

Christin D'Ovidio:

I am really excited about our guest today. We have Dr. Elizabeth Harwood, or Lizzie as she likes to be called with us on the show. Dr. Harwood is a professor of psychology at Rivier University in Nashua, and she teaches a course called Drugs and Behavior. She frequently speaks about the biological basis of addiction at community events, which is how we met her, and she was a speaker at an event for the Nashua Prevention Coalition. Today she's talking with us about some of the knowledge gaps around addiction or substance use disorder. Welcome, Lizzie.

Dr. Elizabeth Harwood:

Thank you. It's great to be here.

Christin D'Ovidio:

For so long, substance use has been considered a character flaw, or personal failing. We know it's not. It's a chronic progressive health condition. It affects the body, the brain, behavior. Are there still misunderstandings and myths and stigma, and how can we support this? Can you just take some time to explain all of this? How does this occur and how do we understand it?

Dr. Elizabeth Harwood:

Sure. Well, I think it's high time that we throw out the idea that addiction is a moral failure or a lack of willpower. Science tells us a different story. Addiction to a substance fundamentally changes the brain, its structures and how it works. And understanding this can help us develop more compassion and empathy for those struggling with substance use disorder. Addictive drugs activate the reward pathway in the brain by releasing dopamine. And dopamine is a naturally occurring brain chemical that has several different functions, including controlling movement, motivation, emotion, cognition, and pleasure. Now, of course, the reward pathway does not exist for drugs. It's there to encourage us to engage in behaviors that are important to our survival, such as eating a good meal, engaging in hobbies, having a laugh with friends.

Unfortunately, addictive drugs release 2 to 10 times the amount of dopamine that natural reinforcers do. So this euphoria is above and beyond what a person is used to experiencing in their day-to-day life. And this encourages repeated use. Drugs also have a faster onset than natural reinforcers. Injecting a drug takes seconds to hit the brain, and its effects last so much longer than a bite of birthday cake, no matter how delicious it is. And so with repeated use, the brain adapts to the presence of the drug and the excess of dopamine by slowing down its own production. So the brain recognizes that there's too much dopamine in the system and attempts to self-correct. For example, in long-term cocaine use, the brain can shut down as many as 20% of the receptor sites for dopamine. So this reduction in dopamine causes an impairment in the reward pathway.

Now, natural reinforcers are no longer reinforcing because the brain simply is not releasing enough dopamine. So all the things the person used to enjoy, such as spending time with family and friends, it's just not as motivating or reinforcing. And at this point, the person needs the drug to feel normal. Without it, life is simply empty and bland.

And then if they try to stop taking drugs abruptly, the brain will be in a dopamine deficit and they'll experience incredibly unpleasant withdrawal symptoms. So for example, when withdrawing from opioids like fentanyl or heroin, a person will experience vomiting, chills, fever, and intense excruciating pain. It's

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been described to me as like the worst case of the flu you can imagine. So try to remember the last time you had the flu. What if you could take just one little dose of a drug and it all went away completely? How hard would it be to resist that temptation? And that's essentially what it's like. And even when they're through initial withdrawal, which for opioids can take weeks, the brain is still not fully recovered. So for the next several months, they'll continue to struggle with drug cravings and feeling depressed and anxious, making it very tempting to use again.

But withdrawal is not the only barrier the brain puts up to discontinuing drug use. The dopamine reward pathway extends to several other areas of the brain, especially the prefrontal cortex. So the prefrontal cortex is really important because it helps with executive functioning like thinking, planning ahead, problem solving and impulse control. So with the deficit in the dopamine pathway, the normal activity level of the prefrontal cortex is sluggish during addiction and for months after abstinence. So what that means is that the person literally is not able to think as clearly to consider their consequences or to control their impulses. So as Dr. Volkow, the Director of the National Institute on Drug Abuse describes it, "It's like driving a car without breaks." You're literally unable to stop. The person has lost the ability to control their behavior, and the drug use has become compulsive. So addiction, I think of as a loss of control.

So a common misconception is that people with substance use disorder have personal control over the onus and should be blamed because of it. And the science of addiction shows us this just is not the case. Addiction has an incredibly strong grip on even the most motivated person, and the brain is not fully functioning again for months after discontinuing a drug. So just like any chronic illness, treatment for substance use disorder needs to be long-term, it needs to be comprehensive, and it needs to be compassionate overall.

Christin D'Ovidio:

The science of addiction helps us ditch the notion that someone has control over their chaotic substance use. We now know that addictive drugs activate the reward pathways in the brain and disrupt the body's way of dealing with the reward system. When we understand how the brain is impaired by substance use over time, we can then respond with compassion, and empathy, and support in multiple pathways to recovery.

Dr. Elizabeth Harwood:

When people understand that the brain is compromised, that they can't control their behavior, then they start to feel a little bit more compassionate and it makes more sense. Because if you think about it, no one grows up saying, "I want to become addicted. I want to lose absolutely everything. I want to lose my family. I want to lose my career, maybe my life." Nobody wants that. So what is getting in the way of them stopping this behavior? And so I think understanding how the brain makes it incredibly hard to stop helps quite a bit with developing some of that compassion and empathy.

Christin D'Ovidio:

Saving lives, preventing overdose, reducing the spread of disease and reducing violence are all benefits of recovery and the use of medications to assist in the treatment of opioid use disorder.

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Dr. Elizabeth Harwood:

Well, I think there's a recognition that there are multiple pathways to recovery. And so you can't just use a one size fits all approach. And it depends on the person, their support system, do they have a co-occurring mental illness? And what drug they've been using to really develop an individualized treatment plan. So it could involve detox, inpatient, outpatient treatment, they might want to join AA or another self-help group like Smart Recovery, or they might want to use medication assisted treatment like methadone or suboxone. So I think it's important to recognize, again, that you can't just use a one size fits all approach and that especially with opioids, that medication assisted treatment might be the best option in addition to wraparound services and other types of treatment options.

Christin D'Ovidio:

Now, why is that true of opioids versus other substances?

Dr. Elizabeth Harwood:

So essentially the FDA has not approved any medications yet to treat cocaine use disorder, for example. But there is methadone and suboxone that have been helpful with opioid use disorder. So essentially methadone works by, it can help with withdrawal, but it can also act as a replacement to sort of reduce drug craving. The person also doesn't experience the high associated with taking something like heroin. And then they can sort of, I guess takes away the chaos of living in addiction and gets them back into society and starting to put their life back together with the idea that they can then start to taper off or withdraw from methadone. And then suboxone of course is another option that's a little bit longer lasting and can be given by a physician who's been trained in that. And that's also been helpful with reducing drug craving and preventing withdrawal symptoms as well. So opioids have such terrible withdrawals, that's often what people fear the most. And so having something like methadone or suboxone can help ease the withdrawals, but also help with the intense drug craving that comes along with that.

Christin D'Ovidio:

It's interesting because there's even stigma around use of these drugs to help people manage and recover from their substance use disorder with opioids.

Dr. Elizabeth Harwood:

Definitely. That's a common misconception, I think that you're replacing one drug with another. But again, I think of it like a chronic illness. With many chronic illnesses, if you have diabetes, then you need to take insulin to help manage your disease. And I think of methadone or suboxone helping manage the disease of addiction. And we know that it saves lives, it prevents overdose, it prevents the transmission of diseases, it prevents violence associated with drug cartels and such. So I think that the results speak for themselves when you actually look at the data of how helpful medication-assisted treatment can be.

Christin D'Ovidio:

Given what we know about the significant impact of early substance use on the developing brain, our guest talks about the importance of prevention, early identification and harm reduction. When a person

starts to use matters. Lizzie explains how early substance use has greater negative consequences for teens, including addiction.

Dr. Elizabeth Harwood:

Most people use drugs for the first time when they're teenagers or young adults. For example, the average age for trying marijuana is 14. And we know that if a person hasn't used a drug, an illicit drug by the time they're 25, it's pretty unlikely that they're going to do so. And if you look at the brain, it's pretty interesting why that might be the case. So why are teen years so vulnerable for drug use? Well, teen's brains are still developing. In fact, their prefrontal cortex isn't fully developed until 25, interestingly enough. So remember, the prefrontal cortex is the part of the brain that helps us think through things, plan and control our impulses. Teens also feel rewards very intensely, and they tend to be sensation seekers. A part of their development is to experiment, to try on new identities, and they can make impulsive in the moment decisions.

So in a peer pressure situation, a teen might give in even though they know it's not the best idea because they're worried about what others will think of them or they think, "I can handle it, I can control my use, addiction can't happen to me." And a lot of teens unfortunately, aren't educated fully on how dangerous drugs are. So they rely on what their friends say, that "It's fun, it's harmless, it hasn't hurt me." And we know that when a person uses matters. The earlier a person uses a drug, the more likely they are to experience negative outcomes, including developing addiction, engaging in risky sexual behavior, having problems in school, legal repercussions. And we know that early drug use has a much more detrimental impact on a developing brain than a fully formed adult brain. So really it does matter in terms of either preventing altogether or at least delaying the onset of drug use until they are an adult.

And I think if we can't prevent use entirely, then our next step needs to be harm reduction strategies. Take alcohol for example. There are over 1,500 deaths associated with alcohol use by college students each year. 1,500 deaths. So how can we reduce these negative outcomes with alcohol and teach young adults if you're going to consume alcohol, how can you do it safely? So for example, in my drugs and behavior class, we actually spend a considerable time discussing these strategies that students use to keep themselves safe to reduce those negative outcomes, such as monitoring their drinks at all times or having a sober buddy to watch out for them. So if we see someone struggling with alcohol or drug use, don't wait. Early intervention is key. I'm really not a fan of the idea of hitting rock bottom because hitting rock bottom can mean losing so much. Career, family, friends, their house, maybe even their freedom, and in worst case scenarios, their life. So that is a huge hole to dig yourself out of. So instead, intervene early. That's the best option in my opinion.

Christin D'Ovidio:

Learning fact-based information, having open and frank conversations, showing support and care and having opportunities to participate in meaningful activities makes a huge difference in your teen's choice to use substances. These are referred to as protective factors.

Dr. Elizabeth Harwood:

Well, having taught drugs and behavior for quite some time now, my students always remark that they wish they had known this information earlier. So I think they have a real desire to understand how drugs work. They might've been told, identify a particular drug like marijuana or alcohol and told that it's bad

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and you shouldn't do it. But it really didn't go into educating them about how it works in the brain and how it affects them physically, behaviorally, and then some of these harm reduction strategies that we talk about. And so I think they are interested in this material.

And for parents, we know that when teens feel supported by and connected to their parents and caregivers, they're much less likely to use drugs, especially if their parents talk openly about the negative consequences of drug use. It may not seem like it, but teens do listen to their parents. Actually, it can make a big difference in for example, whether or not they binge-drink when they have their freshman year of college. And so I think that a strong education on addiction at home and at school can be a huge protective factor. So talk to your kids early and often about drug use and advocate for your schools to provide evidence-based prevention programs.

We also know that teens who are involved with activities like after school clubs or sports are also less likely to use drugs, especially if there are sanctions against drug use for these activities. We know that a lack of supervision, boredom, and some pocket money are three big risk factors. And so know where your teens are, who they're with, more than ever, teens are under tremendous pressure and they still need their parents to guide them. So if I were a parent and I am, I would suggest learning some of the common signs of drug and alcohol use to watch out for because we know that drugs are more potent, more pervasive, and very, very easy to access. Even marijuana today is very different than it was in the 90s. So it's important to keep a lookout for and intervene early if you suspect drug use. I think parents too can also model appropriate use of alcohol, for example, because our kids are always watching and listening and imitating, so they will copy our behavior whether it's good or bad.

Christin D'Ovidio:

As adults, we have the opportunity to model healthy and safe decisions. Lizzie talks about the behaviors that adults can model to the young people in their lives and the influence this has on their behaviors and choices.

Dr. Elizabeth Harwood:

I think we just have to be more conscious of the behaviors that we show our kids and to think, is this something that I would want them to replicate? Because if for example, a parent were to come home and immediately start drinking alcohol or whenever they're stressed or upset, they drink alcohol, or they ask their kids to bring them alcohol, they're sort of modeling for their kids that this is how you deal with stress. This is how you relax. This is a "normal behavior" and that becomes a model for them to then repeat. Then it doesn't seem like that bad of a thing. So you have to think about, is this a behavior that I necessarily want to do in front of my children and for them to see as acceptable? Similarly to marijuana or social media devices. How can I regulate my child's use of social media if they only see me on my own phone all the time. I need to model for them appropriate social media use as well too.

I think kids listen a lot. They pay attention more to behaviors than to necessarily what you say, and so you have to show them appropriate use of social media or any other type of behavior that we're talking about today. I think part of the problem is our society tends to focus on one drug at a time, rather than the underlying reasons why people may use drugs and have difficulty stopping them. And as a parent or a caring adult ... I mean, I teach this and it's hard to keep up with all of the new drugs that are constantly coming up. And so that's a hard ask to parents to know this information. So instead, rather than focusing on a single drug, how can we identify what puts kids at risk? Can we tell if perhaps they're using

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something? What do we do to intervene? How can we help them make better informed decisions? It's tough. It's really tough out there for parents and for kids.

But one of the things I've found giving some of these talks is that when people hear the biological basis of addiction, they're more, like I said, more empathetic. They sort of understand, "oh, this is why they keep going back." Or "This is why they seem to not care about their family and friends." It's not that they don't care. They're impaired at that point, and they're not really their true selves. And so I think that can help mend some of the broken bridges that can happen with addiction if they understand that a little bit more.

Christin D'Ovidio:

One thing that we don't hear enough about is, I think you kind of touched on this, three out of four people who experience addiction or substance use disorder eventually recover. So can you talk a little bit about that?

Dr. Elizabeth Harwood:

Yeah, I agree. We don't hear this nearly enough. A common misconception is that people with addiction hardly ever recover, and this simply isn't true. It's important to remember that addiction is a chronic disease, and as with any chronic disease, there will be times when it's managed well and times when it's not. Just like diabetes, just like hypertension, and addiction actually has recovery rates similar to other chronic diseases. I also think if a person relapses, people with addiction are treated much more severely if they have a relapse, then if someone with a chronic condition has a relapse. And really all it is just a sign that there's an adjustment needed. Like we said earlier, there's no single pathway to recovery. There's no one size fits all approach. And so we have to consider it as a part of the condition and adjust treatment accordingly to get them back on the path to recovery.

So what I'm hopeful for is that we'll continue to hear stories of recovery in the media. I think this is really what's going to help tremendously with reducing stigma and the misconception that people don't get better. We just need people to talk about it more openly and to share their stories.

Christin D'Ovidio:

We like to ask our guest at the end of the show the same question. So the question is, what is your definition of prevention or how do you define prevention?

Dr. Elizabeth Harwood:

Great question. So I was thinking about this earlier, and one of the statistics that strikes me is that there are 3.5 million deaths per year worldwide associated with substance use disorder. We also know that the direct and indirect costs, economic costs of substance use disorder exceed over 15% of the average state's annual budget. These numbers are startling, and so it's easy to see why prevention is necessary. So for me, prevention is delaying the onset or avoiding altogether, alcohol and drug use. Prevention is humane, it saves lives, it reduces human suffering, and prevention is cost-effective. It's been estimated that if students were given effective school-based prevention education, we could save \$18 for every \$1 invested. I just don't really see how you can argue with the benefits of prevention.

Christin D'Ovidio:

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That's great. Thank you. Well, Lizzie, it has been an absolute pleasure to speak with you and to learn some of what you have to teach and know about this behavior and substance use. It's really amazing. I want to thank you for spending time talking to us.

Dr. Elizabeth Harwood:

Well, thank you. I've really enjoyed my time here. It's been great.