate use from injection to smoking, that helps better direct the methods of interactions. When you have a public health department that's set up for needle exchange, making interactions kind of in that environment, and then all of a sudden people are no longer using needles as often. They have to find other ways to maintain those interactions and engage with people who use drugs and try to offer them services towards better support for them, and hopefully getting them into some modality of treatment and stability.

Lawrence Mullen [00:12:38] Thanks for sharing. In your experience have the drug trends changed over time that your office has monitored?

Bill Barbour [00:12:44] Yeah, absolutely. You know, when we started up the program, fentanyl was new to our area. It wasn't something that was typical among our drug landscape at that time. You know, the main opiates were either illicitly obtained legitimate prescription opiates like Percocet, hydrocodone, oxycodone, those kind of drugs, and then illicit opiates like heroin. So when we started to see fentanyl in our area first appeared, it actually showed up in frequently referred to as blues or blue and 30. So this would be a typical looking pill. An M on one side and then 30 on the other. And these would be blue in color and made to look exactly like legitimate Percocet. Around that time, a legitimate 30 milligram Percocet, which the M30 was made to look like, would go for about \$1 a milligram. So \$30 for that pill. When we started to see the restrictions on prescribing opiates increase, that's when we really saw this primary market for the counterfeit opiates, the synthetic fentanyl, to take over. And then as that price of those opioid pills went down, we started seeing different user bases. So predominantly it had been people who had either prior exposure through legitimate prescriptions, chronic pain, mental condition, or had dedicated illicit streams where they could get, you know, with their finances, be able to get these counterfeit pills or even legitimate pills. At that time, as that price came down, that we just started being able to see it much more readily accessible by the impoverished homeless people living in supportive housing. And that's really when we saw our first big spike in fatal overdose numbers. And then I'd say as late as, you know, summer 2022, fall and winter 2022, we started to see an increasing frequencies of powder and rock forms that, let's say, by the summer of 2023. Last year, we had started to see more rock and powder fentanyl than we actually saw pills. And this became concerning for a couple of reasons. Number one, when we did have compositional analysis done on the blue pills in the blue M30s, they typically came back at 1 to 3% of that. And that's a pretty big range. If you're thinking you're getting a, you know, a pill that has 1%, that you get one, that's 3% that that's three times more powerful. So that can be quite alarming. But when we started to test the rocks and powders, we were finding a variability in their sort of percentage of fentanyl would range anywhere from 1% all the way up to 80, 82%, wildly variable. And our most recent set of fentanyl powders that we had tested ranged from 35% to 80%. So you're looking at an order of ten to 20 to 30 times more powerful than your typical blue M30. So alerting that information and providing that information to care providers in the community was what really the idea was to just make sure that that level of education was known to them, but also became a concern for people who were opiate naive people who traditionally use powder cocaine or rock cocaine crack. We were now starting to encounter situations where people who thought they had gotten cocaine or crack are now encountering fentanyl, so alerting to them that, hey, just because you see a white powder, that doesn't mean it's cocaine we had used to see 2 or 3 years ago. And then, of course, there's concerns that as we have more powder fentanyl, we can more easily adulterate it with other chemicals along the way. So keeping eyes out for new additions, new changes, those are all sort of the trends that we've been looking at over the years.

Lawrence Mullen [00:15:51] Now, you did mention M30s is, you know, basically like a street name for a drug. So is there any correlation between street drug names and then the drug trends, has the program been able to track that in any way or does that make any impact?

Bill Barbour [00:16:05] No, I mean, it's mostly trying to come up with the same terminology that's used across a lot of the street names for drugs or slang terms, and they can change highly, very locally. And what we call blue M30s out here may have a different

name somewhere else, what they call fatty the is a common term for the powers. So when you see terms like that, it does lend a little, little idea. You know, if they're talking about blues and you know, they're talking about a pill rather than a powder, and it's just that kind of information that will help us better identify the form of fentanyl use and then keep track of if there's any major shifts there. How can we alert the caregivers as well as the people using drugs to make sure that they're doing everything they can to prevent a fatal overdose?

Lawrence Mullen [00:16:45] How does the program's process kind of relate to early identification of emerging drugs?

Bill Barbour [00:16:50] We do see a lot of concern about new adulterants like xylazine, different opioids like nitazines that that may be out there. Those detection sort of the novel newer drugs can be a bit trickier. Most of the technology we have is set up to detect common drugs of abuse that are well known. And so there is a bit of a blind spot when it comes to some of the synthetic benzos or drugs that are just being new sort of chemical analogs of exploring existing drugs and identifying those. So we may not be able to detect all of those with our current technology. But adapting that technology as new updates and new software, new immunoassay tests come available, we can screen for those. But also if we see an overdose that presents as a, you know, a fentanyl overdose, but we're unable to detect any fentanyl that's going to cue us in right away that we may have something different. So we might not be able to identify what the different thing is, but we're able to tell something's different. And then we can request some enhanced analysis on arrest data. We send something to our Washington State Patrol crime lab on a rush. We might be able to get a result within a month on what we think is that substance, and then trying to take that in sort of in the grander picture of, okay, well, we had this one substance once. Are we seeing it more and more? We're always identifying one offs. People are able to get things through the internet, or they'll come from another area of the country or the world with drugs that we just don't typically see here. But our question is always, is this part of our mainstream drug supply is this something that the routine individual is going to encounter, is this something we need to send a larger alert about.

Lawrence Mullen [00:18:19] Thank you for showing more light on that. Do you have any advice for others that may want to implement the King County OCME workflow and creation of fatal overdose surveillance? Like if anybody wanted to create a program similar to yours, would you have any advice on how they would do that or what they would need to do?

Bill Barbour [00:18:35] Yeah, I mean, there's some really low cost, readily available technologies, specifically the test strips and the multidrug urine cups that you can use just as a basic form of screening, whether it's doing just urine testing on every one of your decedants or actually using immunoassay tests to test narcotics you're collecting, I think unique to our office is that our investigators actually do collect the drug paraphernalia and narcotics from death scenes, being in a majority of the offices in our state, and I believe throughout the country, that is primarily done by the law enforcement agency. So if you were interested in enhancing sort of your surveillance of fatal overdoses in your medical examiners office, you could do so easily with some of those immunoassay tests. But even without any enhanced testing, just the enhanced analysis. Are you seeing pipes at the scene? Was there foil at this scene? Was there powder drugs or pills at the scene? Even without testing those items, you can start to build the pattern database in your mind or even using a simple Excel spreadsheet. Once you start your surveillance efforts, you'll end up with more questions that you can work towards answering. But ideally, you're going to

want a relationship with your local toxicology or drug evidence material analysis lab that can do the conformation testing. All of our testing is preliminary, so we always want to have a backstop of confirmed and certified lab also doing the testing. So developing that relationship and then finding ways to fund the resources you're going to need when you start wanting those technologic components like Randox Multistep Lab Blood Serum Analyzer or a Raman spec device. These devices cost tens of thousands of dollars, so locating grant funding to support those efforts and then the manpower to run this and look at these deaths, definitely say that's something you need to consider that the more you look at, the more questions you have, the more time it's going to take. But it is. It can start with just an enhanced eye and then build from there. So I would say start and then figure out what you need as you get going.

Lawrence Mullen [00:20:27] I think that's great advice. So as we kind of dig into like, you know, foundational questions about developing a program similar to the one that you guys run, what are some of the greatest barriers or challenges that you faced?

Bill Barbour [00:20:37] Well, like in the previous question, having the good relationship with the lab, who's willing to do these tests? Remember, these aren't necessarily criminal cases, so they might not necessarily fit in the crime labs testing modality. And then, you know, the manpower and the resources. But I'd say for us, one of our larger challenges initially was the scale at which we rapidly saw the overdose numbers increase. We went from, you know, at the start of this program, at about just under 400 fatal overdoses a year in King County to last year, having nearly 1400. So upscaling and trying to find ways to do what you were already doing, but now do it on a much larger scale as the numbers continue to increase. That was always a challenge for us here. So that's one thing to look out for, is how are your needs going to change? And then ongoing costs. Some of these technologies that we use have a high initial upfront cost, but not much after that. Others need test kits and reagents and things that you're going to have to order on, you know, on a regular basis that will add to the expense and the cost. So dedicated funding and sustainability will also be a challenge.

Lawrence Mullen [00:21:40] So in light of that question, or in contrast, rather, what are some of the impacts that this program has had on the MEC office in the community? The big wins and the great wins there.

Bill Barbour [00:21:51] I would say probably to me the most significant win was for the families initially, where they're not having to wait months for information results on their loved ones. When you can tell them within 24 hours all your preliminary screening results, what the evidence tests that the urine tests are, that what you're seeing in circumstances are telling you that is, I think, misunderstood by a lot of people how difficult that wait is for families. So to me, that was probably the biggest win. From there the networking really just the starting to connect and have conversations around fatal overdoses. What are we seeing? What are we not seeing? What is true that we're seeing reported in media? What's overstated? How do how does the national conversation fit into our local conversation? And then from there, the networking partnerships have developed into a lot more data sharing, a lot more continual contact. And then the additional programs after we started our King County Fatal Overdose Surveillance program, we started a statewide surveillance program where we develop a network of corners medical examiners who report data on their fatal overdoses to our office. And then we do a monthly bulletin with statewide data. And again, this is in a data vacuum where after the deaths are certified, it could be anywhere from a year to 18 months before that data is available for the general public to analyze. So being able to provide this data monthly on a real time basis is one

significant benefit of the surveillance effort. I think the other one is what we call OFR or Overdose Fatality Review Program. It's been around, you know, for over a decade nationwide, but it's been here for less than a year. We started ours in August of last year, and that's really allowed us to get granular on the life and death circumstances of individuals who suffered fatal overdose. And with this program, we're bringing together people from across the continuum of care for people who use drugs. So treatment providers, hospital emergency room physicians, behavioral psychologists, law enforcement attorneys, policy. We all sit at a table and we'll analyze a couple overdose deaths that fit one of the trends we see, and allow us to really look at our processes and points of connections and see, are there things that we can do that if we were faced with a similar individual that we could do differently to prevent their death? And that's really what we're focusing in on, is how can we now use this data to actually make actionable steps to improve our local systems of intervention?

Lawrence Mullen [00:24:01] So what would you say would be next for the program?

Bill Barbour [00:24:04] Yeah, I think the continued maintenance of the surveillance aspect, looking for changes and and developing additional technologies to put us in a better position to detect novel substances, whether they be fentanyl analogs or other synthetic opioids, new benzodiazepines, other adulterants like xylazine really trying to hone that in so that we have as few sort of dark spots in our information. We don't want to have any gaps or get caught off surprise, and then finding ways continually to find ways to inform programs about the individuals that they're treating. If you see somebody in an ED and they die of an overdose at home seven days later, do the ED providers know? Does knowing that change how they would have had interactions with the patient at that time? And that goes for any agency, whether that's law enforcement, emergency medical services, board of housing, jails, veterans administrations, all these agencies that have connections with people before they die. How are we maximizing those contacts? How are we looking upstream from those contacts? What can we do in the years prior to a fatal overdose to decrease somebody's likelihood of a fatal overdose? So continuing to look at that, using our fortunately large fatal overdose database to try to figure out the patterns and trends and how we can use that to our advantage to improve people's outcomes.

Lawrence Mullen [00:25:19] Wow. That's amazing. I really love the concept of connection. Like really trying to figure out a way to connect all of the different aspects that you know, an individual may be going through, and making sure that that's presented to different agencies or different programs that could really offer and provide help or assistance. That's important. So that's a great idea. Would you have any other further examples where plans of sustainability.

Bill Barbour [00:25:41] Yeah, an issue. I mean really when it comes to sustainability for a program like this, it's about funding and it's whether or not, you know, up until this point that funding has all been grant based, but whether or not we can find dedicated funding. So we're not worried about cycles or needing to scale up or scale back the program based off of available resources. And then I'd like to see this, more broadly, a private question. The state of Washington, where, you know, you don't have to die in King County just to get this level of surveillance of your overdose death, where every medical examiner has access to the same technology and same information gathering tools that we do, so that our experiences and sort of accomplishments or changes that we're able to make here in King County can be similarly made elsewhere throughout the state and customized to their own sort of needs locally so that we can, you know, as a state tackle the amount of fatal overdoses we're experiencing.

Lawrence Mullen [00:26:31] So we're coming up to the end of our time together here. Would you like to share any final thoughts, any anything else that you'd like to share with the listeners or anything like that?

Bill Barbour [00:26:38] Yeah, I mean, if you have any questions or you're curious about the program, I want I want everyone out there to know that I'm available if I can help in any way. I think that, you know, this is very much a community of practice, and the more we can help each other as we have lessons learned on what's working and seeing how we can apply that to other jurisdictions. Feel like a lot of jurisdictions sometimes feel like they're alone in trying to figure all this out. As I found out in this job as, there's already people who've been working on these problems for years and decades, and there's a lot that can be learned to sort of get you up to speed and get you, get you going. And then really, it's just starting to take a close look at what patterns do you see, what trends do you see? How can you use that knowledge and leverage that knowledge to intervene and prevent fatal overdoses? The belief that every fatal overdose is preventable is really the guiding principle behind the work we're doing.

Lawrence Mullen [00:27:26] Well, again, I'd like to thank our guest today for sitting down with Just Science to discuss King County Medical Examiner Office. Thank you so much, Bill, for your time today.

Bill Barbour [00:27:34] You're welcome. Thank you for the opportunity.

Lawrence Mullen [00:27:36] If you've enjoyed today's conversation, be sure to like and follow Just Science on your podcast platform of choice. For more information on today's topic and resources in the forensic field, visit ForensicCOE.org to request training and technical assistance or learn about additional resources from the COSSUP TTA collaborative visit COSSUP.org. I'm Lawrence Mullen and this has been another episode of Just Science.

Introduction [00:28:04] Next week, Just Science down with doctor Chris Delcher to discuss his wastewater epidemiology project in Kentucky. Opinions are points of views expressed in this podcast, represent a consensus of the authors, and do not necessarily represent the official position or policies of its funding.