Official Newsletter of Drug Free Workplaces
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Given love and opportunity, every child and adult can recover. All who know this and have the capacity to help others should assist as they can.
– Dallin H. Oaks
www.LiveDrugFree.org

DrugFree@WorkPlace

Genetics and Drug Addiction

Drug addiction negatively impacts millions of lives worldwide. While it's true that environmental factors play a significant role, genetics also contribute substantially to an individual's susceptibility to addiction.

In this *Employee Education Newsletter*, we take a look at the relationship between genetics and drug addiction and explain how genes can influence an individual's vulnerability to substance abuse.

The Genetic Basis of Addiction

1. *Heritability*: Studies suggest that approximately half of an individual's risk of developing a drug addiction is based on their genetic makeup. This means that specific genes passed down in families may put certain individuals at a higher risk for addiction. However, it's essential to recognize that genetics alone do not determine addiction; they merely contribute to the overall picture.
2. *Twin and Family Studies*: Research involving identical twins, fraternal twins, adoptees, and siblings has provided valuable insights. These studies have indicated that genes play a role in addiction to substances such as alcohol, nicotine, and other drugs. The heritability of addiction varies across substances, but the genetic influence is undeniable.
3. *Genetic Variants*: Scientists have identified numerous genes, chromosomes, and neural circuits in the brain associated with an increased risk of addiction. In individuals genetically predisposed to addiction due to a family history of alcohol or drug use problems, addiction pathways can form more quickly and easily.

The Role of Dopamine Signaling

1. *Dopamine System*: The dopamine system plays a central role in addiction. Dopamine is a neurotransmitter associated with pleasure, reward, and motivation. Genetic variations can impact dopamine receptor function, affecting an individual's response to drugs.
2. *Reward Pathways*: When drugs are consumed, they activate the brain's reward pathways, leading to a surge of dopamine. Genetic factors influence the sensitivity of these pathways. Some individuals may experience heightened pleasure from drug use due to their genetic makeup.

3. *Dopamine Tolerance*: Some people have a genetically inherited diminished response to dopamine resulting in more of a need for increasingly larger doses of substances over time to achieve the same effects they once felt with smaller doses.

Beyond Genetics: Environmental Factors

1. *Nature vs. Nurture*: While genetics contribute significantly, environmental factors also shape addiction risk. Stress, trauma, peer influence, socioeconomic status, and availability of drugs all play crucial roles.
2. *Epigenetics*: Epigenetic modifications, which alter gene expression without changing the DNA sequence, can occur due to environmental factors. Stress, substance exposure, and lifestyle choices can influence epigenetic changes, impacting addiction susceptibility.

Implications and Prevention Strategies

1. *Personalized Interventions*: Understanding genetics brings us closer to developing personalized interventions. Tailoring treatments based on an individual's unique biology, environment, and experiences can enhance outcomes.
2. *Preventive Services*: Genomic studies help identify factors that may protect or predispose someone to substance use disorders. This knowledge can be used to expand preventive services and empower informed decisions about drug use.
3. *Business and Community-Focused Prevention Programs*: Drug-Free Workplace Programs play a crucial role in preventing substance abuse among employees, and community-based drug prevention is a vital approach to addressing substance abuse at the local level.
4. *Public Health Crisis*: Drug addiction remains a public health crisis, affecting families, communities, and society. By addressing both genetic and environmental factors, we can reduce the emotional, social, and financial costs associated with addiction.

For substance abuse prevention programs to work, they must be comprehensive, research-based, science-based, evidence-based, proven, and practical. These programs empower communities and businesses to take action, educate the public, and create a safer environment for everyone.

Summary and Conclusion

In the battle against drug addiction, genetics is a critical piece of the puzzle. Recognizing the interplay between our DNA and environmental influences allows us to develop comprehensive prevention and treatment strategies. As we continue to unravel the complexities of addiction, we should strive for a future where personalized care and informed choices lead to healthier lives.

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Supervisor Newsletter

Potential Change to Drug Testing Panel

Currently, DOT-required standard drug tests do not include testing for fentanyl. To detect fentanyl, an expanded panel that specifically tests for it must be ordered and this specialized test adds to the cost.

Fentanyl is extremely dangerous, and many people believe that its inclusion in drug testing panels is essential for public health and safety.

On March 5, 2024, the Substance Abuse and Mental Health Services Administration's (SAMHSA) Center for Substance Abuse Prevention's (CSAP) Drug Testing Advisory Board (DTAB) held a meeting to hear presentations regarding changing drug test panels to include fentanyl. The meeting included cost and benefits analysis and a summary of public comments received regarding this proposed change.

The following information is provided by the Federal Register:

Section 8105 of the Fighting Opioid Abuse in Transportation Act, included in the SUPPORT for Patients and Communities Act, required the Secretary to determine whether it is justified, based on the reliability and cost-effectiveness of testing, to revise the Mandatory Guidelines for Federal Workplace Drug Testing Programs to include fentanyl. Section 8105 additionally required the Secretary to consider whether to include any other drugs or other substances listed in Schedule I and II of Controlled Substances Act (CSA). Norfentanyl is a metabolite of fentanyl. Because it is also an immediate precursor used in the illicit manufacture of fentanyl, it is a Schedule II substance under the CSA.

Fentanyl is involved in a large proportion of overdose deaths in the United States and is therefore an important public safety concern. Furthermore, fentanyl is increasingly used as a stand-alone substance, not in conjunction with heroin and other substances. According to the National Forensic Laboratory Information System (NFLIS) 2022 report, fentanyl was the third most frequently identified drug and accounted for 13.81% of all drugs reported by forensic laboratories. Norfentanyl is an important component of identifying people who use fentanyl when urine is the specimen matrix. Fentanyl has been detected in oral fluid in patients receiving pain management services, overdose cases, and driving under the influence of drugs (DUID) cases. Information provided by HHS-certified

laboratories in 2023 indicated that a majority (84%) of the laboratories analyzed non-regulated workplace specimens for fentanyl and/or norfentanyl, and that all had the ability to analyze urine specimens for fentanyl with sufficiently sensitive detection limits using commercially available immunoassay kits and confirmatory test instrumentation commonly used in HHS-certified laboratories.

The Department plans to remove MDA and methylenedioxymethamphetamine (MDMA) from the drug testing panel, because the number of positive specimens reported by HHS-certified laboratories does not support testing all specimens for MDA and MDMA in federal workplace drug testing programs. Information provided to the department through the NLCP in 2021 and 2022 shows the positivity rate for MDMA ranges from 0.001 to 0.003%, and a review of the results indicate that >25% of the positive specimens are likely agency blind samples. MDA has a lower positivity rate than MDMA and both have lower positivity rates than phencyclidine (PCP). SAMHSA also considered removing PCP but decided against this change. While PCP has an overall positivity rate nearly as low as MDMA, there are regional differences in positivity, with some areas of the country having much higher rates, so PCP remains a regulated test analyte. Because MDA and MDMA are Schedule I drugs, a federal agency may test specimens for these analytes in accordance with Section 3.2 of the UrMG and OFMG (*i.e.,* on a case-by-case basis for reasonable suspicion or post-accident testing, or routinely with a waiver from the Secretary).

Summary of Meeting

The National Laboratory Certification Program (NCLP) presented information at the March meeting on the prevalence of fentanyl seizures at clandestine labs. Fentanyl is the third most seized drug with methamphetamine and cocaine being number one and two.

During the meeting, comments submitted by the public were considered. One hundred fifteen commenters agreed with adding fentanyl to the drug panel and only three disagreed. Many of the respondents supported removing MDMA and MDA because of the low positivity rate.

Conclusion

The Drug Testing Advisory Board must review and publish its responses to public comments and a federal review process must take place before this potential change to drug test panels can become official. A future *Federal Register* article will announce if and when the change is finalized, and that information will be provided through future *Supervisor Training Newsletters.*