Consequences of the Non-Medical Use of Prescription Drugs (NMUPD)

The purpose of this document is to describe the adverse (including both short and long-term) consequences associated with nonmedical use of prescription drugs (NMUPD).

**Physical Consequences: Nonmedical Use of Prescription Drugs**

**Increased Risk of Overdose, Injury, and Death**
Non-medical use of prescription drugs is associated with an increased number of Emergency Department (ED) visits. A review of 5 years of SAMHSA's Drug Abuse Warning Network (DAWN) data (2004-2008) of ED visits involving NMUPD estimated that the number of ED visits for the nonmedical use of opioid analgesics increased 111% (from 144,600 to 305,900 visits) during this 5-year period and increased 29% during the last year of data studied (2007—2008). Oxycodone, hydrocodone, and methadone were the most common prescription drugs involved in these ED visits. The estimated number of ED visits involving nonmedical use of benzodiazepines, which result in sedative or anxiolytic effect, increased 89% during 2004--2008 (from 143,500 to 271,700 visits) and 24% during 2007-2008 (MMWR, 2010). Data on ED visits involving the nonmedical use of other types of prescription drugs (e.g., stimulants, tranquilizers) were not available. Data could not be located on drugged driving or on-the-job accidents specific to NMUPD.

Rates of US deaths involving the overdose of prescription drugs increased rapidly during 1999-2006 (Warner, Chen, & Makuc, 2009). The number of US deaths due to poisoning doubled between 1999-2005 from about 20,000 to 37,000. This increase is largely attributed to deaths involving prescription opioid analgesics—this coincided with a nearly 4 fold increase in use of prescription opioids nationally (Hernandez & Nelson, 2010; Paulozzi, Budnitz, & Xi, 2006). Opioid pain relievers were involved in 73.8% of the 20,044 prescription drug overdose deaths which occurred in 2008 (MMWR, 2011).

**Acute Medication Side Effects and Withdrawal Symptoms**
Prescription drugs all have potential acute (side) effects that range from mild symptoms to more severe reactions that can lead to significant morbidity and potentially death (see above). Effects vary by type of medication misused.

- Common acute side effects of opioid prescription drugs include nausea, sedation/drowsiness, depressed respiration, euphoria, dysphoria, constipation and itching. Termination or reduction in opioid use can lead to withdrawal symptoms including restlessness, muscle and bone pain, insomnia, diarrhea, vomiting, cold flashes with goose bumps, and involuntary leg movements (Manchikanti & Singh, 2008; NIDA Report, 2005).

- CNS depressant (sedatives, tranquilizers) side effects include increased drowsiness or sedation. CNS depressants can slow heart rate and respiration when combined with prescription pain...
medications, some types of OTC cold/allergy medications, or alcohol. Rapid discontinuation of sedatives or tranquilizers can lead to seizures, some of which can be life-threatening (NIDA Report, 2005).

- Effects of stimulant medications include increases in alternateness, attention and energy; physiologic effects also include elevated heart rate, blood pressure, increased respiration, suppressed appetite, and sleep deprivation. Frequent use of stimulants during a short period of time can lead to feelings of hostility or paranoia. Large doses can lead to irregular heartbeat and high body temperature, as well as potential for heart failure or seizures. Stimulant withdrawal symptoms can include fatigue, depression, and disrupted sleep cycles (NIDA Report, 2005).

Other adverse consequences associated with regular NMUPD over a long period of time include hormonal & immune system effects, physiological dependence, and increased sensitivity to pain. These long-term effects can lead to an increase in physical disability related to these subsequent medical conditions (Manchikanti & Singh, 2008).

**Dependence**

NMUPD is associated with a greater likelihood of developing dependence (Blanco et al., 2007; Colliver, Kroutil, Dai, & Gfroerer, 2006; McCabe, West, Morales, Cranford, & Boyd, 2007; SAMHSA, 2011), particularly for adolescents who begin use earlier in adolescence, some data suggest age 16 (Colliver et al., 2006), others suggest age 13 (McCabe et al., 2007). Opioid analgesics, which are in the pain reliever category of prescription drugs, are more likely to lead to dependence. In 2004, 1 in 3 adolescents in drug treatment had a diagnosis of prescription drug abuse or dependence (Colliver et al., 2006). National survey data suggest that adolescent females may be at greater risk of dependence on prescription drugs compared to their male counterparts. There are several hypothesized reasons for this difference, including potentially greater pharmacologic sensitivity in females, as well as greater access to prescription drugs by females since they are more likely to be prescribed medications (Cotto et al., 2010).

**Association with Psychiatric Conditions**

NMUPD is associated with increased risk of developing psychiatric and other medical conditions (Hernandez & Nelson, 2010; Strassels, 2009), including depression, anxiety, ADHD and mania. Hall and colleagues (2010) found that among a sample of 723 adolescents in residential care for antisocial behavior, those who endorsed high levels of anxiety and depression also reported significantly greater amount of sedative/anxiolytic misuse compared to adolescents who did not report high levels of anxiety and depression. Several studies have demonstrated a link between major depressive disorder and greater NMUPD (Havens, Young, & Havens, 2011; Manchikanti & Singh, 2008; Schepis & Krishnan-Sarin, 2008; Subramaniam & Stitzer, 2009); however it is unknown if this indicates a directional relationship, or whether another factor might account for both conditions. Research has found an association between illicit drug use and increased risk of suicide, however, however this has not been directly linked with NMUPD (Bohnert, Roeder & Ilgen, 2010). A study of treatment-seeking opiate dependent adolescents found that prescription drug opioid users endorsed higher rates of ADHD and manic episodes compared to adolescent heroin users. Both groups of adolescents reported high scores on a measure of depression (Subramaniam & Stitzer, 2009). Additional research is needed to determine whether certain classes of prescription drugs are related to different types of psychiatric or other medical conditions.

**Cognitive Changes**

Evidence from a study using functional Magnetic Resonance Imaging (fMRI) with 10 individuals with PD opioid dependence and 10 matched healthy controls found that opioid dependence was associated with structural and functional changes in the brain. The regions that appear to be affected include brain regions responsible for the regulation of affect and impulse control, as well as the centers of the brain involved in reward and motivation functions (Upadhyay et al., 2010). The sample sizes used in fMRI studies are typically small and therefore the generalizability of the findings is not known.
Psychosocial Consequences: Nonmedical Use of Prescription Drugs

Delinquency/and or Violent Behavior
Several studies have demonstrated a link between violent or delinquent behavior (Catalano, White, Fleming, & Haggerty, 2011; Hall, Howard, & McCabe, 2010; Harrell & Broman, 2009; McCauley et al., 2010; Sung, Richter, Vaughan, Johnson, & Thom, 2005) and NMUPD. The direction of the relationship (e.g., NMUPD leads to increased violent/delinquent behavior; delinquent behavior leads to future NMUPD) has not been established. However, in a longitudinal study of adolescents assessed from grade 10 to age 20, the only unique predictor of nonmedical opiate prescription drug use was violent behavior. This relationship remained significant after accounting for licit (alcohol, tobacco) and illicit (marijuana, cocaine/crack, psychedelics, heroin) drug use (Catalano et al., 2011).

Academic Functioning
Greater misuse of prescription drugs is associated with lower levels of educational attainment (Harrell & Broman, 2009). Adolescents reporting greater rates of NMUPD also demonstrate poorer academic performance (McCabe & Boyd, 2005; Schepis & Krishnan-Sarin, 2008), and a greater likelihood of school drop-out (Havens et al., 2011; Wu, Pilowsky, & Patkar, 2008). Due to the cross-sectional design of these research studies it is not possible to rule out that poorer academic functioning occurs prior to the onset of NMUPD or that another factor is associated with both poor academic functioning and NMUPD.

Economic Burden
The economic burden of NMUPD has been estimated to be $9.5 billion for 2005 (Hernandez & Nelson, 2010). These costs include arrests, legal and adjudication costs, as well as correctional facilities costs associated with NMUPD. Economic loss associated with decreased work productivity due to disability, death and withdrawal from the workforce is also included. Additionally, NMUPD users are more likely to use medical services than non-users (Hernandez & Nelson, 2010; Strassels, 2009).

References


