
A Reassessment of Trends in the Medical Use and Abuse of Opioid Analgesics and Implications for Diversion Control: 1997-2002

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Abstract

This study updates a previous analysis of trends in medical use and abuse of opioid analgesics, and provides data from 1997 through 2002. Two research questions were evaluated: 1) What are the trends in the medical use and abuse of frequently prescribed opioid analgesics used to treat severe pain, including fentanyl, hydromorphone, meperidine, morphine, and oxycodone? 2) What is the abuse trend for opioid analgesics as a class compared to trends in the abuse of other drug classes? Results demonstrated marked increases in medical use and abuse of four of the five studied opioid analgesics. In 2002, opioid analgesics accounted for 9.85% of all drug abuse, up from 5.75% in 1997. Increase in medical use of opioids is a general indicator of progress in providing pain relief. Increases in abuse of opioids is a growing public health problem and should be addressed by identifying the causes and sources of diversion, without interfering with legitimate medical practice and patient care.

Key Words

Balance, drug abuse, drug diversion, medical use, opioid analgesics, pain management

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Introduction

Despite increased attention to pain management over the last two decades, inadequate pain relief continues to be a major public health concern in the U.S.¹⁻⁹ Although there are pharmacologic and non-pharmacologic therapies for pain management, opioid analgesics remain the cornerstone for the treatment of severe pain¹⁰⁻¹⁴ and are recognized by the World Health Organization as essential drugs for pain management.¹⁵ In the U.S., many opioid analgesics are approved as safe and effective for use under medical supervision.

In addition to their value as analgesics, opioids have an abuse potential, as do all medications that are "controlled" under the U.S. Controlled Substances Act.¹⁶ The production and distribution of opioid analgesics are strictly regulated by federal and state laws and regulations.

An earlier descriptive analysis by Joranson et al. suggested a low and steady rate of abuse of opioid analgesics in spite of their increasing medical use from 1990 to 1996.¹⁷ Recently reported increases in abuse and diversion of prescription medications¹⁸⁻²² and extensive media coverage²³⁻²⁸ warrant an update of our previous study to determine the current extent of opioid analgesic abuse in the context of their medical use.

Methods

This study describes 1) the trends from 1997 to 2002 in the medical use and abuse of five opioid analgesics frequently prescribed to treat severe pain, specifically fentanyl, hydromorphone, meperidine, morphine, and oxycodone, and 2) the abuse trend of opioid analgesics as a class compared to trends for other drug classes. The five drugs evaluated for this study are approved in the United States for treating severe pain, are frequently prescribed, and are marketed only as analgesics.^{12,13,29,30} Other opioid analgesics that are frequently prescribed, such as codeine and hydrocodone, were not included because they are not indicated for the treatment of severe pain; methadone was not included because it is marketed for the treatment of addiction as well as pain.

Data Systems

The Automation of Reports and Consolidated Orders System (ARCOS), sponsored by the Drug Enforcement Administration (DEA), was the indicator of medical use. The Drug Abuse Warning Network (DAWN) Emergency Department (ED) information, sponsored by the Office of Applied Studies (OAS) in the Substance Abuse and Mental Health Services Administration (SAMHSA), was the indicator of abuse. Both of these systems have been described previously and used as indicators of medical use

and abuse,^{17,31-34} with one author using a methodology similar to the Joranson et al. study.³⁴

Automation of Reports and Consolidated Orders System.

ARCOS data measure the amounts of controlled substances legitimately distributed to the retail level (expressed in total grams and grams per 100,000 population).³⁵ In 1997, the DEA made changes to their data collection methodology that resulted in significantly increased quantities reported to ARCOS. Consequently, it would not be valid to compare ARCOS data prior to 1997 with subsequent data. For this reason, the study timeline and data collection begins in 1997. In the interest of assuring public access in a timely manner to this important source of data, the DEA Office of Diversion Control has recently made ARCOS reports available on its website, at www.deadiversion.usdoj.gov/arcos/index.html.

Limitations of the ARCOS Data. There are several limitations of the ARCOS data that can influence the findings of this study. First, these data over-represent the amounts that are distributed for human use because they include unknown quantities used for veterinary purposes. Second, these data over-represent the amounts used for analgesia because they include unknown quantities used for other indications, such as anesthesia. Finally, these data over-represent amounts dispensed or consumed by patients because they include (a) amounts re-ordered to replace drugs stolen from pharmacies or other retail-level dispensers, and (b) amounts distributed to the retail level that were not actually dispensed or consumed by patients in the same year.

Drug Abuse Warning Network.

DAWN is a national surveillance system, begun in 1972, that reports data annually on drug-related visits to a national probability sample of hospital EDs located throughout the coterminous United States. It is a large-scale ongoing retrospective survey of medical records that provides information about the health consequences of drug abuse that result in visits to hospital EDs. Participating institutions are non-federal, short-stay general medical and surgical hospitals that operate 24-hour EDs. The DAWN system, using a statistical weighting methodology, estimates the national number of episodes and mentions. A DAWN episode is a single visit to the ED involving drug abuse by a person between the ages of 6 and 97. Number of episodes does not equate with number of patients because one patient could have multiple visits to the ED in a year. A DAWN drug mention refers to a single substance that was recorded during a DAWN ED episode. Up to 4 substances can be reported for each ED episode, in addition to alcohol. The estimated number of

drug mentions serves as the metric for abuse data in this study, as a proxy for a true measure of abuse prevalence.

In response to concerns about the DAWN system,^{17,36,37} the OAS revised and improved the DAWN method for estimation and classification of drugs retrospectively to 1994, superseding the data in previously published reports. Consequently, it would not be valid to compare DAWN data in this report to those in our previous study.¹⁷ The changes by the OAS have improved reporting accuracy and classification consistency, and also included an "overhaul and replacement of the DAWN drug vocabulary" (p. 24)³⁸ to identify more drugs. We incorporated SAMHSA's new and more pharmacologically correct drug vocabulary into our study design. In addition, the DAWN methodology now estimates the number of mentions for morphine and heroin and reports them separately. This change distinguishes between an important prescription opioid analgesic and a drug that is not approved for medical use in the United States. Additional information about the DAWN system is available on the SAMHSA website, at www.dawninfo.net.

To conform to current scientific terminology and to distinguish between licit and illicit production, we made several additional changes to the drug classifications used in DAWN reports, including:

1. For "Narcotic,"
 - a. Moved phenacetin and aspirin/ethoheptazine to "Non-Opioid Analgesics" because they do not contain an opioid analgesic.
 - b. Renamed "Narcotic" as "Opioid" to reflect medical, rather than legal, terminology.
2. For "Major Substances of Abuse,"
 - a. Moved amphetamines, ketamine, and inhalants to "Other Drugs" because they are also licitly produced.
 - b. Renamed "Major Substances of Abuse" as "Illicit Drugs" to indicate that the remaining drugs in this category come primarily from the illicit market.
3. Moved methaqualone from "Psychotherapeutic Agents" to "Illicit Drugs" because it has not been licitly produced in the United States since 1984.

As a result, five drug categories were created for this study: opioid analgesics/combinations, including in combination with other drugs such as aspirin and acetaminophen (called "Opioid Analgesics"); non-opioid analgesics/combinations, including in combination with other drugs such as caffeine and butalbital (called "Non-Opioid Analgesics"); Alcohol-in-Combination; Illicit Drugs;

and Other Drugs. [Table 1](#) includes the individual drugs and classes that make up these five categories.

Limitations of the DAWN Data. The DAWN ED methodology has several limitations that are relevant to this study. First, the DAWN system underestimates the number of drug mentions because the methodology limits identification to a maximum of four drugs during each ED episode, in addition to alcohol. Second, the DAWN reports do not distinguish between a drug mention and causation, so there is no way to determine whether the drugs identified during an episode caused the ED visit. Third, the medical records and toxicology reports, which are the basis for the DAWN data, do not, by themselves, differentiate licit from illicit drug mentions. For example, heroin is metabolized into morphine³⁹ and alpha-methylfentanyl (China White) is metabolized into fentanyl.⁴⁰

Finally, some DAWN mentions have high relative standard errors (RSEs). This imprecision is due primarily to two factors: 1) drug-related visits to hospital EDs are a low frequency phenomenon, such as in 2002 when less than 1% of the 102,000,000 ED episodes related to drug use,⁴¹ and 2) a retrospective data collection procedure is used to obtain information from toxicology reports and medical charts prepared by a number of hospital staff who treat patients admitted to the ED. Any variability between staff and facilities regarding the accuracy, completeness, and consistency with which the information is entered into these records can affect the validity and reliability of DAWN data. The RSEs for the five study drugs in 2002 ranged from 19.7 for morphine to 71.6 for hydromorphone.^{42,43} This means, for example, that the 2002 DAWN estimate of 2,667 mentions for hydromorphone could actually range between -1,076 and 6,410 mentions,⁴⁴ which makes the estimate for hydromorphone extremely imprecise.⁴⁵

Results

What Are the Recent Trends in Medical Use and Abuse of the Five Opioid Analgesic Study Drugs?

ARCOS: Medical Use. [Table 2](#) presents the trends in medical use of the five study drugs from 1997 through 2002. With the exception of meperidine, the medical use of each opioid analgesic increased in both total amount and amount adjusted for population. Total use of oxycodone (402.90%) increased the most, followed by fentanyl (226.68%). Meperidine was the only study drug to show a decrease in medical use over the six-year study period.

DAWN: Abuse. The abuse trends of the five selected opioid analgesics from 1997 through 2002 are presented in [Table 3](#). The number of mentions increased for all study drugs except for meperidine. Fentanyl mentions increased

the most (641.87%) but represented the second lowest proportion of all DAWN mentions in 2002 (0.124%).

After fentanyl, oxycodone mentions increased the most (346.87%) and represented the highest proportion of all DAWN mentions in 2002 (1.851%); this percentage more than tripled during the study period. Oxycodone was the only study drug to exceed 1% of total DAWN mentions. Morphine abuse mentions increased by 113.46%, and its percentage of total DAWN mentions nearly doubled during the study period. In 2002, combined mentions of the five study drugs accounted for 25.23% of the Opioid Analgesics category, and 2.49% of total DAWN mentions. This compares to 1997 figures of 14.75% and 0.85%, respectively.

To What Extent Are Opioid Analgesics as a Class Involved in Drug Abuse?

Table 1 lists the drugs and drug classes contained in each of the five categories used in this study, and the percentage of total DAWN ED mentions that each category represented in 2002. Non-Opioid Analgesics was the smallest category, representing 5.93% of all DAWN mentions, followed by 9.85% for Opioid Analgesics. Illicit Drugs and Alcohol-in-Combination together accounted for more than half of all DAWN mentions.

Table 4 presents trends in abuse levels for the five drug categories from 1997 through 2002. Throughout most of the study period, Opioid Analgesics accounted for the lowest percent of total DAWN mentions of any of the drug categories. By 2002, however, Opioid Analgesics had surpassed Non-Opioid Analgesics in both number and percentage of mentions of all drug categories, and showed the greatest increase over the six-year study period (120.24%).

Discussion

In our previous study, the ARCOS and DAWN data for 1990 to 1996 showed steadily increasing medical use and relatively low and stable levels of abuse for the category of Opioid Analgesics and the five study drugs.¹⁷ At that time, we concluded that increased medical use of opioid analgesics did not appear to contribute to increased adverse health consequences.

In the present study, medical use of 4 of the 5 study drugs continued to increase from 1997 to 2002, especially for oxycodone and fentanyl. The increase in medical use of oxycodone was influenced by the introduction in 1996 of Oxy-Contin, a controlled-release formulation. The decline in medical use of meperidine by over 6% may signify growing awareness of its shortcomings: a short duration of action and conversion to a long-lived toxic metabolite.^{13,46,47}

During the same time, abuse of the category of Opioid Analgesics increased, as did 4 of the 5 study drugs, in particular oxycodone, fentanyl, and hydromorphone. Despite these increases, the study drugs continued to be a relatively small part of total DAWN mentions. This conclusion is even more apparent when compared to DAWN data for hydrocodone, an opioid analgesic not indicated for severe pain and, therefore, outside the scope of this study. Abuse of hydrocodone increased from 11,570 mentions in 1997 to 25,197 in 2002. The percent of total DAWN abuse mentions for hydrocodone in 2002 was 2.08%, higher than any of the five study drugs. In comparison, the categories of Illicit Drugs and Alcohol-in-Combination comprised about 55% of DAWN mentions in 2002. Total estimated mentions in the DAWN system increased by 29% during the study period, with about 60% of the increase related to alcohol and illicit drugs. According to these data, it is evident that in recent years increased medical use of several opioid analgesics is associated with increased abuse, a finding that is consistent with an excellent position statement developed recently by Zacny et al. for the College on Problems of Drug Dependence Task Force.¹⁸

Data are not available from the DAWN system to determine the specific causes of drug abuse episodes that are identified. A few possible explanations can be posited, however, for the increase in drug abuse as compared to the previous study. Between 1997 and 2002, there was a 28% increase in the number of multi-drug episodes seen by DAWN EDs,⁴⁸ which indicates increasing poly-drug use. It is possible that multi-drug episodes involve more than one opioid analgesic; thus, one episode could contribute several opioid analgesics to the total DAWN mentions. Another influence could be the availability of controlled substances as a result of increased diversion from criminal theft from pharmacies. Recent DEA pharmacy theft and loss statistics demonstrate that the amount of diverted OxyContin more than doubled between 2000 and 2002, from 218,339 dosage units to 506,711.⁴⁹ Although such information is not yet available for other opioid analgesics, these limited data suggest that pharmacy crime may be an important source of prescription medications that become involved in abuse episodes.

Previously, we stated that "if the abuse of opioid analgesics should increase, the sources of diversion should be addressed directly without interfering with medical availability of opioid analgesics, legitimate medical practices, or patient care" (p. 1713).¹⁷ It is important to understand the reasons for increased abuse, and whether the reasons involve prescribing for pain or other factors. The determinants of prescription drug abuse are complex, and there are numerous ways in which opioid analgesics become illicitly available to those who abuse them.

Understanding Sources of Diversion.

Prescription controlled substances become illicitly available and abused through "diversion," that is, activities of individuals who "transfer a controlled substance from a lawful to an unlawful channel of distribution or use" (p. 63).⁵⁰ Federal and state laws establish a system that attempts to deter diversion, and penalties are provided if registrants divert controlled substances.⁵¹ This is accomplished by registration of more than one million manufacturers, distributors, pharmacies, hospitals, nursing homes, and physicians who provide prescription controlled substances.⁵²

Despite the system of control, some diversion occurs through illegal activities of individuals inside and outside the healthcare system. For example, diversion occurs when registrants prescribe or dispense without a legitimate medical purpose, when healthcare employees steal from inventory, or when patients sell their medications. Diversion is also caused by non-registrants who obtain drugs from registrants under false pretenses, for example, "doctor shopping" or forgery, or through force, such as pharmacy theft. The amount of drugs diverted from each source is generally unknown.⁵² Nevertheless, the accurate identification of individual sources of diversion is critically important to guiding effective responses that do not interfere with legitimate practice and patient care.

Tracking Opioid Diversion.

Existing information systems should be used to identify diversion from registrants and patients.^{53,54} Several systems collect prescription data and can identify patients who are "doctor shoppers" as well as potentially errant prescribers. One such system, the Medicaid Drug Utilization Review system, is recommended by the federal government⁵⁵ and is available in all states. Prescription monitoring programs are available in 19 states,⁵⁶⁻⁵⁹ which cover half of the U.S. population.⁶⁰ The DEA's ARCOS reports to state agencies provide data on the amounts of many specific products that are distributed to the retail level by zip code, thus making identification of locations with rapidly increasing use for further analysis.⁶¹

Information is also available about thefts and losses from all registrants including pharmacies. Such losses are tracked using federally-required reports on DEA Form 106,^{62,63} which can be used to monitor the amounts of opioid analgesics, and any other controlled substance, stolen from pharmacies, hospitals, manufacturers, and distributors in every state. This information can and should be used to quantify this source of diversion, and to guide law enforcement efforts to address pharmacy crime, which is a federal offense.⁶⁴

Closer scrutiny of pharmacy theft data could also help to identify the extent of criminal diversion, which is a

significant source that does not involve the prescribing of opioids for pain management. Recent news articles have reported increases in pharmacy thefts, especially in Florida, Kentucky, Maine, Massachusetts, and Pennsylvania.⁶⁵ These reports suggest that some unknown (but knowable) amount of opioid analgesics is becoming illicitly available from pharmacy thefts and could be an important source of drugs involved in overdoses, which is supported by the recent DEA website posting of OxyContin pharmacy theft and loss statistics.⁴⁹

Finally, street-level law enforcement intelligence, undercover operations, arrest and probation reports, and crime laboratory examinations of drug evidence can be valuable sources of information about diversion.⁵⁴ For example, the DEA's action plan for addressing OxyContin diversion and abuse targets both registrants and non-registrants involved in illegal sales, pharmacy thefts, fraud, and abuse.⁶⁶

Addressing Diversion While Maintaining Balance. The choice of methods to address diversion is important, especially when diversion from registrants in the healthcare system is suspected; these choices should be guided by the principle of balance. Balance refers to the dual imperative of national drug control policy to address diversion without interfering in medical use medical use and patient care.^{67,68} The conceptual framework can help to guide responses to diversion. A balanced approach will have: 1) a high potential to identify and address the specific sources of diversion, and 2) a low, perhaps zero, potential to interfere with legitimate availability of pain medications, medical practice, and patient care. This conceptual framework can be used to clarify the roles of healthcare practitioners and law enforcement officials. Healthcare practitioners are responsible for assessing and treating pain, just as law enforcement is responsible for assessing and stopping diversion. Additionally, practitioners must avoid contributing to diversion just as law enforcement must avoid interfering in pain management.⁶⁹

Unbalanced approaches must be avoided not only because they may be ineffective, but also because they interfere in legitimate medical practice and patient care, especially at a time when pain is still significantly undertreated.^{1,2} Examples of unbalanced approaches would include a physician who stops prescribing opioids and refers all patients to pain specialists to obtain opioid prescriptions, or pharmacists who stop stocking pain medications without making alternative arrangements to fill legitimate prescriptions. In Massachusetts, following a spate of pharmacy robberies in 2001,⁶⁵ some drug stores pulled OxyContin from their shelves until the state Board of Pharmacy ordered them to carry the drug.²⁴ In 2002, however, after experiencing continued pharmacy thefts, the Board of Pharmacy modified this decision, allowing

pharmacies to decide whether or not to stock OxyContin as long as the pharmacy took steps to help patients obtain medications.⁷⁰

Although the use of criminal prosecutions to address unintentional diversion may well get to the source of diversion, it represents an extreme reaction that can have a profound impact. Registrants who have a clear intention to divert should be handled differently than those for whom intent is lacking. For example, the Uniform Controlled Substances Act provides immunity from civil and criminal liability for a pharmacist who dispenses based “on a reasonable belief that an order purporting to be a prescription was issued by a practitioner in the usual course of professional treatment” (p. 62).⁵⁰

Certain state statutes and regulations are not balanced, such as those that place restrictions on the amount of drug that can be prescribed regardless of patient need or medical judgment.⁷¹ Recent Medicaid regulations in some states have caused concern that, under such rules, it may be more difficult for patients to receive pain medications that they need.^{24,72}

Some media reports have used anecdotes to suggest that the legitimate prescribing and medical use of opioid analgesics is the main contributor to abuse, addiction, and overdose death, often failing to mention the important role of intentional misuse. Sensationalized coverage of drug abuse, which fails to recognize that prescription pain medications provide a great medical benefit to patients, sends an unbalanced message and can create fear that ultimately interferes with patient care. Intentional misuse of prescription controlled substances should not be allowed to compromise patient access to needed medications.

Opioid Abuse in a Larger Context

Abuse and diversion of prescription pain medications have a detrimental effect on individual and public health.^{19,20} It is essential to address the abuse of opioid analgesics, but it is important to keep in mind that substance abuse is not unique to opioid analgesics; substance abuse is a manifestation of the complex underlying problems of risky drug use by vulnerable individuals.⁷³

In 2002, the single category of Alcohol-in-Combination accounted for 17.14% of total DAWN mentions, compared to 9.85% for Opioid Analgesics. Because alcohol is only identified in DAWN when it is in combination with another reportable drug, DAWN mentions represent only a fraction of the health consequences of alcohol abuse.⁴² In addition, Illicit Drugs had almost four times as many DAWN mentions compared to Opioid Analgesics. These findings offer a different perspective than Zacny et al., who indicate that opioid analgesics have a similar extent of adverse

health consequences as illicit drugs.¹⁸ Although it is true that the number of DAWN mentions for the category of Opioid Analgesics is comparable to those of illicit drugs such as heroin and marijuana, this unfairly compares an entire drug category containing almost 30 prescription opioids to individual illicit drugs, rather than the entire category of Illicit Drugs. When morphine alone is compared to heroin, the percent of DAWN mentions for each of the drugs in 2002 was 0.23% and 7.73%, respectively. In fact, as shown in Table 3, in 2002 no single drug in our study represented a proportion of total DAWN mentions that came close to those of cocaine (16.46%), marijuana (9.87%), or heroin (7.73%).

There are also health consequences associated with non-opioid analgesics that are available over the counter and by prescription. It is estimated conservatively that there are 16,500 deaths every year related to the use of nonsteroidal anti-inflammatory drugs among patients with rheumatoid and osteoarthritis.⁷⁴ It has been suggested that chronic use of opioids for prolonged pain has “fewer life-threatening risks than does the long-term daily use of high-dose nonselective NSAIDs” (p. S213).⁷⁵

Study Limitations

As in our previous study,¹⁷ we did not use other drug abuse estimation systems to corroborate our findings because, to our knowledge, there are no other nationally representative information systems that permit the kind of detailed analysis of individual opioid analgesics that is possible with DAWN. We did not use the DAWN Medical Examiner (ME) system because it is not nationally representative, and because DAWN drug-related mortality data cannot differentiate between morphine, heroin, and codeine.³⁹ In addition, the aggregate data systems used in this study did not identify specific formulations or commercial products.

We initially attempted to compare the abuse and medical use of study drugs over time by using a proportional statistic to quantify the risk-benefit ratio for a particular drug over each year of the study period, with abuse indicating “risk” and medical use designating “benefit.” However, a number of factors deterred our use of such a statistic including the wide but unknown variation in potency of opioid products included in the aggregate ARCOS data. In addition, year-to-year changes in a proportional statistic could be due either to changes in the number of abuse mentions or the number of grams used. Zacny et al. created such a metric using DAWN ED mentions and IMS HEALTH, Inc. data, representing abuse and legitimate use, respectively, but recognized that to accurately interpret the ratio changes for a particular drug one must know the numerator and denominator comprising the ratio.¹⁸ However, there are drawbacks to the use of such a ratio to compare different drugs. For example, in 1999 hydromorphone had the largest ratio (2.49) of any

individual drug evaluated, leading the authors to conclude that this drug had the “greatest risk of an adverse outcome” (p. 220).¹⁸ In the same year, the ratio for hydrocodone was only 0.22 but represented a total number of DAWN mentions that was 11 times greater than for hydromorphone, which suggests that hydrocodone is more highly associated with adverse health consequences. In response to these considerations, we concluded that a proportional statistic, when used as a stand-alone metric, could not be reliably interpreted and, therefore, was of limited value.

Conclusions

Abuse of opioid analgesics has increased in recent years, and their medical use has also increased. It should be recognized that some abuse of opioid analgesics is predictable because of their abuse liability, their availability for medical purposes, criminal demand for drugs of abuse, and imperfect control systems. To completely eliminate diversion and abuse of opioid analgesics is not possible because this would require their removal from the legitimate distribution system, causing unacceptable harm to the patients who depend on their analgesic benefit for quality of life.

Instead, it is essential to improve our capability to address the abuse and diversion of pain medications while ensuring that these essential drugs reach the people who need them. Safe and effective diversion control responses depend on identifying the sources of diversion, carefully distinguishing diversion and abuse from legitimate pain management, and choosing interventions that are appropriate to the type of problem. We reiterate our previous recommendation that “manufacturers, pharmacies, clinicians, and patients should continue their efforts to improve pain management while exercising care so that the diversion of opioid medications for non-medical use is minimized” (p. 1713).¹⁷ In addition, we encourage more actions by state governments and regulators to promote pain management through adoption of balanced policy because pain continues to be inadequately treated.^{2,4,5,8}

Intentional illegal sale of drugs or prescriptions, or exchanges for sex or other drugs, clearly warrants criminal prosecution. Diversion resulting from well-intentioned but “duped” practitioners should be addressed in a disciplinary, yet respectful, framework that includes remedial education to ensure that pain practitioners and primary care providers do not fear criminal prosecution or unwarranted investigation and discipline. This perspective is made clear in a position statement from the Utah Division of Occupational and Professional Licensing:

It is inappropriate, except on rare occasions upon a showing of good cause, for the Division to insert itself into the near sacred relationship that must exist between a licensed health-care professional and their patient. That relationship must be founded in the competence and wisdom of the practitioner coupled with the trust and cooperation of the patient. The unnecessary and unwise intrusion into that relationship by the “regulator” is the classic representation of abusive government acting at its worst (p. 110).⁷⁶

Practitioners should use new training resources to learn about using controlled substances and how to work with pain patients to minimize diversion, especially when a patient has a history of drug abuse.⁷⁷⁻⁸¹ Patients receiving opioids should be advised about safe-keeping and not sharing with others. Treatment agreements between a physician and patient may be needed for some cases to outline patient responsibilities and reasons for which drug therapy may be discontinued, such as prescriptions from more than one physician. Such approaches, if implemented reasonably, could reduce some diversion with little potential to negatively impact patient care.

Although not all pain requires opioids, we should expect to see further increases in their medical use. Several law enforcement organizations have recognized the important use of opioid analgesics and have encouraged their appropriate use.^{82,83} In October 2001, the DEA released an unprecedented joint statement with 21 healthcare organizations (now endorsed by 43 organizations) that calls for a balanced approach to abuse and diversion of opioid analgesics:

Both healthcare professionals and law enforcement and regulatory personnel share a responsibility for ensuring that prescription pain medications are available to the patients who need them and for preventing these drugs from becoming a source of harm or abuse ... The roles of both health professionals and law enforcement personnel in maintaining this essential balance between patient care and diversion prevention are critical (p. 1).⁸²

The call for balanced responses to diversion also has been made by the National Association of Attorneys General.⁸⁴ Education and proper knowledge of the nature of pain, including the use of opioids, as well as problems of diversion and abuse, is essential for practitioners, patients, regulators, and others who are involved in or affect patient care.

Unrelieved pain and abuse of prescription drugs both represent unacceptable risks to human health. It is our belief that communication and cooperation between healthcare professionals (including pain management and addiction-medicine specialists) and law enforcement, guided by the principle of balance, is the appropriate public health strategy to stem diversion and abuse of prescription drugs without restricting their use for legitimate medical purposes. Such cooperation will be enhanced by more information about the sources and extent of diversion, greater awareness among clinicians about how to avoid contributing to drug abuse, enhanced sensitivity of law enforcement and regulatory authorities about the need to avoid interfering in medical practice and patient care, and continued improvements in dialogue with clinicians. In this way, we can accelerate progress toward the common goal of protecting public health and ensuring patient access to essential pain relief medications.

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References

1. Marlowe KF, Chicella MF. Treatment of sickle cell pain. *Pharmacotherapy* 2002;22:484–491.
2. National Institutes of Health Consensus Development Program. Symptom management in cancer: pain, depression and fatigue. Statement prepared following a National Institutes of Health State-of-the-Science Conference on Symptom Management in Cancer; Bethesda, MD; July 15-17, 2002. Available at consensus.nih.gov/ta/022/022_intro.htm.
3. Kutner JS, Kassner CT, Nowels DE. Symptom burden at the end of life: Hospice providers' perceptions. *J Pain Symptom Manage* 2001;21:473–480.
4. Weiss SC, Emanuel LL, Fairclough DL, Emanuel EJ. Understanding the experience of pain in terminally ill patients. *Lancet* 2001;357:1311–1315.
5. Teno JM, Weitzen S, Wetle T, Mor V. Persistent pain in nursing home residents (research letter). *JAMA* 2001;285:2081.
6. Tolle SW, Tilden VP, Rosenfeld AG, Hickman SE. Family reports of barriers to optimal care of the dying. *Nurs Res* 2000;49:310–317.
7. Bernabei R, Gambassi G, Lapane K, et al. Management of pain in elderly patients with cancer. *JAMA* 1998;279:1877–1882.
8. Institute of Medicine Committee on Care at the End of Life. *Approaching death: improving care at the end of life*. Washington, DC: National Academy Press, 1997. Available at books.nap.edu/catalog/5801.html.
9. SUPPORT Study Principal Investigators. A controlled trial to improve care for seriously ill hospitalized patients: the Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatments (SUPPORT). *JAMA*. 1995;274:1591–1598.
10. Miaskowski C, Cleary J, Burney R, et al. *Guideline for the management of cancer pain in adults and children*. Glenview, IL: American Pain Society, 2004.
11. American Pain Society. *Guideline for the management of pain in osteoarthritis, rheumatoid arthritis, and juvenile chronic arthritis*. Clinical practice guideline number 2. Glenview, IL: American Pain Society, 2002.
12. Gaughan DM, Hughes MD, Seage GR, et al. The prevalence of pain in pediatric human immunodeficiency virus/acquired immunodeficiency syndrome as reported by participants in the Pediatric Late Outcomes Study. (PACTG 219). *Pediatrics* 2002;109: 1144–1152.
13. American Pain Society. *Principles of analgesic use in the treatment of acute pain and cancer pain*, 4th ed. Glenview, IL: American Pain Society, 1999.
14. World Health Organization. *Cancer pain relief: with a guide to opioid availability*, 2nd ed. Geneva, Switzerland: World Health Organization, 1996. Available at whqlibdoc.who.int/publications/9241544821.pdf
15. World Health Organization. *The use of essential drugs: ninth report of the WHO expert committee (technical report series 895)*. Geneva, Switzerland: World Health Organization, 2000.
16. Controlled Substances Act. Pub L No. 91-513, 84 Stat 1242, 1970.
17. Joranson DE, Ryan KM, Gilson AM, Dahl JL. Trends in medical use and abuse of opioid analgesics. *JAMA* 2000;283:1710–1714.
18. Zacny J, Bigelow G, Compton P, et al. College on Problems of Drug Dependence taskforce on prescription opioid non-medical use and abuse: position statement. *Drug Alcohol Depend* 2003;69: 215–232.
19. Substance Abuse and Mental Health Services Administration and Food and Drug Administration. *Prescription drug abuse rising rapidly*. U.S. Department

- of Health and Human Services; Bethesda, MD. Press release issued January 16, 2003 as part of new initiative to battle prescription drug abuse. Available at www.rx.samhsa.gov/main.htm.
20. National Institute on Drug Abuse. NIDA and partners announce national initiative on prescription drug misuse. NIDA, National Institutes of Health, U.S. Department of Health and Human Services; Bethesda, MD. News release issued April 10, 2001. Available at www.drugabuse.gov/MedAdv/01/NR4-10.html.
21. Drug Enforcement Administration - Office of Diversion Control. Summary of medical examiner reports on oxycodone-related deaths. U.S. Drug Enforcement Administration; Arlington, VA. May 16, 2002. Available at www.deadiversion.usdoj.gov/drugs_concern/oxycodone/oxycotin7.htm.
22. Drug Enforcement Administration - Office of Diversion Control. OxyContin® diversion and abuse. U.S. Drug Enforcement Administration; Arlington, VA. October 2003. Available at www.deadiversion.usdoj.gov/drugs_concern/oxycodone/oxycotin7.htm.
23. Roche T. The potent perils of a miracle drug. *Time* 2001;January 8:47.
24. Tough P. The alchemy of OxyContin®. *NY Times Mag* 2001;July 29:32–37, 52, 62.
25. Adams N. OxyContin® use and abuse (transcript). *NPR All Things Considered* 2001;July 31.
26. Neighmond P. Powerful painkiller OxyContin® and some of the negative effects it has had on drug abusers (transcript). *NPR All Things Considered* 2001;November 27.
27. Clines FX, Meier B. Cancer painkillers pose new abuse threat. *NY Times* 2001;February 9:A1.
28. Zwillich T. Prescription drug abuse said to be on the rise. *Reuters Health* 2001;April 10.
29. Thomson Healthcare. Physicians' desk reference, 58th ed. Montvale, NJ: Thomson PDR, 2004.
30. Hardman JG, Limbird LE, Gilman AG. Goodman and Gilman's The pharmaceutical basis of therapeutics, 10th ed. New York, NY: McGraw-Hill, 2001.
31. Steinbrook R. Physician-assisted suicide in Oregon—an uncertain future. *N Engl J Med* 2002; 346:460–464.
32. Tolle SW, Tilden VP, Hickman SE, Rosenfeld AG. Family reports of pain in dying hospitalized patients: a structured telephone survey. *West J Med* 2000;172:374–377.
33. Hickman SE, Tolle SW, Tilden VP. Physicians' and nurses' perspectives on increased family reports of pain in dying hospitalized patients. *J Palliat Med* 2000;3:413–418.
34. Novak S, Nemeth WC, Lawson KA. Trends in medical use and abuse of sustained-release opioid analgesics: a revisit. *Pain Med* 2004;5:59–65.
35. Drug Enforcement Administration - Office of Diversion Control. Automation of Reports and Consolidated Orders System. Retail drug summary reports, 1997–2002 - Report 4. Arlington, VA: U.S. Drug Enforcement Administration, 2004. Available at www.deadiversion.usdoj.gov/arcos/retail_drug_summary/index.html.
36. Ball J, Korper S, Woodward A. Reporting drug abuse in the emergency department (letter). *JAMA*. 2000;284:564.
37. Joranson DE, Ryan KM, Gilson AM, Dahl JL. In reply to "Reporting drug abuse in the emergency department" (letter). *JAMA*. 2000;284:564.
38. Substance Abuse and Mental Health Services Administration - Office of Applied Studies. Emergency department trends from the Drug Abuse Warning Network, preliminary estimates January–June 2001 with revised estimates 1994 to 2000. Rockville, MD: DAWN Series D-20, DHHS Publication No. (SMA) 02-3634, 2002. Available at dawninfo.samhsa.gov/pubs_94_02/edpubs/2001prelim/default.asp.
39. Misra AL. Metabolism of opiates. In: Adler ML, Manara L, Samanin R, eds. Factors affecting the action of narcotics. New York: Raven Press, 1978: 297–343.
40. Martin M, Hecker J, Clark R, et al. China white epidemic: an Eastern United States emergency department experience. *Ann Emerg Med* 1991;20: 158–164.
41. Mallonee E. Personal communication regarding DAWN limitations. E-mail correspondence with study authors on April 27, 2004.
42. Substance Abuse and Mental Health Services Administration - Office of Applied Studies. Detailed emergency department tables from the Drug Abuse Warning Network 2002. Rockville, MD: 2003. Available at dawninfo.samhsa.gov/pubs_94_02/edpubs/2002final/.
43. Mallonee E. Personal communication regarding hydromorphone estimate for 2002. E-mail correspondence with study authors on April 27, 2004.
44. Mallonee E. Personal communication regarding RSE for hydromorphone in 2002. E-mail correspondence with study author on April 27, 2004.
45. Crane E. Personal communication regarding hydromorphone estimate for 2002. E-mail correspondence with study author on April 14, 2004.
46. Jacox A, Carr DB, Payne R, et al. Management of cancer pain. Clinical practice guideline number 9, AHCPR No. 94-0592. Rockville, MD: Agency for Health Care Policy and Research, U.S. Dept of Health and Human Services, Public Health Service, 1994.
47. Kaiko RF, Foley KM, Grabinski PY, et al. Central nervous system excitatory effects of meperidine in cancer patients. *Am Neurol Assoc* 1983;13:180–185.
48. Substance Abuse and Mental Health Services Administration - Office of Applied Studies. DAWN Emergency Department Table 5.2.0 - ED Drug Episodes by Episode Characteristics: Estimates for the coterminal U.S. by year. Rockville, MD: 2003. Available at dawninfo.samhsa.gov/pubs_94_02/edpubs/2002final/.

49. Drug Enforcement Administration - Office of Diversion Control. OxyContin Theft and Loss Incidents—Data from the DEA Drug and Loss System. 2003. Available at www.deadiversion.usdoj.gov/drugs_concern/oxycodone/oxycodone.htm.
50. National Conference of Commissioners on Uniform State Laws. Uniform Controlled Substances Act. NCCUSL; Chicago, IL. Adopted at its Annual Conference Meeting in its One-Hundred-and-Third-Year; Chicago, IL; July 29–August 5, 1994.
51. Joranson DE. Guiding principles of international and federal laws pertaining to medical use and diversion of controlled substances. In: Cooper JR, Czechowicz DJ, Molinari SP, et al., eds. Impact of prescription drug diversion control systems on medical practice and patient care: Monograph 131. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute on Drug Abuse, 1993: 18–34.
52. Drug Enforcement Administration - Office of Diversion Control. The diversion of drugs and chemicals – A descriptive report of the programs and activities of DEA's Office of Diversion Control. Washington, DC: Drug Enforcement Administration, 1999. Available at www.deadiversion.usdoj.gov/pubs/program/activities/index.html.
53. United States General Accounting Office. Prescription drug monitoring: states can readily identify illegal sales and use of controlled substances. Washington, DC: United States General Accounting Office, GAO/HRD-92-115, 1992.
54. Chi KS. Prescription drug abuse control: the Wisconsin approach. *Innovations* 1983;April:1–8.
55. United States General Accounting Office. Prescription drugs and Medicaid: automated review systems can help promote safety, save money. Washington, DC: United States General Accounting Office, GAO/AIMD-96-72, 1996.
56. Pain and Policy Studies Group. Prescription monitoring programs: trend and current status. 2003. Available at www.medsch.wisc.edu/painpolicy/domestic/diversion.htm.
57. Drug Enforcement Administration - Office of Diversion Control. Prescription accountability resource guide. Washington, DC: Drug Enforcement Administration, 1998. Available at www.deadiversion.usdoj.gov/pubs/program/rx_account/index.html.
58. Drug Enforcement Administration, National Alliance for Model State Drug Laws. Diversion and abuse of prescription drugs: A closer look at state prescription monitoring programs. Washington, DC: Drug Enforcement Administration, 2000. Available at www.deadiversion.usdoj.gov/pubs/program/rx_monitor/index.html.
59. Joranson DE, Carrow GM, Ryan KM, et al. Pain management and prescription monitoring. *J Pain Symptom Manage* 2002;23:231–238.
60. United States Census Bureau - Population Division. Population estimates: April 1, 2000 to July 1, 2003. Suitland, MD: U.S. Census Bureau, 2004. Available at eire.census.gov/popest/data/states/tables/NST-EST2003-01.php.
61. Infant Formula Act. Pub L No. 96-359, 94 Stat 1190, 1980.
62. Code of Federal Regulations. Title 21 CFR Sec.1301.76(b). Available at www.access.gpo.gov/nara/cfr/waisidx_03/21cfr1301_03.html.
63. Drug Enforcement Administration. Pharmacist's manual: An informational outline of the Controlled Substances Act of 1970. Washington, DC: U.S. Department of Justice, 2001.
64. Controlled Substance Registrant Protection Act. Pub L No. 98-305, 18 U.S.C. 2118(a), 1984.
65. Butterfield F. Theft of painkiller reflects its popularity on the street. *NY Times* 2001;July 7:A6.
66. Drug Enforcement Administration - Office of Diversion Control. Action plan to prevent the diversion and abuse of OxyContin. U.S. Drug Enforcement Administration; Arlington, VA. June 22, 2001. Available at www.deadiversion.usdoj.gov/drugs_concern/oxycodone/abuse_oxycodone.htm.
67. Pain and Policy Studies Group. Achieving balance in federal and state pain policy: a guide to evaluation, 2nd ed. Madison, WI: University of Wisconsin Comprehensive Cancer Center, 2003. Available at www.medsch.wisc.edu/painpolicy/2003_balance/.
68. World Health Organization. Achieving balance in national opioids control policy: guidelines for assessment. Geneva, Switzerland: World Health Organization, 2000. Available at www.medsch.wisc.edu/painpolicy/publicat/00whoabi/00whoabi.htm.
69. American Medical Association-House of Delegates. Protection for physicians who prescribe pain medication H-120.960. Chicago, IL: American Medical Association, 2003.
70. Massachusetts State Board of Pharmacy. State board of pharmacy amends its policy on OxyContin® Boston, MA: 2002. Available at www.state.ma.us/reg/services/press/nw060002.htm.
71. Cancer Pain Management Policy Review Group. American Cancer Society position statement on regulatory barriers to quality cancer pain management. National Government Relations Department, American Cancer Society, 2001.
72. Cancer Pain Management Policy Review Group. American Cancer Society position statement on Medicaid prior authorization for pain medications. National Government Relations Department, American Cancer Society, 2001.

73. Savage SR, Joranson DE, Covington EC, Schnoll SH, Heit HA, Gilson AM. Definitions related to the medical use of opioids: evolution towards universal agreement. *J Pain Symptom Manage* 2003;26: 655–667.
74. Wolfe MM, Lichtenstein DR, Singh G. Gastrointestinal toxicity of nonsteroidal anti-inflammatory drugs. *N Engl J Med* 1999;340:1888–1899.
75. American Geriatrics Society Panel on Persistent Pain in Older Persons. The management of persistent pain in older persons. *J Am Geriatr Soc* 2002;50: S205–S224.
76. Robinson DE. Prescribing controlled substances for cancer pain: position paper of the Utah Division of Occupational and Professional Licensing. *J Pharm Care Pain Symptom Control* 1993;1:109–112.
77. National Institute on Drug Abuse. Prescription drugs: abuse and addiction. NIDA research report. NIH Publication No. 01-4881. Rockville, MD: NIDA, 2001.
78. Dannemiller Memorial Educational Foundation. Lawful opioid prescribing and prevention of diversion: Issues and insights. San Antonio, TX: CDROM for 2 CME/CPE Credit Hours, 2001.
79. California Academy of Family Physicians, CorTexT/Mind Matters Educational Seminars. Lawful prescribing and prevention of diversion. USA: PharmaCom Group, Inc., 2001, Available at www.familydocs.org/.
80. National Pain Education Council. Assessment and management of aberrant drug-related behavior in the chronic pain patient. Deerfield, IL: Discovery International, 2002.
81. American Society of Addiction Medicine. Pain and addiction medicine. 2003. Available at www.asam.org/pain/pain_and_addiction_medicine.htm.
82. Drug Enforcement Administration, Last Acts, Pain and Policy Studies Group, American Academy of Hospice and Palliative Medicine, American Academy of Pain Medicine, American Alliance of Cancer Pain Initiatives. Promoting pain relief and preventing abuse of pain medications: A critical balancing act. Washington, DC: Last Acts, 2001. Available at www.medsch.wisc.edu/painpolicy/dea01.htm.
83. National Association of State Controlled Substances Authorities. NASCSA Resolution 99-01. A Resolution Endorsing the Model Guidelines for the Use of Controlled Substances for the Treatment of Pain. Adopted at the NASCSA 15th Annual Educational Conference; Coeur d'Alene, Idaho; October 29, 1999. Available at www.nascsa.org/resolutions.htm.
84. National Association of Attorneys General. Resolution calling for a balanced approach to promoting pain relief and preventing abuse of pain medications. Adopted at the National Association of Attorneys General Spring Meeting; Washington, DC; March 17–20, 2003.

Table 1

DAWN Drug Categories as a Percentage of Total Mentions in 2002 (n=1,209,938)

Opioid Analgesics/combinations (9.85%)	Non-Opioid Analgesics/combinations (5.93%)
Alfentanil	Analgesic combinations
Anileridine	Antimigraine agents
Buprenorphine	Aspirin/ethoheptazine
Butorphanol	Non-steroidal anti-inflammatory drugs
Codeine	Phenacetin
Dezocine	Salicylates
Dihydrocodeine	Miscellaneous analgesics
Dihydromorphinone	
Fentanyl	Alcohol-in-Combination (17.14%)
Hydrocodone	Illicit Drugs (37.29%)
Hydromorphone	Cocaine
Hydroxy-N-methylmorphinan	Flunitrazepam
Kaolin-pectin/paregoric	Gamma hydroxy butyrate (GHB)
Levomethadyl acetate	Heroin
Levorphanol	Marijuana
Meperidine	Methamphetamine
Methadone	Methaqualone
Morphine	Methylenedioxymethamphetamine (Ecstasy)
Nalbuphine	Lysergic acid diethylamide (LSD)
Noscapine	Phencyclidine (PCP)
Opium	Miscellaneous hallucinogens
Oxycodone	
Oxymorphone	Other Drugs (29.79%)
Papaveretum	Psychotherapeutic Agents
Pentazocine	Respiratory Agents
Propoxyphene	Cardiovascular Agents
Remifentanil	Other (non-analgesic) CNS Agents
Sufentanil	Inhalants
Not otherwise specified	

Table 2
Medical Use of Selected Opioid Analgesics*

Year	Fentanyl	Hydromorphone	Meperidine	Morphine	Oxycodone
1997	74,086 (27.76)	241,079 (90.34)	5,765,954 (2,160.85)	5,922,872 (2,219.66)	4,449,562 (1,667.52)
1998	90,618 (33.96)	260,009 (97.44)	5,834,294 (2,186.46)	6,408,322 (2,401.59)	6,579,719 (2,465.82)
1999	107,141 (38.57)	292,506 (105.31)	5,539,592 (1,994.45)	6,804,935 (2,450.02)	9,717,600 (3,498.69)
2000	138,382 (49.82)	336,326 (121.08)	5,506,981 (1,982.71)	7,693,640 (2,769.99)	15,305,914 (5,510.69)
2001	186,083 (66.99)	400,642 (144.24)	5,450,204 (1,962.27)	8,810,700 (3,172.17)	19,927,286 (7,174.55)
2002	242,027 (87.13)	473,362 (170.42)	5,412,389 (1,948.61)	10,264,264 (3,695.43)	22,376,892 (8,056.33)
Percentage change 1997-2002	226.68 (213.87)	96.35 (88.64)	-6.13 (-9.82)	73.30 (66.49)	402.90 (383.13)

*Values are expressed as grams (grams/100,000 population). Data from the Automation of Reports and Consolidated Orders System.

Table 3
Abuse of Selected Opioid Analgesics Listed by Drug Abuse Warning Network Category*

Year	Fentanyl	Hydromorphone	Meperidine	Morphine	Oxycodone
1997	203 (0.022)	604 (0.064)	864 (0.092)	1,300 (0.138)	5,012 (0.532)
1998	286 (0.029)	937 (0.095)	730 (0.074)	1,955 (0.199)	5,211 (0.531)
1999	337 (0.033)	1,313 (0.130)	882 (0.087)	2,217 (0.219)	6,429 (0.634)
2000	576 (0.052)	1,983 (0.180)	1,085 (0.099)	2,483 (0.226)	10,825 (0.985)
2001	710 (0.061)	2,003 (0.172)	665 (0.057)	3,403 (0.292)	18,409 (1.580)
2002	1,506 (0.124)	2,667 (0.220)	722 (0.060)	2,775 (0.229)	22,397 (1.851)
Percentage change, 1997-2002	641.87	341.56	-16.44	113.46	346.87

*Values are expressed as number (percentage) of raw mentions.

Table 4
Abuse Listed by Drug Abuse Warning Network Category*

Year	Opioid Analgesics	Non-Opioid Analgesics	Alcohol-in-Combination	Illicit Drugs	Other Drugs	Total
1997	54,116 (5.75)	86,269 (9.16)	171,894 (18.26)	326,355 (34.66)	302,993 (32.18)	941,627
1998	58,945 (6.01)	82,984 (8.46)	184,989 (18.85)	349,466 (35.61)	304,902 (31.07)	981,286
1999	69,011 (6.81)	69,725 (6.88)	196,178 (19.35)	365,443 (36.05)	313,331 (30.91)	1,013,688
2000	82,372 (7.50)	84,822 (7.72)	204,500 (18.61)	400,961 (36.49)	326,260 (29.69)	1,098,915
2001	99,317 (8.52)	75,183 (6.45)	217,940 (18.70)	431,644 (37.05)	341,064 (29.27)	1,165,148
2002	119,184 (9.85)	71,695 (5.93)	207,395 (17.14)	451,168 (37.29)	360,496 (29.79)	1,209,938
Percent change, 1997-2002	120.24	-16.89	20.65	38.24	18.98	28.49

* Values are expressed as number (percentage) of raw mentions. Percent total mentions do not add to 100% due to rounding.