

THE TOX LAB

Podcast Transcript

Episode 7: Truth or Bias - self reporting vs lab testing

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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 try to answer the question: can people really be trusted to report their own drug use?

So Rebecca, why don't you introduce the study that tries to answer that?

The paper we're talking about today has a very long title: Reported recreational drug and new psychoactive substance use versus laboratory detection of substances by high-resolution mass spectrometry in patients presenting to an emergency department in London with acute drug toxicity.

It is absolutely one of those titles that tells you exactly what is in the paper, but it is not very catchy.

Definitely not snappy.

So what did they actually do?

The aim of the study was to compare what people said they had taken against what was actually found in laboratory analysis. They were not primarily interested in the exact details of every single specific drug; they were mostly interested in broad classes such as stimulants, opioids, benzodiazepines, and so on.

It was a cross-sectional study carried out in a central London emergency department. They looked at patients presenting between 1 February 2019 and 2 February 2020 with acute recreational drug or new psychoactive substance toxicity.

They reviewed discharges daily, identified adults with a consistent clinical picture of acute drug toxicity, and then used leftover serum that had already been sent to the laboratory for clinical testing. That residual sample was saved and later sent to a referral lab for broad toxicological analysis using high-resolution mass spectrometry after extraction.

They also went through the discharge reports and recorded age, sex, and the drugs the patient had reportedly taken, although they only captured up to six self-reported substances per patient.

So in simple terms: patients came to hospital with acute drug toxicity, they were asked what they had taken, blood had already been collected for clinical purposes, and the researchers compared the reported history with the toxicology.

Exactly.

Out of 1,000 patients screened, 939 met the inclusion criteria. About 85 percent were male, and the median age was 34.

So once again, lots of men.

Very much a recurring theme.

And at least two-thirds reported more than one substance, so, once again, a lot of polydrug use.

Another recurring theme.

In the study, they looked at positive predictive values and negative predictive values for self-reported drug use.

So Rob, do you want to explain what those mean in this context?

Yes. Positive predictive value here means: if someone said they had used a certain drug or drug class, how often was that actually confirmed by the lab?

So if somebody says they have taken cocaine, how often does the lab also find cocaine or a relevant marker?

Negative predictive value is the opposite question: if someone did not report taking a particular drug, how often was that drug not found in the laboratory analysis?

So these are telling us two slightly different things. One is how often people are right when they say they have taken something, and the other is how often they are right when they don't mention something.

Exactly.

Across all drug classes, the median negative predictive value was about 90 percent.

So on average, if somebody did not mention a drug, it usually was not detected.

Yes. The median positive predictive value was around 68 percent.

So if someone said they had taken a drug, it was confirmed in the lab about two-thirds of the time.

Which, at first glance, is a bit surprising. You might expect people to under-report, and therefore you might think the lab would detect lots of drugs people hadn't disclosed.

That was definitely my instinct as well.

But on average, the data suggest people were actually fairly accurate, at least in broad terms.

Yes, although there are lots of caveats, and those caveats matter a lot.

Let's go through some of the classes.

Self-reported alcohol use was about 42 percent. Stimulants such as cocaine were self-reported in around 53 percent. GHB was reported in around 23 percent.

In the laboratory data, opioids were detected in about 57 percent, stimulants in 64 percent, and benzodiazepines in 52 percent.

The paper also has an "other drugs" category that was very common, but that likely includes therapeutics, antihistamines, and all sorts of things rather than a neat single class of recreational substances.

So already you can see some mismatches between what people say and what the lab finds.

Yes. Let's look at opioids first, because that is one of the most striking examples.

Around 18 percent of people self-reported opioid use, including things like heroin, methadone, and codeine.

But opioids were detected in 57 percent of samples, which is a huge difference.

The common findings included methadone and its metabolite EDDP, as well as morphine and codeine.

So why might opioids be detected so much more often than they were reported?

One likely explanation is methadone. Methadone is often prescribed as opioid substitution therapy, and it has a long half-life. Someone might be taking methadone regularly, not think it is relevant to the reason they are in the emergency department, and therefore not mention it.

Another possibility is that some opioids, or painkillers more broadly, may have been given in the emergency department before the sample was collected, although the paper does not really disentangle that properly.

And some detected compounds like noscapine or papaverine are interesting because they can point toward heroin use, but they can also have other explanations. Noscapine can be found in some cough preparations, for example.

So the opioid discrepancy does not necessarily mean people were deliberately hiding opioid use. It may also reflect prescribed drugs, long detection windows, and the fact that people do not always report therapeutics they do not see as relevant.

Exactly.

Benzodiazepines showed a similar pattern. They were detected more often than they were reported.

And again, that might be because they had been given in hospital, or because some benzodiazepines have long half-lives and people had taken them earlier than the immediate event that led to admission.

So with both opioids and benzos, the positive lab rate being higher than the self-report rate does not automatically mean dishonesty. It may mean that patients do not think a background prescribed drug or yesterday's benzo is relevant when they are answering the question "what have you taken?"

Now let's look at cocaine, because that is also interesting.

Cocaine had a relatively high positive predictive value, around 80 percent. So if somebody said they had taken cocaine, the lab usually confirmed it.

But the negative predictive value was only around 54 percent, meaning there were quite a lot of people who did not report cocaine use but still tested positive.

So there does seem to be a fair amount of under-reporting there.

Why might that be?

Some of it could still relate to timing and relevance. A person may use cocaine relatively regularly but not think it is the thing responsible for why they have come to hospital that day. Some of it could also be stigma, or simply reluctance to disclose cocaine use in a healthcare setting.

And, unlike something like methadone, cocaine is perhaps more socially stigmatised as an illicit recreational drug, at least in some settings.

We should also remember that they were looking at serum, not urine, so the window of detection is more limited than some people imagine, but still long enough that recent use could show up even if the patient did not mention it.

So there may be genuine under-reporting there.

Cannabis was another interesting one. It was self-reported in around 13 percent of people and detected in around 16 percent, so actually the mismatch there was fairly small.

That surprised me a bit, because cannabis is often considered very common.

Same. I expected it to show up more often.

But again, this is a very specific hospital population, so the prevalence figures are entirely dependent on who is coming through that emergency department.

Yes. These predictive values are not transferable to every other population. They depend heavily on the underlying prevalence of use and on the types of cases presenting to that hospital.

Psychedelics were especially interesting because they had a very low positive predictive value, only around 19 percent.

So only a small fraction of people who said they had taken psychedelics had that confirmed by laboratory testing.

That could mean people were exaggerating or misreporting, but I think a more plausible explanation is that the analytical method was simply not very good at detecting all psychedelics in all circumstances.

Many psychedelics have short half-lives, some are present at very low blood concentrations, and the sampling and storage process here was not designed specifically for ultra-sensitive psychedelic testing.

So I would be very cautious about concluding that people were lying about psychedelics.

GHB is another one where the interpretation is complicated. GHB was self-reported in a fairly high proportion of cases, around 24 percent, and detected in around 14.5 percent.

That seems high as a self-report figure, but this is a specific central London emergency department population, and GHB use is likely over-represented in some nightlife-related presentations.

The analytical interpretation is also tricky because GHB has a short half-life and is also present endogenously at low levels, so cut-offs matter a lot.

Exactly. Without knowing the precise cut-offs and sample timing, it is difficult to over-interpret the GHB findings.

So what are the implications of all of this? Have we answered the original question?

I think yes and no.

Broadly, it seems that if people do not report a drug, then most of the time it is not found. That suggests people are not wildly omitting huge numbers of substances across the board.

And if they do report a drug, it is often, though not always, confirmed.

But there are major caveats: half-lives differ, some drugs are easier to detect than others, some may have been given in hospital, some may have been prescribed, and the timing between use and sampling is absolutely critical.

So the big takeaway is probably that self-report is more useful than people might assume, but it is not perfect and cannot replace analytical testing.

Exactly.

I would also have loved this paper to correlate the lab findings with clinical presentation. That would have been really interesting.

Yes. It would be much more useful clinically if you could say not just "this person reported cocaine and tested positive," but also "they presented with this toxidrome" or "their signs were more consistent with this class of drug."

That would have made it much more immediately useful to emergency clinicians.

But even without that, I think the study does challenge the lazy assumption that people with acute drug toxicity are completely unreliable historians.

Yes. I think the default assumption is often "well, of course you can't trust what people say, they're on drugs." And actually the picture is much more nuanced than that.

So I think in that case we're going to wrap it up here. I hope you've all enjoyed listening.

Do tune in again. Don't forget to check us out on Instagram. We are @the_tox_lab and we'd love to hear from you.

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I hope you all have a fantastic week and we'll see you next time. Bye.