National Laboratory Certification Program

DRUG TESTING MATTERS

November 2012

Opioids: Prescription

This article is the first in a continuation of the Drug Testing Matters series on opioids that was initiated in December 2011. The first four parts address information related to the opiates. This article and the articles to follow will present additional information on prescription drug abuse, the fentanyl family of opioids, and other opioids.

Introduction

The Substance Abuse and Mental Health Services Administration (SAMHSA) Mandatory Guidelines for Federal Workplace Drug Testing Programs (1) (the Guidelines) specify the technical standards for the federal workplace drug testing program. The Guidelines specify that drug testing may be accomplished only using urine specimens and only for the parent drugs or metabolites of marijuana, cocaine, opiates, amphetamines, and phencyclidine.

However, federal agencies are allowed to test a specimen collected under the authority of the Guidelines for any drugs listed in Schedule I or II of the Controlled Substances Act (2) if certain requirements are met (3). In addition, SAMHSA continues to evaluate the possibility of allowing testing of alternative specimen matrices and additional drugs under the Guidelines. This article focuses on the prescription drug problem and the actions being taken to stem the increasing tide of opioid abuse.

Abuse of Prescription Medications

In some countries, including the United States, nonmedical use of prescription drugs is more prevalent than the use of any illicit drug other than cannabis. The most common misused prescription drugs are opioids (4). In the United States, the problem has reached crisis proportions—more than 26,000 overdose deaths occur per year, with most attributed to nonmedical opioid use. As stated in congressional testimony by Massachusetts Representative Stephen Lynch, "If that many people died from avian flu or some other virus, it would make headlines around the world (5)."

In the past 10 years, more than 100,000 people in the United States have died from overdoses involving prescription opioids. The number now exceeds deaths involving heroin and cocaine combined (see Figure 1) (6). The drastic rise in the numbers of fatal overdoses and treatment admissions paralleled the increase in sales of prescription opioids over the past decade (see Figure 2) (7).

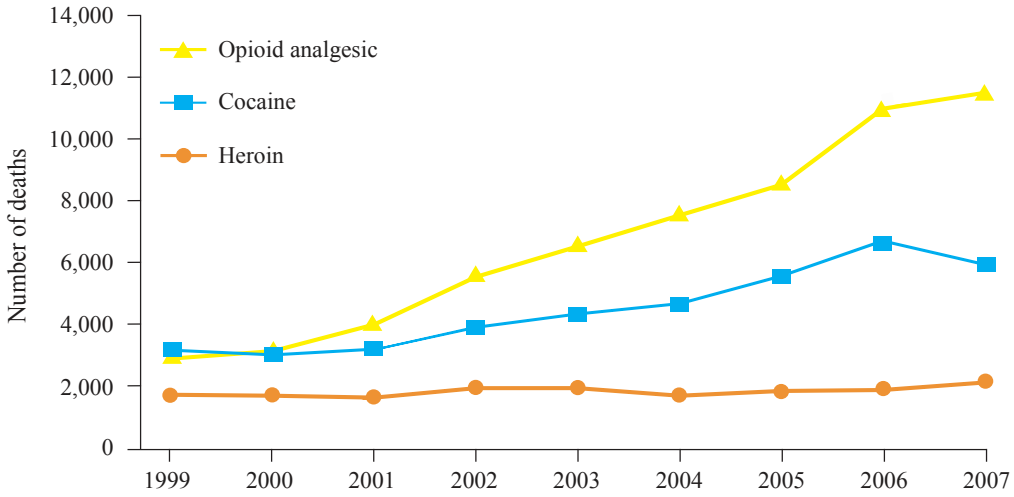

Figure 1. Unintentional drug overdose deaths by major type of drug, United States, 1999–2007

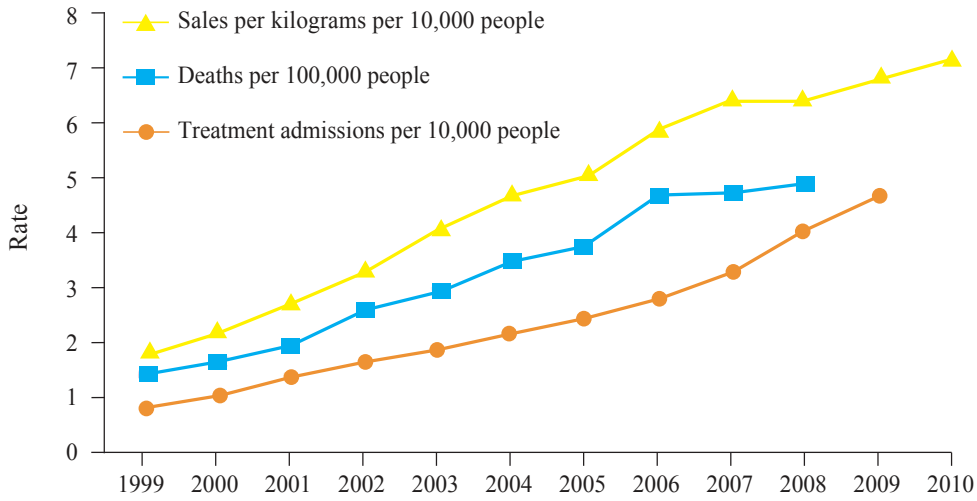

Figure 2. Rates of prescription painkiller sales, deaths, and substance abuse treatment admissions (1999–2010)

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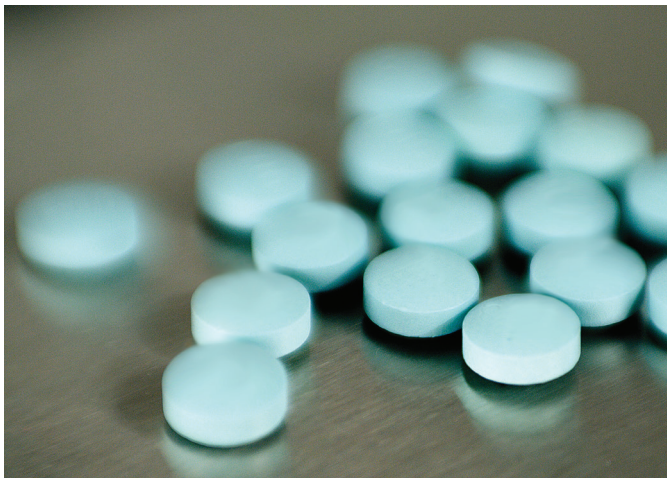


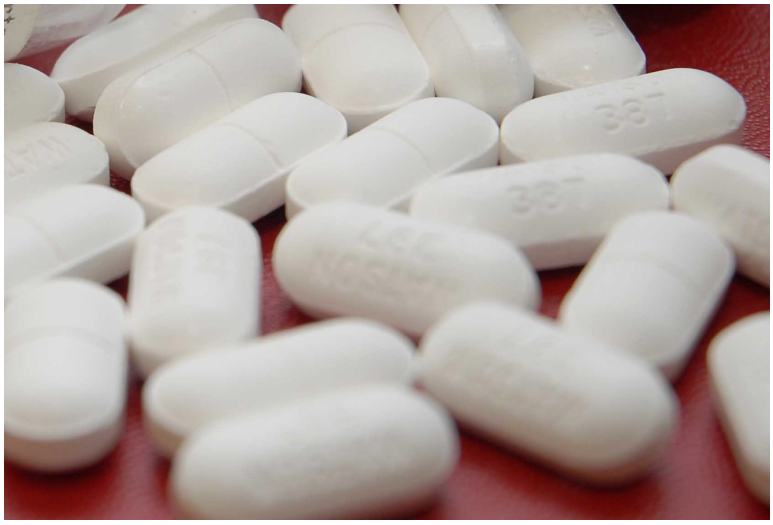
About one sixth of the people aged 12 and older who started drug use in 2010 began with abuse of prescription painkillers from various sources (8). The 2008 Department of Defense survey on health behaviors (9) shows a significant increase in drug use, primarily attributed to changes in reporting of prescription drug abuse. The Drug Abuse Warning Network (DAWN) Report (10) shows that the estimated number of emergency room visits involving nonmedical use of narcotic pain relievers increased from 166,338 in 2004 to 425,247 in 2010, an increase of 156%. Emergency room visits were highest for oxycodone and hydrocodone. In 15 states, the number of deaths from prescription medications now exceeds the number of traffic fatalities (11). In November 2006, the Food and Drug Administration (FDA) issued a public health advisory stating that methadone use in pain control may result in life-threatening cardiac and respiratory changes and death (12).

According to the National Center for Health Statistics (NCHS) Health E-Stats publication, poisoning by methadone increased 66% from 19,741 in 1999 to 32,691 in 2005. During the same period, methadone deaths increased 468% to 4,462 (14% of all poisonings). Overdoses were once almost always due to heroin use but are now increasingly due to prescription opioids (6). Methadone has been noted to be responsible for a high proportion of deaths. Although only 5% of opioid prescriptions were for methadone, that opioid was responsible for about one third of the opioid-related deaths (13). Other opioids also present problems, and the Center for Substance Abuse Research recently published a warning concerning an emerging epidemic of buprenorphine abuse (14).

Opioids create the typical problems of addiction. There are the risks of overdosing, the possibility of purchasing drugs that are cut or adulterated with toxic substances, the possibility of purchasing material that does not contain the drug needed, or the possibility of an insoluble substance within a parenteral preparation. In addition, there are the risks of infection with HIV, hepatitis B and C, or other diseases from sharing needles. Chronic users of drugs by parenteral means may develop collapsed veins, infections of the heart lining and valves, liver disease, and abscesses. In many cases, the drug user is generally debilitated and has many health problems. Recent information (15) indicates a risk of blackmail following orders of online drug prescriptions. The scammers sell the drugs online and then pose as Drug Enforcement Administration (DEA) agents to ask the purchaser to pay to take care of their "problem" with the purchase or risk prosecution.

Synthetic opioid analgesics do not necessarily have the phenanthrene structure of the opiates that were covered in the December 2011 issue of *Drug Testing Matters*. However, they do possess most of the properties of the naturally occurring opiates and act as agonists (or antagonists) at the same receptors. The pharmacological effects vary based on the interaction at the receptors. For example, buprenorphine is a partial agonist at the mu receptor and an antagonist at the kappa receptor. The effects of these opioids are similar to those of the opiates and include symptoms such as shallow breathing, slow heartbeat, seizure (convulsions), cold, clammy skin, confusion, severe weakness or dizziness, constipation, headache, and anxiety.

Action Being Taken to Reduce Abuse



The Office of National Drug Control Policy (ONDCP) has developed a plan within the United States to stem the rapidly developing prescription drug abuse crisis. The plan is an adjunct to the National Drug Control Strategy and presents four actions to reduce the abuse of prescription medications (16). First, education to increase awareness about the dangers of prescription drug abuse is critical for both the public and for health care providers. Second, prescription drug monitoring programs will help to identify "doctor shoppers," therapeutic duplication, and other abuses. Third, the development of appropriate drug disposal programs may help to limit the diversion of drugs, as most nonmedical users appear to be getting the drugs from family and friends. Fourth, it is important to provide law enforcement agencies with the support and tools they need to expand their efforts to shut down "pill mills" and to stop "doctor shoppers." Various federal agencies have been assigned responsibilities to accomplish the goals.

Model drug laws are available through the National Alliance for Model State Drug Laws (NAMSDL). These may be used to assist states in the development of appropriate laws to reduce abuse of prescription medications (17). NAMSDL reports that, as of January 2012, 40 states had implemented prescription monitoring programs and 48 states had enacted legislation. Most states have enacted authority to monitor drugs in Schedules II, III, and IV. A study of Schedule II opioids and stimulants completed for NAMSDL in 2003 indicated that monitoring programs do reduce abuse of prescription drugs, possibly by changing prescribing or dispensing behavior.

The American Society of Addiction Medicine (ASAM) provides guidance for health care professionals on the use of opioids for pain relief and states that the diagnosis must include a clear and reasonable judgment that pain exists and opioids are indicated. Opioids should be prescribed in a lawful and clinically sound manner and the patient monitored at reasonable intervals to confirm, as much as possible, that the medications are used as prescribed and that the goals of treatment are met (18). ASAM continues with a number of other recommendations to reduce abuse of the opioids.

Pharmaceutical companies have an important role to play in fighting prescription drug abuse (19). In 2010, Purdue Pharma released a new version of the drug OxyContin. The new formulation is resistant to crushing and cutting to make it more difficult to prepare for snorting or injecting, thereby reducing the immediate effect. Acura Pharmaceuticals has incorporated a substance in pills that forms a gel when the drug is dissolved. The gel will not go through a needle. The company also has formulated Oxecta (oxycodone) to produce an intense nasal irritation when pills are crushed and snorted. Other changes are in development and include pills with a consistency of gummy bears, which makes them difficult to crush and drugs that must be activated by digestive enzymes to prevent use by snorting or injection.

Summary

Prescription drug abuse is the fastest growing drug problem in the United States. The federal government, public health organizations, pharmaceutical companies, and others have implemented a variety of programs and actions to reduce the abuse of prescription opioids and to reduce the impact on abusers and health care utilization. Of particular interest to *Drug Testing Matters* is that federal agencies are allowed to test their employee specimens collected under the authority of the Guidelines for any Schedule I or II drugs. However, while many prescription opioids are Schedule II and may be tested if proper procedure is followed, several heavily abused opioids, such as buprenorphine and propoxyphene, are Schedule III or above and are not subject to federally regulated workplace drug testing.

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Richard Hilderbrand, Ph.D., has over 40 years of experience in the field of biochemistry, which includes the toxicology of drugs and other substances in humans as well as testing for drugs of abuse and performance enhancing substances. He has overseen and directed drug testing programs for the U.S. Navy, the Department of Defense, the Substance Abuse and Mental Health Services Administration (SAMHSA), and the U.S. Anti-Doping Agency (USADA). He has worked in drug-testing laboratories accredited by all those agencies, including serving as the Responsible Person of a laboratory certified by the Department of Health and Human Services (HHS). He is the author of 1 book, 7 book chapters, 11 peer-reviewed articles, and numerous reports and presentations concerning testing of biological specimens. He is currently retired and serves as a consultant to and inspector for the National Laboratory Certification Program (NLCP).