

**DEPARTMENT OF HEALTH AND HUMAN SERVICES**

**NATIONAL INSTITUTES OF HEALTH**

**America's Addiction to Opioids: Heroin and Prescription Drug Abuse**

**Witness appearing before the**

**Senate Caucus on International Narcotics Control**

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Good Morning, Madam Chair and members of the Caucus. Thank you for inviting the National Institute on Drug Abuse (NIDA), a component of the National Institutes of Health (NIH), to participate in this important hearing and contribute what I believe will be useful insights into the growing and intertwined problems of prescription pain relievers and heroin abuse in this country.

## Background

The abuse of and addiction to opioids such as heroin, morphine, and prescription pain relievers is a serious global problem that affects the health, social, and economic welfare of all societies. It is estimated that between 26.4 million and 36 million people abuse opioids worldwide,<sup>1</sup> with an estimated 2.1 million people in the United States suffering from substance use disorders related to prescription opioid pain relievers in 2012 and an estimated 467,000 addicted to heroin.<sup>2</sup> The consequences of this abuse have been devastating and are on the rise. For example, the number of unintentional overdose deaths from prescription pain relievers has soared in the United States, more than quadrupling since 1999. There is also growing evidence to suggest a relationship between increased non-medical use of opioid analgesics and heroin abuse in the United States.<sup>3</sup>

To address the complex problem of prescription opioid and heroin abuse in this country, we must recognize and consider the special character of this phenomenon, for we are asked not only to confront the negative and growing impact of opioid abuse on health and mortality, but also to preserve the fundamental role played by prescription opioid pain relievers in healing and reducing human suffering. That is, scientific insight must strike the right balance between providing maximum relief from suffering while minimizing associated risks and adverse effects.

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<sup>1</sup> UNODC, World Drug Report 2012. <http://www.unodc.org/unodc/en/data-and-analysis/WDR-2012.html>

<sup>2</sup> Substance Abuse and Mental Health Services Administration, Results from the 2012 National Survey on Drug Use and Health: Summary of National Findings-

## Abuse of Prescription Opioids: Scope and Impact

Prescription opioids are one of the three main broad categories of medications that present abuse liability, the other two being stimulants and central nervous system (CNS) depressants.

Several factors are likely to have contributed to the severity of the current prescription drug abuse problem. They include drastic increases in the number of prescriptions written and dispensed, greater social acceptability for using medications for different purposes, and aggressive marketing by pharmaceutical companies. These factors together have helped create the broad “environmental availability” of prescription medications in general and opioid analgesics in particular.

To illustrate this point, the total number of opioid pain relievers prescribed in the United States has skyrocketed in the past 25 years **(Fig. 1)**.<sup>4</sup> The number of prescriptions for opioids (like hydrocodone and oxycodone products) have escalated from around 76 million in 1991 to nearly 207 million in 2013, with the United States their biggest consumer globally, accounting for almost 100 percent of the world total for hydrocodone (e.g., Vicodin) and 81 percent for oxycodone (e.g., Percocet).<sup>5</sup>

This greater availability of opioid (and other) prescribed drugs has been accompanied by alarming increases in the negative consequences related to their abuse.<sup>6</sup> For example, the estimated number of emergency department visits involving nonmedical use of opioid analgesics

2007<sup>8</sup>; and overdose deaths due to prescription opioid pain relievers have more than tripled in the past 20 years, escalating to 16,651 deaths in the United States in 2010.<sup>9</sup>

In terms of abuse and mortality, opioids account for the greatest proportion of the prescription drug abuse problem. Deaths related to prescription opioids began rising in the early part of the 21<sup>st</sup> century. By 2002, death certificates listed opioid analgesic poisoning as a cause of death more commonly than heroin or cocaine.<sup>10</sup>

Because prescription opioids are similar to, and act on the same brain systems affected by, heroin and morphine (**Fig.2**), they present an intrinsic abuse and addiction liability, particularly if they are used for non-medical purposes. They are most dangerous and addictive when taken via methods that increase their euphoric effects (the “high”), such as crushing pills and then snorting or injecting the powder, or combining the pills with alcohol or other drugs. Also, some people taking them for their intended purpose risk dangerous adverse

osteoarthritis (approximately 17 million).<sup>12</sup> Even if a small percentage of this group develops substance use disorders (a subset of those already vulnerable to developing tolerance and/or clinically manageable physical dependence<sup>13</sup>), a large number of people could be affected. Scientists debate the appropriateness of chronic opioid use for these conditions in light of the fact that long-term studies demonstrating that the benefits outweigh the risks have not been conducted. In June 2012, NIH and FDA held a joint meeting on this topic,<sup>14</sup> and now FDA is requiring companies who manufacture long-acting and extended-release opioid formulations to conduct post-marketing research on their safety. .P << //TT00TcTf 0 12 Tw 0.36 0 Td [21

experience by taking the drug in ways other than those prescribed. For example, extended-release oxycodone is designed to release slowly and steadily into the bloodstream after being taken orally in a pill; this minimizes the euphoric effects. People who abuse pills may crush them to snort or inject which not only increases the euphoria but also increases the risk for serious medical complications, such as respiratory arrest, coma, and addiction. When people tamper with long-acting or extended-release medicines,



since 1999 is greater among women: Deaths from opioid



abuse, like prescription opioid abuse, is dangerous both because of the drug's addictiveness and because of the high risk for overdosing. In the case of heroin, this danger is compounded by the lack of control over the purity of the drug injected and its possible contamination with other drugs (such as fentanyl, a very potent prescription opioid that is also abused by itself).<sup>30</sup> All of these factors increase the risk

multidisciplinary approach using both human and animal studies to examine factors (including pain itself) that predispose or protect against opioid abuse and addiction. Funded grants cover clinical neurobiology, genetics, molecular biology, prevention, treatment, and services research. This type of information will help develop screening and diagnostic tools that physicians can use to assess the potential for prescription drug abuse in their patients. Because opioid medications are prescribed for all ages and populations, NIDA is also encouraging research that assesses the effects of prescription opioid abuse by pregnant women, children, and adolescents, and how such abuse in these vulnerable populations might increase the lifetime risk of substance abuse and addiction.

Another important initiative pertains to the development of new approaches to treat pain. This includes research to identify new pain relievers with reduced abuse, tolerance, and dependence risk, as well as devising alternative delivery systems and formulations for existing drugs that minimize diversion and abuse (e.g., by preventing tampering and/or releasing the drug over a longer period of time) and reduce the risk of overdose deaths. New compounds are being developed that exhibit novel properties as a result of their combined activity on two different opioid receptors (i.e., mu and delta). Preclinical studies show that these compounds can induce strong analgesia but fail to produce tolerance or dependence. Researchers are also getting closer to developing a new generation of non-opioid-based medications for severe pain that would circumvent the brain reward pathways, thereby greatly reducing abuse potential. This includes compounds that work through a type of cannabinoid receptor found primarily in the peripheral nervous system. NIDA is also exploring the use of non-medication strategies for managing pain. An example is the use of “neurofeedback,” a novel modality of the general biofeedback approach, in which patients learn to regulate specific regions in their brains by getting feedback from real-time brain images. This technique has shown promising results for altering the perception of pain in healthy adults and chronic pain patients and could even evolve into a powerful psychotherapeutic intervention capable of rescuing the circuits and behaviors impaired by addiction.

**Developing More Effective Medications for Preventing Overdose Deaths**The opioid overdose antidote naloxone has reversed more than 10,000 overdose cases between 1996 and 2010,

according to CDC.<sup>33</sup> For many years, naloxone was available only in an injectable formulation and was generally only carried by medical emergency personnel.

program, can effectively maintain abstinence from other opioids and reduce harmful behaviors; we believe their gradual onset and long duration contribute to this ability to “stabilize” patient behavior.

Scientific research has established that medication-assisted treatment of opioid addiction is associated with decreases in the number of overdoses from heroin abuse,<sup>35</sup> increases retention of patients in treatment and decreases drug use, infectious disease transmission, and criminal activity. For example, studies among criminal offenders, many of whom enter the prison system with

drug abuse problems, showed that methadone treatment begun in prison and continued in the community upon release extended the time parolees remained in treatment, reduced further drug use, and produced a three-fold reduction in criminal activity (**Fig. 5**). Investment in medication-assisted treatment of opioid addiction also makes good economic sense. According to a 2005 published analysis that tracked methadone patients from age 18 to 60 and included such variables as heroin use, treatment for heroin use, criminal behavior, employment, and healthcare utilization, every dollar spent on methadone treatment yields \$38 in related economic benefits—seven times more than previously thought.<sup>36</sup>

Buprenorphine is worth highlighting in this context for its pioneering contributions to addiction treatment. NIDA-supported basic and clinical research led to the development of this compound, which rigorous studies have shown to be effective, either alone or in combination with naloxone, in significantly reducing opiate drug abuse and cravings.

The arrival of buprenorphine represented

under the Drug Addiction Treatment Act of 2000. Subutex contains only buprenorphine hydrochloride. This formulation was developed as the initial product. The second medication, Suboxone, contains naloxone to guard against misuse (by initiating withdrawal if the formulation is injected). Subutex and Suboxone are less tightly controlled than methadone because they have a lower potential for abuse and are less dangerous in an overdose. As patients progress in their therapy, their doctor may write a prescription for a take-home supply of the medication. To date, of the nearly 872,615 potential providers registered with the Drug Enforcement Administration (DEA), 25,021 registered physicians are authorized to prescribe these two medications. The development of buprenorphine and its authorized use in physicians' offices gives opioid-addicted patients more medical options and extends the reach of addiction medication to remote populations.

Medication-assisted treatments remain grossly underutilized in many addiction treatment settings, where stigma and negative attitudes (based on the misconception that buprenorphine or methadone “substitute a new addiction for an old one”) persist among clinic staff and administrators. This leads to insufficient dosing or limitations on the duration of use of these medications (when they are used at all), which often leads to treatment failure and the perception that the drugs are ineffective, further reinforcing the negative attitudes toward their use.<sup>37</sup> Policy and regulatory barriers also can present obstacles.

### Integrating Drug Treatment into Healthcare Settings

Medication-assisted treatment will be most effective when offered within the larger context of a high-quality delivery system that addresses opioid addiction not only with medication but also with behavioral interventions to support treatment participation and progress, infectious disease identification and treatment (especially HIV and HCV), screening and treatment of co-morbid psychiatric diseases, and overdose protection (naloxone). NIDA’s research over the last two decades has provided us with evidence that a high quality treatment system to address opioid addiction must include all these components, yet there are currently very few systems in the

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<sup>37</sup> Knudsen, H.K.; Abraham, A.J.; and Roman, P.M. Adoption and implementation of medications in addiction treatment programs. *J Addict Med* 2011; 5:21-27.

United States that provide this bundle of effective services.<sup>38</sup> Health care reform—with a focus on both expanding access to treatment and improving the quality of care—offers hope that we may be better able to integrate drug treatment into healthcare settings and offer comprehensive treatment services for opioid addiction. We also are examining ways to use health care reform and the focus on health promotion and wellness to pay for and deliver prevention interventions targeted at children, adolescents, young adults, and high-risk adult populations like those with chronic pain or returning veterans.

### Prevention, Education, and Outreach

Because prescription drugs are safe and effective when used properly and are broadly marketed to the public, the notion that they are also harmful and addictive when abused can be a difficult one to convey. Thus, we need focused research to discover targeted communication strategies that effectively address this problem. Reaching

training, including medical students and resident physicians in primary care specialties (e.g., internal medicine, family practice, and pediatrics). NIDA has also developed, in partnership with the Office of National Drug Control Policy (ONDCP), two online continuing medical  
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but they are also powerful clinical allies. Therefore, it is imperative that we strive to achieve a balanced approach to ensure that people suffering from chronic pain can get the relief they need while minimizing the potential for negative consequences. We support the development and implementation of multipronged, evidence-based strategies