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NEWS

How Purdue is engineering solutions to the heroin epidemic

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WEST LAFAYETTE, Ind. — Tackling Tippecanoe County's heroin epidemic will require a broad approach that spans fields such as medicine, public safety, law enforcement and mental health.

But Purdue University engineers believe they also can play a role in finding solutions to one of the biggest challenges currently facing Indiana.

Such collaboration was the focus of a discussion Sept. 12 at Purdue by Jim McClelland, who was recently appointed Indiana executive director for drug treatment, prevention and enforcement.

McClelland outlined the state's strategic goals in addressing heroin abuse, one of which is to allocate resources more efficiently through predictive analytics technology.

"Our approach is going to be increasingly data-driven," McClelland said. "Right now, our data systems are not yet giving us access to the kind of timely, useful, actionable information that we really need in order to be able to make decisions and deploy resources in an optimum manner.

"As soon as possible, we want to get to a position where we can start using predictive analytics to help us get ahead of some aspects of this problem."

Professor Paul Griffin, director of Purdue's Regenstrief Center for Healthcare Engineering, said the event was organized to gather faculty with varying expertise around a common goal.

"How can we think about this collectively, as a community, as opposed to a set of individual researchers?" Griffin said. "That really was the motivation behind it. Also, for us to understand the state's strategic goals, so that we can align with that."

Over the past six years, researchers have partnered with Lafayette Police Department, among other agencies, to design iVALET, a tool that uses troves of data to visualize crime statistics and forecast when and where an incident could happen.

Now, Indiana officials hope iVALET, which stands for Mobile Visual Analytics Law Enforcement Toolkit, potentially could incorporate local and state data on opioid abuse and overdoses.

"We've started talking with them about how we can get tools to help them. We've been talking to a lot of different agencies about that," said Professor David Ebert, director of the Purdue lab that created the technology. "It's a way to take things we've done in the past, and look at what data across the state, what data across agencies need to be brought together to help get people the information so they can be effective and improve the situation."

But compiling and analyzing such data is a challenge due to the variety of sources from which they come, including hospitals, ambulance services and police, Lafayette police Chief Patrick Flannelly said.

"Now that Narcan is publicly available, people sometimes won't even call EMS or law enforcement when they have an overdose," Flannelly said of the medication, which counteracts the effects of an overdose. "If somebody is transported directly into the hospital, and there's not a public safety issue, than the hospitals aren't going to share that data with us because of privacy concerns."

A more direct way to track overdoses is by using a device that monitors a person's health in real time. Biomedical engineering Professor Jacqueline Linnes is part of a team developing a smart watch prototype to do just that.

"The smart watch ... is detecting overdoses and looking at physiological measurements like heart rates, respiration, oxygen saturation, and really a lot of things that hospitals would monitor on the patients, but being able to do this in a watch that's unobtrusive and easy for people to use," Linnes said. "This watch is connected to a smart phone that could call for help."

Linnes also is developing a patch that measures drugs in a person's system through their sweat. The technology could be easier and more effective than weekly urine screens, she said.

Although the devices are in various stages of development, Linnes said she hopes the accumulation of research at Purdue will tackle the opioid issue from all angles.

"Technology in general can provide a lot of advances for drug abuse, but that is certainly not just a one-and-done solution," she said. "Addiction is a chronic disease, so there's not going to be any one pill or any one device that you can use, but there's a lot that can be done that will actually help clinicians and help behavioral people to do their jobs better and to really help patients themselves."