Praxis Training for Massachusetts Addiction Professionals

Understanding Opioid Use Disorder

The Mechanisms of Addiction

The addictive process is modulated by both reinforcement and neuroadaptation. **Reinforcement** occurs when a stimulus (e.g., taking a drug or experiencing withdrawal) increases the probability of a response (e.g., continued use of the drug). **Neuroadaptation** refers to the process by which initial drug effects are either enhanced (known as sensitization) or weakened (known as counteradaptation) by repeated exposure to a substance. Reinforcement is modulated by the neuroadaptive changes that occur with drug exposure. Together, these factors motivate the initial, short-term response to or experience of a drug and the establishment of the long-term craving for the drug.

Understanding the Reward Pathway

Substance use can lead to structural changes in the brain. Many of these changes occur in the **reward pathway.** The reward pathway also works to interpret the emotional output from other systems.

Human brains are programmed to ensure that we will repeat activities necessary to sustain life, such as eating. By associating this activity with pleasure or "reward," we are more likely to do that activity again. Memories that have an intense emotional component (such as pleasure) may be permanently embedded. Excessive use of substances like opioids can lead to changes in reward signaling and a range of motor and cognitive functions. These changes lead to the transition between normal goal-directed behavior and compulsivity. In essence, opioid use disorders 'trick' the brain into believing that an opioid is necessary for survival, like food and water.

TOLERANCE, DEPENDENCE AND ADDICTION

- **Physical dependence** occurs because of normal adaptations to chronic exposure to a drug and is not the same as addiction. Someone who is physically dependent on a substance will experience withdrawal symptoms.
- **Tolerance** is characterized by the need to take higher doses of a medication to get the same effect.
- **Addiction** is a condition in which a behavior that can function both to produce pleasure and to reduce pain is employed in a pattern that is characterized by two key features: the recurrent failure to control behavior and the continuation of the behavior despite significant harmful consequences.