

Episode 70: Poison Centre Data - Insights into Drug Trends and Toxicology Surveillance

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Transcript

Hi everyone, welcome back to the Tox Lab. I'm Rebecca. I'm Rob. This week we're going to be taking another look at poison centre data which we've looked at a few times now on this podcast. We're going to be looking at it from a slightly different angle.

Before we dive in, what do poison centres do Rebecca? What kind of calls do they deal with? Lots of different things when people have been exposed to something and they want some advice and it kind of depends on the poison centre as to whether people can ring in themselves or whether it's got to be a doctor who rings in and you normally get advice on what to do to treat that exposure. So my experience of poison centre calls was, I've told this story before when I was a child and my brother ate a toilet duck and my mum knew the number to phone for the local poison centre just because she happened to work at the hospital switchboard.

That has really stuck with me and in my mind poison centres are people dealing with often children eating things they shouldn't. And I imagine calls are things like plants and mushrooms and chemical exposures. What doesn't really or perhaps didn't really until we read today's papers cross my mind is how many calls to poison centres are actually about more traditional drugs. And that's what we're going to be taking a look at this week and asking the question, can calls to poison centres actually serve as a possible drug early warning indicator?

Before we dive into today's episode, if you want to stay up to date with our content, you can find us on Instagram at [@the_tox_lab](#). We also have a page on LinkedIn and we're fairly active on there. And for those of you who don't use social media, but still want to get in touch with episode suggestions or comments about episodes, you can email us at thetoxlab@gmail.com. So why don't we first of all dive in and have a broad look at some of this poison centre data. Set the scene for us.

So this first paper is a retrospective analysis of common recreational drug poisonings across six European poison centres located in Austria, Freiburg in Germany, the Netherlands, Sweden, Switzerland and the UK. And the study aimed to assess recreational drug-specific poisoning rates across these six centres and to evaluate changes between 2021 and 2024. Poisoning rates were also compared between poison centres to identify shared and country-specific patterns. Before we jump in, the UK has four different poison centres covered by NPIS and all were included in this data set.

Germany has seven different poison centres, but only the Freiburg centre was included, which represents 13% of the German population, and the other four countries each have a single poison centre. The UK and the Dutch poison centres only serve healthcare professionals, whilst the others also serve the public so they can ring in directly. That's interesting already, isn't it? So you're going to have some different data depending on who's going to be making these calls.

Exactly. The data was collected on the 11 most commonly reported recreational drugs to poison centres, which included amphetamine, cocaine, GHB, heroin, ketamine, LSD, MDMA, methamphetamine, alcohol, nitrites or poppers, psilocybin and delta-9-THC. Between 2021 and 2024, the six poison centres recorded 1,051,287 poisonings, with 37% being from Sweden, 16% being from the UK, 13% from the Swiss centre, 12% from Freiburg in the Dutch centre and 10% from the Austrian

centre. In 2024, the Swedish centre had the highest number of poisonings per million inhabitants of 9,897, while the UK had the lowest at 636.

So already some country differences there. Yeah, and that's general poison, so all of the calls that were made rather than recreational drug specific ones. Okay, so this will include the toddler Eights and Berries phone calls. Yeah.

Of the total number of poisonings recorded in this data set, 23,779 exposures were related to recreational drug poisonings, which is a rate of 2.3%. Overall, the rate of poisonings from recreational drugs increased from 1.8% in 2021 to 2.6% in 2024. And that's interesting in itself, isn't it? The proportion pretty much doubled.

Now, is that because drug exposures went up or is that because people were more confident phoning the poison centre for these sorts of exposures? Oh, that's our hop on ton pack. The UK, Austria and Freiburg poisoning centres had an increase in the rate of recreational drug poisonings during this time, while the rate in Switzerland remained relatively constant. And despite an increase in the rate in the Netherlands and in Sweden between 2021 and 2022, their rates remained relatively stable for the rest of the study period.

Sweden handled the most recreational drug poisonings of all the poison centres in 2024 of 237 per million inhabitants, while the UK handled the lowest at 14 per million inhabitants. That's a huge difference. Yeah. Nearly tenfold difference between the two.

More than tenfold. Yeah, but it surprised me too. Do we know why this is? No, I don't know why it's so drastically different.

I guess for the Swedish poison centre, members of the public can ring in themselves, whereas in the UK, it's only medical professionals. So if you're not presenting to hospital, then your data is not going to be included in the UK data set, whereas in Sweden, maybe they've got a very low threshold, like members of the public know they can ring in and ask for advice. So ring in more frequently. Okay.

Yeah, I guess that's a possibility, isn't it? It's that perhaps the services are better marketed effectively. I can't believe the drug use rates are that much higher. Yeah.

This has to be a difference in accessing the poison centres and asking for advice. Yeah, I think it's a bias in the data set. I mean, I don't know. I've not actually been to Sweden.

Is there like less stigma associated with drug use? Are people feeling more confident that they can phone up and admit to a professional? I mean, possibly. I'd be really interested to know why there's so much difference in uptake between the two countries.

So out of the 11 recreational drugs I mentioned earlier, the most involved in poisonings were THC, cocaine, amphetamine and MDMA. And these are your classic party drugs, aren't they? Yeah. We've not got opioids in that list.

We've not got benzos, although we'll talk about benzos in a little bit, won't we? So breaking that down even further, THC was the drug most involved in poisonings reported to four out of the six poison centres, which included Austria, Freiburg, the Netherlands and Switzerland. In 2024, the rate of THC poisoning varied from 0.33% in Sweden to 1.17% in Freiburg. The rates increased significantly between 2021 and 2024 in Austria from 0.34% to 0.54% and in Freiburg from 0.38% to 1.17%.

And there was also an increase in the other four poison centres, although this increase was not significant. So that jump in Germany could be to do with the decriminalisation that happened in 2024, right? Yeah, possibly. Moving on to amphetamine, amphetamine was the most involved drug in

recreational drug poisonings reported to the Swedish centre, and the rate increased from 0.61% to 0.94% over the study period, and this was significant.

Freiburg also had a statistically significant increase in the rate of amphetamine poisonings from 0.38% to 0.63%, and the four other poison centres had relatively low rates ranging from 0.05% here in the UK to 0.27% for the Netherlands, and there was no significant increase over the time period. So you can see very different rates of amphetamine use in the UK versus other parts of Europe where amphetamine is a lot more common. So in the UK, which wasn't a surprise to me, cocaine was the drug most involved in drug poisonings with rates significantly increasing from 0.45% to 0.74% from 2021 to 2024.

Cocaine was this drug with the second highest poisoning rate in the other poisoning centres ranging from 0.37% in Sweden to 0.78% in Freiburg in 2024, and the increase in Freiburg was significant across the study period, but for the other four countries, the rate was stable. Again, that mirror is what we see, doesn't it? Cocaine seems to be increasing in prevalence, or at least staying prevalent, certainly not a rare compound that we encounter.

MDMA was the third most prevalent drug reported by the Dutch Poison Centre at a rate of 0.53%, the Austrian Poison Centre at a rate of 0.36%, the Swiss Poison Centre at a rate of 0.31%, and the UK Poison Centre at a rate of 0.28% in 2024. They're all relatively consistent with one another, aren't they? Yeah, and the rate significantly increased in the UK from 2021 to 2024, and although not significant, the Austrian Poison Centre also saw an increase while the rate remained stable elsewhere. And the rate of methamphetamine poisonings in 2024 were really low, ranging from 0.02% in Austria to 0.08% in Freiburg.

I'm slightly surprised at that, but I'm wondering if perhaps in the same way that opioids aren't represented, whether there's maybe perhaps a little bit more stigma associated with methamphetamine and people are less willing to phone. I'm not sure. Hmm, that's an interesting point. For ketamine, rates significantly increased in Austria-Freiburg and the UK from 2021 to 2024.

There was also an increase seen in the Dutch Centre, and ketamine poisonings were most frequently observed in the UK and Dutch centres compared to others, which likely mirrors availability based on seizures and increased use in these countries of ketamine. Yeah, that mirrors what we've seen, doesn't it, in terms of ketamine use really increasing over these last few years? GHB was most frequently reported in the Netherlands in 2024, and the rate of poisoning in the UK increased from 0.04% to 0.07%.

Heroin poisonings were highest in the UK, with a rate of 0.16% in 2024, and the Swedish and Freiburg centres also reported relatively high rates of 0.13% and 0.14%, respectively. When looking at LSD poisonings, they were the highest in the Freiburg and Dutch centres in 2024, and the poisoning rate for psilocybin was highest for the Swedish and Dutch centres. We need to unpack this a little bit, don't we? LSD poisonings is probably not a sentence we tend to use.

Yeah. I think we must be talking about adverse psychiatric effects related to the use of these drugs, right? Yeah, it's basically the exposure that's reported, so what drug was reported and why they rang up in the first place, basically. If you think about it as exposures rather than poisonings necessarily.

And finally, the rate of poppers use was highest in the Dutch and the Swiss centres. So a lot of numbers there to unpack, isn't there? Quite a lot of statistics, and they're all expressed as relatively low numbers, but that's because they're proportions of total cause to the poison centres, aren't they? Yes, rather than proportions of total drug-related cause.

So we do need to consider that when we're comparing numbers. It's probably only really useful to look at relative differences between them and relative trends, I suppose. But some interesting trends, weren't there? Certainly, some trends that I would say are consistent with other observed trends in terms of cocaine increasing or generally staying prevalent, ketamine increasing, amphetamine use more common in Europe than in the UK.

These calls to the poison centre do seem to mirror what we see elsewhere. I guess what this data doesn't show us is what the outcomes of these were. These are just calls. We don't know whether these are significant or incidental.

And it is possible, Sweden are phoning up 10 times as many times, but actually the harms are similar. It's just the threshold for calling is different in other countries. I don't know. I'm just providing alternative explanations for the data.

Okay, so they were the more traditional drugs. Why don't we look at some novel drugs now? So this next paper is looking at recreational drugs, including new psychoactive substances by using data from four European poisoning centres. So in 2024, the EUDA was monitoring 930 new psychoactive substances and the EUDA used data from the European Drug Emergencies Network, which collects drug-related emergency department presentation data.

And between 2014 and 2019, new psychoactive substances made up 8% of these presentations and was the third highest group behind common recreational drug exposures and prescription medicines. Poison centres also collect this data and offer a national perspective so they aren't confined to hospitals in specific areas.

So this paper was a one-year feasibility study of using this data to aid in toxicovigilance by looking at the number and rates of recreational drug poisonings from four poisoning centres in addition to the prevalence of new psychoactive substances, their classes, the individual substances themselves, clinical effects and user characteristics. These are the same poison centres we were just talking about. So they looked at the Freeberg Poison Centre, the Netherlands, Sweden and Switzerland, and this data was collected in 2021.

So in this paper, they do cover the data collected on the 11 commonly reported recreational drugs that we talked about earlier. So I'm not going to touch on those and I'm just going to focus on the new psychoactive substances. And that's because this data overlaps, right? Yeah.

So in 2021, there were 189,039 calls to the four poison centres with 2% involving poisonings with recreational drugs. This involved 3,705 patients and involved 4,380 recreational drug exposures and the number of exposures varied at the different call centres, which we also saw in the previous data set. Of all the exposures to new psychoactive substances reported to the four poison centres and there were 672 exposures overall, 75% were reported by the Dutch Centre. An NPS exposure in the Netherlands accounted for 35% of all recreational drug exposures.

So do we take that to mean there's more NPS in the Netherlands? That's one way of looking at it. It just seems quite a statistic, doesn't it? So many of these NPS exposures were coming from one poison centre.

Yeah. So the Dutch Poison Centre received calls about 399 patients exposed to 506 NPS. At the Swedish Poison Centre, there were 96 NPS exposures and almost all were about a single substance. Freeberg received calls on 44 patients, about 57 exposures and the Swiss Centre only received 13 calls.

So when we talk about exposures, it's the number of individual substances. So it's 506 substances across the 309 patients, for example. Cathinone's represented 43% of all calls and Desina Benzo's

represented 28% of NPS and these were the most prevalent NPS substances overall. In Sweden, Cathinone exposure represented 63% of all exposures to NPS but in Switzerland and the Netherlands, it's represented 46% and 42% respectively.

I'm slightly surprised by that. Yeah. I would have guessed the Netherlands was going to be higher given the general, I don't know, party vibe. That's fair.

Synthetic cannabinoids were the NPS class most frequently reported to the Freeberg Centre at 37%. 25% of all NPS exposures involved 3-Methamethcathinone and 3-Echcloromethcathinone was the most prevalent substance reported to the Swedish Centre in 21% of cases. So these are the Cathinone variants, aren't they? But these are, or were, common ones.

We don't tend to see these ones now. I think they've come under some degree of international control. In terms of Desina Benzo's, it's Islam and clonazepam were among the most frequently reported and represented 21% and 19% respectively at the total exposures to Desina Benzo's. I am surprised by the clonazepam.

Yeah. That was not a compound we saw a lot of when clonazepam was around. It was not a compound people seemed to like. I wonder if it's perhaps overrepresented in the poison data because of the adverse effects.

That is a very good point, if people aren't getting on with it and experiencing quite negative side effects, you're more likely to present to hospital and then there's more likely to be calls about it. It reportedly had very significant amnesia associated with it. Oh, OK. So the top NPS drugs reported were 3-MmC, 2-Cb, it is Islam, clonazepam, 4-MmC, flualprazolam, 3-CmZ, Flu Nitrazepam, bromazepam, and 4-CmZ.

And no synthetic cannabinoids made the top 10. What year was this data from? 2021. I was going to say, this feels like a trip down memory lane, some of these names.

Some of these compounds probably haven't seen for five years. 55% of patients were aged between 13 and 30 years old with children under the age of 18 representing 8% of NPS poisoning exposures. 42% of the patients in the Netherlands were aged between 18 and 24. 67% of the individuals were male but the distribution is a bit more even at 53% being male when looking at patients exposed to design benzos.

That's interesting. OK, so young men are more likely to take stimulants and then that kind of balances out when you think about benzos. Yep. 245 patients with NPS poisoning had no other car exposures which was 45% of the total.

The majority were exposed to design of benzos at cathinones, phenylamines and nescannabinoids and 17% reported no symptoms. That's 17% is an interesting statistic. So what's the logic here? The poison centre has been contacted but they were asymptomatic.

Well, I guess for the poison centres that allow the public to ring up maybe there was a concern of like, I've taken this, what do I do? Just like general advice rather than I've taken this I'm experiencing this weird thing. What do I do? I'm still struggling with some logic.

I appreciate what you're saying. It just doesn't seem to... No, it doesn't quite fit in my head either. Or I guess the under 18 group, it could be parents ringing up on behalf of their kids who have taken something but aren't experiencing any symptoms.

That is, OK, yeah, that's perhaps a reasonable logic. OK, all right, you've convinced me. And I guess if you're with a group of friends and someone sees you take something and then they're like an overly

anxious friend and call up for advice before something happens, that's also a possibility. Of the individuals who did report symptoms where only one NPS was reported, tachycardia, anxiety, drowsiness, hypertension and agitation were the most frequently reported symptoms overall and reported in at least 10% of the patients.

Other symptoms included chest pain, hallucinations, convulsions, hypothermia and comas. So quite a range there, wasn't there? Ranging from what could be described as possibly even, I'm not suggesting that it is, but possibly anxiety associated with taking a compound rather than the compound itself. Ranging to quite severe symptoms.

So in breaking it down by drug group, the symptoms reported kind of fit with what we know about those drugs. So in the cathinone group, which is 120 patients, tachycardia was reported in 35%, anxiety in 16%, hypertension and chest pain in 13%. And these are the most frequently reported symptoms. The design of benzoas, which included 50 patients, drowsiness was reported in 38%, and tachycardia and coma were reported in 6%.

For the 28 patients exposed to phenylamines, hallucinations were reported in 21%, agitation in 18%, and anxiety in 14%. With the synthetic cannabinoids, which included 27 patients, 44% reported tachycardia, and 15% reported anxiety and agitation. I have a question. I've just had a thought.

For example, these designer benzos, it all relies on self-report, right? Yeah, these aren't lab confirmed exposures. So we're only capturing a designer benzo if somebody believes they've taken for example, clonazepam, and is having an experience of it. As opposed to where people thought they were buying street diazepam and were in fact getting bromazepam, these are deliberate ingestions of novel benzos, as opposed to incidental ingestions of novel benzos when people believed they were getting some pharmaceutical.

Yeah, exactly. And therefore, we don't actually know that what was reported to be clonazepam was clonazepam, for example. Yeah, for sure. So to go back to our original question then, and I think we've possibly answered it, does this poison control data actually tell us much about drug trends?

Yeah, I think it does. Both the commonly reported recreational drugs and trends in NPS. And I think it definitely has value in adding to what we know about what people are taking and comparing those trends between different countries and different poison centers. Yeah, I'd agree.

I think there's some really valuable data here. It shows a chunk of the market that is often not captured by, as you say, the Sentinel hospital sites or post-mortem data. You know, for example, cathinones, in general terms, not occurring in post-mortem data sets because they're not drugs that typically, not, you know, they can, but in general, are not drugs we associate with fatality. And yet, you're seeing these calls to centers relating to possible drug harms that aren't just being captured anywhere else.

Yeah, and it also fits in with drug seizure data. So for example, 3MMC, 3CMC, and 4CMC accounted for 50% of all the NPS seized in the EU in that year. So the exposure and reports to poison center also mirrors the seizure trends, which is also quite interesting. I think another thought I've had here.

I mean, we're looking at older data, aren't we? We're looking at 2021 data, as we've said. These are drug compounds that we don't see anymore. But actually, this data could probably be available in relatively real time.

Yeah, I think more so than a lot of the data sources we do use for monitoring drug trends, like the post-mortem data. And when looking at emergency department admissions, that's often a lot of retrospective analysis. I'd be really interested if there's plans to sort of dashboard this information or

something. Because as you say, you know, we're looking back at 3CMC and compounds like that.

Clearly, they were very prevalent at this point in time. This data is picking it up really well. What are the poison centers seeing today that we need to be thinking about? Yeah.

If you work at any of these poison centers and would like to share, we'd love to hear from you. So looking in very general terms then, there was a few trends that I think we've already discussed, haven't we? The cannabis trend I thought was interesting. There seems to be this increase in cannabis calls.

And some of that could be explained by increased availability or reduced stigma perhaps with decriminalization. But also we have over a broader period of time seeing this increase in THC and a reduction in CBD, haven't we? And whether there's perhaps some influence of ultra-high potency THC products in some of the more traditional harms that we associate with. Cannabis overuse, I guess.

I'm thinking anxiety. I'm thinking paranoia, the sort of negatives that can come with cannabis use. And crucially, a lot of this data predates the rise of the semi-synthetic cannabinoids. Yes, yes.

And that possibly could be what the poison centers are seeing now. So did novel opioids come up at all in this data set? You mentioned heroin very briefly. So novel opioids were reported to poison centers.

So they were definitely spotted in Freeberg and the Netherlands, but the proportion overall was quite small. So I don't think they had enough data to do any real like trend analysis or breakdown. The different novel opioids that people were reporting to have used. It would be interesting to see what those trends were.

Yeah, so 2021, we were starting to see the rise of novel opioids a bit more broadly, weren't we? But we weren't quite in full swing, as we were in subsequent years either. I'm just trying to work out whether this represents the fact that they weren't there or the fact that it's just a different population of people that phone the poison center. And I wonder if it might be more that one.

Yeah, it is very reliant on for some of the poison centers people presenting to hospital and a clinician picking up the phone and calling the poison center or people having access to the number of being aware that the service exists. So those groups might not necessarily overlap particularly well for certain compounds. So here is a question and I don't know if we can answer this. Are countries with good drug checking services seeing lower proportions of poisonings?

I'm thinking the Netherlands famously has got relatively established drug checking service. There was still relatively high represented wasn't it compared to? Yeah, it wasn't one of the lower ones either in the traditional recreational drugs or the NPS. But then if you have a really good drug checking service are people just more aware that this service exists and then calling up for advice more frequently?

Okay, yeah, so the two could go hand in hand. Like there's more general awareness of drug checking and services to help when you're experiencing adverse effects. That's possibly a really good point, isn't it? Yeah, that's a good point.

The idea that it could potentially bias the data in a positive way. Yeah, yeah, that's a really interesting point. So I think a lot to take away and think about here. I think this is a really, really interesting couple of papers and it shows really that although poison centers probably not considered to be particularly glamorous, are clearly a source of incredibly valuable, well, valuable services to the people that use them.

Let's not ignore that at all, but also a valuable source of data for people like us. And I think I really would like to have a look at some data like this again more frequently because I think there could be some real insights to be drawn from this. And I think especially the symptoms that get reported with

NPS for things that we don't really know what the effects are is quite interesting. I get you'd have to have enough people calling off that particular drug, but if that data is there, that is really valuable.

Yeah, so especially if you get sort of surprise things. I mean, I'm thinking how we were talking about hallucinations and medetomidine and how that had been. That wasn't a poison center that identified it, but there was some correlation between described symptoms and what was tested at drug checking. And you're right, it could be really helpful if a novel compound is showing an unexpected symptom.

Is there something else going on? Well, I hope you've enjoyed listening to us this week. Again, if you've liked what you've listened to, do share us, do leave us a comment, do give us a like, anything to promote the podcast. We really appreciate it.

Hope you all have an amazing week and we'll see you next time. Bye.