

# **Diversion and Abuse of Buprenorphine: A Brief Assessment of Emerging Indicators**

## **Final Report**

Submitted to the

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# Diversions and Abuse of Buprenorphine: Final Report

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## SUMMARY

This assessment was undertaken by SAMHSA/CSAT in response to reports that recent availability of Suboxone® and Subutex® for the treatment of opioid addiction has been accompanied by the emergence of a small but persistent problem with diversion and abuse of those medications. This is not unexpected, in that historical data show a period of experimentation following the introduction of many drugs. Nevertheless, SAMHSA/CSAT officials determined that the problem required further examination. Accordingly, an independent assessment was commissioned, which involved a literature review, analysis of all available data, interviews with key State and Federal officials, and consultation with a group of outside experts.

Assessment results suggest that buprenorphine diversion and abuse are concentrated in specific geographic areas. The phenomenon may reflect lack of access to addiction treatment, as some non-medical use appears to involve attempts to self-medicate with buprenorphine when formal treatment is not available. While the largest part of the diverted drug supply likely comes from buprenorphine prescribed by physicians – either for addiction or for pain – the presence of formulations that are not approved for use in the U.S. suggests that some is being illegally imported as well.

This report summarizes the findings and conclusions resulting from the assessment, and lays out a series of recommendations for future action.

## BACKGROUND

On October 17, 2000, the President signed into law the Drug Addiction Treatment Act of 2000 (DATA), Title XXXV, Section 3502 of the Children’s Health Act of 2000. DATA expanded the clinical context of medication-assisted treatment by allowing qualified physicians to prescribe or dispense specifically approved Schedule III, IV, and V medications for detoxification and maintenance treatment of addiction. In addition, DATA reduced the regulatory burden on physicians by permitting qualified physicians to apply for and receive waivers from the special registration requirements defined in the Federal Controlled Substances Act.

DATA 2000 marks the first time in almost 40 years that pharmacotherapies for addiction can be offered to patients in office-based settings. The act thus is designed to address the growing gap between the number of persons in need of treatment for opiate addiction and the amount of treatment available.

**Availability of Buprenorphine.** Two formulations of buprenorphine (which were approved by the FDA in October 2002) are the first – and so far only – medications approved under DATA 2000 for the pharmacologic treatment of addiction. One formulation (Subutex®) contains buprenorphine alone, while the other (Suboxone®) is a combination of buprenorphine with

naloxone, an opioid antagonist. (The Buprenex® formulation is approved only for the treatment of pain, and no generic version has been approved for use in the U.S.) Both Subutex and Suboxone, which are designed to be administered sublingually, are available in 2 mg and 8 mg tablets. Both are classified as Schedule III narcotics under the Federal Controlled Substances Act.

**Problem Indicators.** Although none of the formal indicators used by the manufacturer or the government signaled any adverse effects attending the introduction of buprenorphine, in December 2005 SAMHSA/CSAT officials received several anecdotal reports of buprenorphine diversion and abuse in Vermont. To address the reports, SAMHSA/CSAT commissioned an independent assessment by the Center for Health Services & Outcomes Research at JBS International, Inc. Using information gathered from multiple sources, JBS analysts set out to determine whether diversion and abuse of buprenorphine actually are occurring and, if so, to assess the nature, extent, and source of the problem (if any) and to formulate recommendations for its amelioration.

**Work Plan.** The plan of action devised for the assessment consisted of multiple steps, which were executed concurrently:

1. Search the literature for published reports of buprenorphine diversion and abuse.
2. Working in concert with Vermont officials, conduct a case study to gather more information about the anecdotal reports of buprenorphine diversion and abuse (results of the case study are summarized here and described in full in a separate report).
3. Analyze all available information (Appendices A and B) to determine whether there is evidence to support or refute the anecdotal reports.
4. Convene a panel of outside experts (Appendix C) to examine and interpret the information gathered and to formulate recommendations for future action.

These activities were conducted from January through November 2006. This report presents the results.

## LITERATURE REVIEW

**Purpose.** The purpose of the literature review was to inform the assessment process, to identify issues that might arise, and to provide the necessary context for interpreting the assessment results.

**Methods.** Relevant literature published since 2002, when buprenorphine was approved in the U.S. for use in office-based treatment of opioid addiction, was the subject of a search by a Substance Abuse Library Information Specialist (SALIS) attached to the JBS Center for Health Services & Outcomes Research. The search (using the key words “buprenorphine,” “Buprenex,” “Suboxone,” and “Subutex”) yielded 347 articles. A separate search using the same key words was conducted through the library at England’s Cambridge University.

The actual review of the literature was conducted by the Director of the JBS Center for Health Services & Outcomes Research, with the results circulated to the panel of outside experts for peer review.

**Results.** The literature review yielded the following results.

***Pharmacology and Metabolism:*** Buprenorphine is a high-affinity, partial mu agonist with kappa antagonist action. This unique combination of pharmacologic properties is thought to offer significant advantages over existing medications for the treatment of opiate addiction (Sporer, 2004).

Buprenorphine is well-absorbed sublingually, with the sublingual form offering 60 to 70 percent of the bioavailability of intravenous administration (Vocci, Acri et al., 2005). The sublingual form results in bioavailability about twice that of orally ingested buprenorphine (Jenkinson, Clark et al., 2005). The drug is lipophilic, and brain tissue levels far exceed serum levels. It is highly bound to plasma protein and is inactivated by enzymatic transformation via N-dealkylation and conjugation (Elkader & Sproule, 2005). Buprenorphine is widely distributed, with peak plasma concentration occurring at about 90 minutes and a half-life of 4 to 5 hours. It is metabolized mainly to inactive conjugated metabolites (Sporer, 2004).

The presence of naloxone does not appear to influence the pharmacokinetics of buprenorphine. The rationale for adding naloxone to one formulation is that incorporating naloxone's antagonist properties would yield a drug that is less subject to diversion and abuse. The 4:1 ratio of buprenorphine to naloxone was selected because it produced significant attenuation of buprenorphine's effects without producing significant signs of withdrawal (Vocci, Acri et al., 2005).

The high-affinity blockade imposed by buprenorphine significantly limits the effects of subsequently administered opioid agonists or antagonists, and the "ceiling effect" appears to confer a high safety profile, a low level of physical dependence, and only mild withdrawal symptoms on cessation after prolonged administration (Vocci & Ling, 2005). In fact, sublingual doses up to 32 mg have been safely given to opiate-experienced – but not physically dependent – subjects (Sporer, 2004).

***Adverse Drug Events:*** Buprenorphine's partial agonist properties also produce a ceiling effect on respiration, suggesting a low risk of severe respiratory depression or apnea (Vocci & Ling, 2005).

To evaluate the safety and ceiling effect of buprenorphine, Umbricht et al. (2004) administered buprenorphine to six non-dependent opiate abusers residing on a research unit. In separate sessions, they tested doses of 12 mg buprenorphine sublingual, escalating buprenorphine intravenous (2, 4, 8, 12 and 16 mg), and both intravenous and sublingual placebo. Physiologic and subjective measures were collected for 72 hours following drug administration.

The investigators concluded that buprenorphine “minimally but significantly” increased systolic blood pressure, but that changes in heart rate and oxygen saturation were not significant. They also found that buprenorphine produced substantial, but variable, mood effects, and that side effects generally were mild. Thus, they concluded that buprenorphine appears to have a ceiling for cardiorespiratory and subjective effects and a high safety margin, even when administered intravenously.

Overdose deaths have been reported, most involving concurrent use of buprenorphine with CNS depressants such as benzodiazepines, other opiates, or alcohol (Sporer, 2004; Auriacombe, Franques et al., 2001; Gaulier, Marquet et al., 2000; Reynaud, Petit et al., 1998). While the majority of decedents administered the drug intravenously (Drummer, 2005), one death involving ingestion of a massive oral dose has been described (Reynaud, Petit et al., 1998).

**Abuse Potential:** While early reports based on animal studies suggested that buprenorphine would have minimal potential for abuse, varying levels of diversion and abuse were predicted by some early investigators (Robinson, Dukes et al., 1993; Jaffe & O’Keeffe, 2003). The most common pattern of abuse involves crushing the sublingual tablets and injecting the resulting extract (Cicero & Inciardi, 2005). When injected intravenously, addicts have described the clinical effects of buprenorphine as similar to equipotent doses of morphine or heroin (Sporer, 2004). Investigators have found that the blockade efficacy of Suboxone is dose-related, and that doses of up to 32/8 mg of buprenorphine/naloxone provide only partial blockade when subjects receive a high dose of an opioid agonist (Strain, Walsh et al, 2002).

Under experimental conditions, buprenorphine has been found to be as effective as methadone in producing reinforcing and subjective effects (Alho, Sinclair et al., 2006). Based on follow-up interviews with study subjects, researchers have hypothesized that, by suppressing withdrawal symptoms, the buprenorphine provides both positive and negative reinforcement by simultaneously producing euphoric effects and alleviating withdrawal (Comer, Sullivan et al., 2005a).

In fact, small but measurable levels of buprenorphine diversion and abuse have been reported worldwide wherever the drug has been used for addiction treatment and, to a more limited extent, in the management of pain (Maxwell, 2006; Yeo, Chan et al., 2006; Chua & Lee, 2006; Jenkinson, Clark et al., 2005; Auriacombe, Fatseas et al., 2004). In a study reported at the 2006 Australian National Drug Trends Conference, one percent of 914 respondents (all of whom were injection drug users) cited buprenorphine as their drug of choice, and six percent said it was the drug they had injected most often in the preceding month. Those who had injected Suboxone reported that they used it to alleviate withdrawal, to achieve intoxication, and out of curiosity (Maxwell, 2006).

A recent study that examined abuse of Subutex and Suboxone by untreated injection drug users found a strong preference for the formulation without naloxone. Three out of four respondents said their use was intended to self-medicate for addiction and/or to suppress withdrawal. Most (68%) had tried the Suboxone formulation, but a large majority (4 out of 5) said it produced a “bad” experience (Alho, Sinclair et al., 2006).

**Risk Factors:** The use of buprenorphine (or any opioid) to avoid withdrawal was explored in a study assessing the degree to which withdrawal is associated with risk-prone behavior. Kirshenbaum et al. (2005) compared the risk behaviors of subjects who ingested opioids intranasally and intravenously. They concluded that, while the avoidance of withdrawal engendered risk-prone choices in all the subjects, intravenous use places greater metabolic constraints on the user and therefore engenders greater risk-taking during the withdrawal period.

Beyond the pharmacology of the drug itself, a variety of familial, social and environmental factors appear to be involved in diversion and abuse (Bouley, Viriot et al., 2000). While there are few reports in the literature on risk factors specific to buprenorphine abuse, Obadia and colleagues (2001) found that the treatment population who injected buprenorphine were younger, injected more frequently, and were more likely to be on buprenorphine maintenance therapy.

Other investigators hypothesize that buprenorphine injection is associated with poor social conditions and ongoing substance abuse. They urge closer patient monitoring and more attention to social and vocational rehabilitation to mitigate such risk, and suggest that methadone may be a more appropriate choice for pharmacotherapy in some patients (Vidal-Trecan, Varescon et al., 2003).

**Methods of Diversion:** Experts have speculated that most buprenorphine obtained for non-medical purposes in the U.S. is diverted from prescriptions written for the treatment of addiction. In such instances, physicians may lack sufficient knowledge to prescribe appropriately, or lack the resources or motivation to adequately monitor patients' progress post-prescription. Patients – driven by various motivations – also contribute through evasive and deceptive behaviors. For example, “doctor-shopping” (in which a patient consults multiple physicians to obtain prescriptions for a desired drug) has long been implicated as a method of diversion (AMA, 1981). In fact, Feroni and colleagues describe patients who consulted multiple physicians to obtain a quantity of buprenorphine greater than their therapeutic needs and then used the excess either for unsupervised personal consumption or dealing on the illicit market. However, they also found that doctor-shopping occurred more frequently among patients of practitioners who gave the lowest doses of buprenorphine, suggesting that some doctor-shopping may be physician-driven and thus not necessarily deviant behavior. The investigators suggested further research to understand the issues involved in establishing a good therapeutic relationship between a general practitioner and an opiate-addicted patient (Feroni, Peretti-Watel et al., 2005).

Another method of obtaining drugs involves thefts from physicians and pharmacies. In an exploratory study of data drawn from the special forms practitioners are required to file with the Drug Enforcement Administration to report such thefts or loss, Joranson and colleagues concluded that a significant portion of drugs available for illicit sale are diverted through such thefts. For example, over a four-year period, the forms filed in 22 Eastern States (including Vermont) documented the diversion of almost 28 million dosage units of controlled substances. In 2003 alone, more than 7 million dosage units of controlled substances were reported lost or stolen, a fourth of which were opioid drugs (Joranson & Gilson, 2005).

Yet a third method of diversion involves illegal importation (GAO, 2005). In its 2006 Annual Report, the International Narcotics Control Board identified smuggling of prescription drugs as

“a major threat posed to law enforcement.” The report documents that, over the past five years, almost every region of the world has experienced an increase in smuggling activity. Based on its examination, INCB investigators concluded that the large size of some the seizures indicates that traffickers are sourcing these substances for distribution on the illicit market. (International Narcotics Control Board, 2006).

The appearance in American drug monitoring systems of buprenorphine formulations not approved for use in the U.S. (e.g., Finibron, Temgesic) suggests that some level of illegal importation of buprenorphine is occurring, although determining its scale would require further study. Preliminary studies also suggest that Internet pharmacies are a significant source of prescription medications obtained for use and misuse in the United States, and may be a source for buprenorphine obtained without a valid prescription (Forman, Woody et al., 2006; Wilford, Smith et al., 2005).

## VERMONT CASE STUDY

**Purpose.** The assessment included a case study of the situation in Vermont, which was undertaken in collaboration with Vermont officials. Using information gathered from multiple sources, analysts set out to determine whether diversion and abuse of buprenorphine were occurring in the state and, if so, to assess the nature, extent, and source of the problem (if any) and to formulate recommendations for its amelioration.

**Methods.** The case study employed interviews with Vermont officials, as well as analysis of Vermont data from the DEA’s Automation of Reports and Consolidated Orders System (ARCOS) and National Forensic Laboratory Information System (NFLIS) reports, Vermont Medicaid records, SAMHSA’s *DAWNLive!* medical examiner reports, treatment data from the Vermont Office of Drug and Alcohol Programs and SAMHSA’s Treatment Episode Data Set (TEDS), the Northern New England Poison Control Center, and the Vermont state police and corrections system.

**Results.** The case study found that anecdotal reports of non-medical use of buprenorphine find some support in Federal and State datasets, although the actual numbers remain very small. This is consistent with predictions of investigators at the time buprenorphine was approved for the treatment of opioid addiction (Jaffe & O’Keeffe, 2003). Their predictions were based on the so-called “spillage effect,” which holds that when a sufficient amount of a medication is available in the distribution system, a certain amount of diversion can be expected to occur (Cicero & Inciardi, 2005). This parallels the experience in other nations where buprenorphine is widely used. Some evidence also shows that increased long-term exposure may be associated with a higher likelihood of abuse (Chabal, Erjovec et al., 1997).

State treatment officials agree that buprenorphine diversion and abuse are occurring in Vermont, but maintain that much of this activity involves efforts at self-medication on the part of individuals who would enter formal opioid treatment if such treatment was available. They describe other diversion as involving individuals who rent pills for “pill counts” to disguise the fact that they are taking greater amounts of the drug than prescribed, or selling off part of their

prescribed dose to other persons who have an established addiction. State officials consistently report that the diverted buprenorphine is not reaching drug-naive populations.

No buprenorphine-related deaths were reported in 2003 in Vermont or by any of the other 122 reporting medical examiners in 35 metropolitan areas captured in the DAWN ME system. However, toxicologic testing for buprenorphine requires a separate test and adds a significant cost. Such testing was not conducted by the medical examiners reporting the New England cases and may not have been done on a regular basis by any medical examiner. This raises the possibility that buprenorphine deaths are being under-reported.

The number of cases in which buprenorphine was seized by Vermont enforcement officers in 2004 and 2005 also was small, according to reports from the State Police toxicology laboratory. This was consistent with a report from the DEA's Vermont field office.

On the other hand, the Northern New England Poison Control Center (which includes Maine, New Hampshire, and Vermont) reported that the number of information calls and human exposure case reports related to buprenorphine increased sharply from 2003 to 2005.

Corrections officials report that buprenorphine is widely available in the State's correctional facilities, although it was not clear whether inmates sought the drug for purposes of self-medication or abuse.

Finally, Medicaid claims data show discrepancies between the number of physicians who are prescribing buprenorphine and the number who hold Federal waivers to use buprenorphine in the office-based treatment of addiction.

These anomalies point to the presence of a small but measurable level of diversion and abuse, and warrant further examination by officials of the State SSA, the Medicaid program, and the Pharmacy Board.

## **DATA ANALYSIS**

**Purpose.** The purpose of the analysis was to examine all available datasets to determine whether the data support anecdotal reports of buprenorphine diversion and abuse.

**Methods.** The analysis employed data from the DEA's Automation of Reports and Consolidated Orders System (ARCOS) and National Forensic Laboratory Information System (NFLIS) reports, Medicaid records, SAMHSA's DAWN*Live!* medical examiner reports, treatment data from SAMHSA's Treatment Episode Data Set (TEDS), from Poison Control Centers, and from various enforcement and regulatory agencies, as well as relevant published studies.

In addition to examining the datasets, assessment team members interviewed State officials and other key stakeholders.

**Results.** The results of the data analysis are summarized here and presented in full in Appendix D.

***Distribution of Buprenorphine:*** Nationally, the number of prescriptions written for Suboxone and Subutex is rising, with 500,000 prescriptions dispensed in 2004. In April 2005, the manufacturer estimated that between 150,000 and 200,000 patients had been treated with buprenorphine. Of the total amount prescribed, the manufacturer reported that about 5 percent is being used for off-label indications such as the treatment of pain. National data on total shipments of buprenorphine, from the DEA’s Automation of Reports and Consolidated Orders System (ARCOS), show a steady rise similar to that described by the manufacturer (Exhibit 1)..

**Exhibit 1. ARCOS Data: State Rankings on Per Capita Distribution of Buprenorphine and Methadone, January – December 2005**

	<b>Buprenorphine Grams Per 100,000 Pop.</b>		<b>Methadone Grams Per 100,000 Pop.</b>
Vermont (rank=1)	583.56	Vermont (rank=22)	991.56
Maine (rank=2)	324.02	Maine (rank=6)	1,973.83
Massachusetts (rank=3)	253.17	Massachusetts (rank=32)	800.05
Rhode Island (rank=4)	204.27	Rhode Island (rank=48)	422.77
Maryland (rank=5)	127.56	Maryland (rank=28)	878.66
<b>U.S. Average</b>	<b>56.73</b>	<b>U.S. Average</b>	<b>929.95</b>

Source: U.S. Drug Enforcement Administration: Automation of Reports and Consolidated Orders System, ARCOS 2, Report 4, 01/01/2005 to 12/31/2005.

***Incidence and Prevalence of Buprenorphine Abuse:*** Using two well-established informant networks, Cicero and Inciardi (2005) reported that the level of buprenorphine abuse remained relatively low through the first quarter 2005 (and was roughly equal to rates of abuse of tramadol, an unscheduled analgesic). Moreover, abuse of buprenorphine appeared to occur at a level much lower than that seen with methadone or oxycodone.

The investigators added that the majority of buprenorphine abusers were young white males who had extensive histories of substance abuse. Significantly, more than a third of those users said they took buprenorphine in an effort to self-medicate or to ease the symptoms of heroin withdrawal.

In a separate report of data gathered from the same key informant network, Cicero, Inciardi and Munoz (2005) ranked buprenorphine last in prevalence of abuse relative to the following drugs (listed here from highest to lowest prevalence of abuse): OxyContin, hydrocodone, other oxycodone, methadone, morphine, hydromorphone, fentanyl, and buprenorphine. For their study, the authors examined populations of health care professionals (using data gathered from State programs for impaired practitioners), methadone patients, and pain patients for patterns of buprenorphine abuse. Health care professionals were of interest because they were among the earliest populations identified as abusing both pentazocine and fentanyl, they have ready access to prescription medications, and they are well aware of their euphorogenic properties. Methadone patients were of interest because they are seen as highly vulnerable to experimenting with all drugs, particularly opiates. Pain patients were included in the study because of the investigators' estimate that they were a high risk of iatrogenic addiction.

***Geographic Distribution of Abuse:*** After mapping the three-digit Zip zones from which cases were reported in the years 2002, 2003, and the first three quarters of 2004, Cicero and colleagues concluded that abuse of prescription opiates was prevalent in all parts of the U.S., but seemed to be unevenly concentrated in the Northeastern and Southeastern regions. Moreover, the authors hypothesized that such abuse tended to “migrate” from the Northeast and Appalachia to the Southeast and West, and that it appeared to be highly concentrated in rural, suburban, and small-to medium-sized cities. They noted its almost complete absence in large metropolitan areas in which heroin use is endemic (Cicero, Inciardi et al., 2005).

Cicero and colleagues concluded that what they characterized as a “sharp increase” in reports of buprenorphine abuse in the last 5 quarters of the study period coincided with the introduction of Subutex and Suboxone. While the actual number of Zip zones in which any abuse of buprenorphine was detected is very small – about 10 percent of all Zip zones monitored – the investigators concluded that the increase in exposure resulting from availability of the new products led to an almost immediate increase in their non-medical use (Cicero, Inciardi et al., 2005). This may be related to the so-called “spillage effect” – that is, once a sufficient amount of a medication is available in the distribution system, some level of diversion will occur. It also is consistent with the pattern seen with other prescription opiates, and with the predictions of experts who testified in favor of the drug's approval for the treatment of opiate addiction in the U.S. (Jaffe & O'Keeffe, 2003).

***Diversion of Related Drugs:*** Diversion and abuse of buprenorphine may be associated with non-medical use of other prescription opioids, which has been increasing in the U.S. for most of the past decade (Zacny, Bigelow et al., 2003). The drugs involved include morphine (both immediate-release and sustained release, such as MS-Contin®), levorphanol (Levo-Dromoran®), methadone, codeine (opioid constituent in Tylenol-3®), hydrocodone (opioid constituent in Vicodin®, Lortab®), oxycodone (Percodan®, OxyContin®), propoxyphene (Darvon®), fentanyl (Duragesic®, Actiq®), tramadol (Ultram®), and hydromorphone (Dilaudid®) (SAMHSA, 2002).

The 2004 National Survey on Drug Use and Health reported that 31.8 million persons aged 12 and older had ever used pain relievers non-medically. By comparison, 34.2 million said they had ever used cocaine and 3.1 million reported ever using heroin. Of those who reported ever having

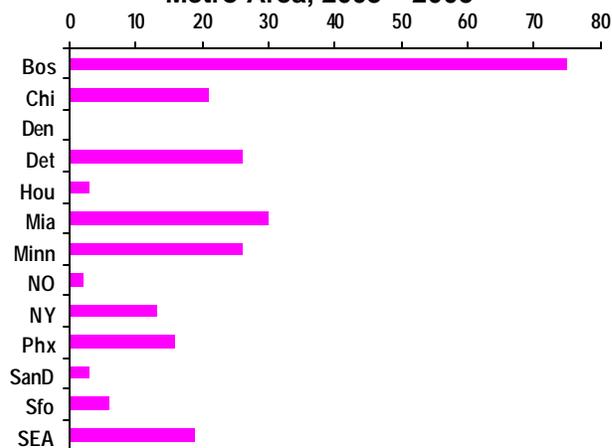
used opioid analgesics non-medically, 11.9 million had used an oxycodone product (3 million had used OxyContin), 5.9 million had used hydrocodone, and 1.3 million had used methadone illegally (SAMHSA, 2005).

To put these data into context, it is useful to compare the rates of non-medical use and abuse of various drugs. Among the psychotherapeutic agents examined by Zacny et al. (2003), past-year prevalence of alcohol, tobacco, and marijuana use far exceeded the non-medical use of prescription opioids. The prevalence of abuse of prescription opioids was similar to that of cocaine, and was significantly higher than the prevalence rates for hallucinogens, inhalants, and psychotherapeutic tranquilizers, sedatives and stimulants. It is not clear whether non-medical use of prescription opioids surpasses the use of heroin. It is clear that the proportion of non-medical users of prescription opioids who report abuse or addiction problems is far lower than the proportion of heroin users who report such problems.

**Emergency Department Visits.** Recent epidemiological data have shown dramatic increases in nonmedical use of pharmaceuticals among youth (12 to 17) and older adults (i.e., 55+) (OAS, 2006a). For example, Federal data show that, in 2004, non-medical use of analgesics and other opioids was associated with more than 100,000 emergency department visits (NIDA, 2001; revised 2005).

Boston reports more emergency department visits related to buprenorphine than any other metropolitan area in the DAWN system (OAS, 2006b; Exhibit 7).

**Exhibit 2. DAWNLive! Data: Emergency Department Visits Related to Buprenorphine, by Continuously Reporting Metro Area, 2003 – 2005\***



\*The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change.

SOURCE: SAMHSA Office of Applied Studies: Drug Abuse Warning Network

**Treatment Admissions:** National treatment data show a steady upward trend in the number of patients admitted to treatment for a primary problem with Other Opiates (defined as buprenorphine, oxycodone, and hydrocodone; OAS, 2005). The relatively large number of individuals seeking treatment may be straining an already overtaxed opioid treatment system,

leading to heavy reliance on office-based treatment and thus to the use of buprenorphine. Specifically, state officials reported that physicians are using buprenorphine to treat many patients who otherwise would be enrolled in methadone maintenance, and that some patients are attempting to self-medicate with buprenorphine.

Treatment data also show that patients who reported Other Opiates as their primary drug of abuse are more likely to use their primary drug on a daily basis than were those who reported heroin as their primary drug, and that the predominant route of administration is shifting from “oral” to “injection,” especially among younger users.

## CONSULTATION WITH OUTSIDE EXPERTS

**Purpose.** A panel of outside experts (Appendix C) was convened to oversee the assessment activities and to interpret the information collected in the literature review, the case study and data analysis, and the interviews with State and Federal officials.

**Methods.** The outside experts were independent of the manufacturer. Each brings a unique body of expertise to the assessment. They are:

- *Gretchen K. Feussner* (the DEA official responsible for buprenorphine data monitoring);
- *Howard A. Heit, M.D., FACP, FASAM* (an expert on the management of pain and addiction who regularly uses buprenorphine in office-based practice);
- *David E. Joranson, M.S.W.* (Director of the Pain & Policy Studies Project at the University of Wisconsin, and an expert on Federal and State legislative and regulatory mechanisms to control prescription drug diversion and abuse);
- *Patrick L. McKercher, Ph.D.* (former Director of the University of Michigan’s Center on Drugs and Public Policy, and an expert on distribution of pharmaceuticals, as well as on illegal importation and counterfeiting of prescription medications);
- *Richard K. Ries, M.D., FASAM* (medical director of the Washington State SSA and an expert on co-occurring addictive and psychiatric disorders); and
- *Martha J. Wunsch, M.D., FAAP* (a pediatrician and addiction medicine specialist, and a leading researcher on prescription drug abuse).

The outside experts were asked to examine the hypotheses formulated to explain the high per capita rate of buprenorphine consumption in Vermont, and to review the data and other information collected for the assessment. Specific questions posed to them included:

***Incidence and Prevalence:*** Are diversion and abuse of buprenorphine occurring at a measurable level? If so, is such diversion limited to specific locales, or is it more generalized? Does the diversion involve identifiable subpopulations, such as persons with a long history of addiction who are in need of methadone treatment?

***Formulations:*** If buprenorphine diversion and abuse are occurring, are they limited to the drug formulations used in addiction treatment (Subutex and Suboxone), or is the injectable formulation (Buprenex) also involved? If Suboxone is involved, why is the naloxone not deterring abuse as predicted?

**Sources:** If diversion of buprenorphine is occurring, how is the drug being obtained (from practitioners, from street markets, from Internet pharmacies, from neighboring countries, et al.)? What part of the supply is being obtained from physicians? Is pharmacy theft a significant source? Is the drug being illegally imported?

**Motives:** What motivates individuals to abuse buprenorphine? Are they using the drug to achieve a euphoric state or “high,” to suppress withdrawal, or for other purposes? Is the non-medical use motivated by any structural barriers, such as lack of access to methadone maintenance therapy or lack of parity in physician reimbursement for treatment services?

**Monitoring and Detection Capability:** If diversion of buprenorphine is occurring, how well have the formal monitoring programs signaled this activity to SAMHSA/CSAT and other interested parties? Are the current post-marketing surveillance activities adequate to provide timely and useful information to Federal and State authorities?

**Possible Interventions:** What steps are most likely to significantly reduce or eliminate non-medical use of buprenorphine while preserving access to the drug as an important treatment modality? Does the current training program for physicians who wish to prescribe buprenorphine adequately prepare them to address the needs of the populations they are actually treating? If not, what additional educational and/or other steps would be useful?

These and other questions were addressed at a February 2006 meeting of the outside experts, as well as in subsequent work by Dr. Maxwell and the staff of JBS’ Center for Health Services & Outcomes Research, the results of which were circulated to the outside experts for review.

**Results.** As an outcome of this process, the outside experts formulated a series of findings and recommendations, which are presented below. Overall, their work was marked by a public health approach and a commitment to the principle of balance: that is, they were designed to address buprenorphine diversion and abuse, while preserving patients’ access to buprenorphine treatment and providers’ use of this valuable pharmacotherapy. Their approach also drew on SAMHSA’s experience in addressing diversion of other drugs such as methadone and emphasizes a collegial approach among Federal and State agencies and private sector stakeholders.

The outside experts were aware that not all of the recommended actions are within SAMHSA/CSAT’s purview. Nevertheless, the group felt strongly that certain principles need to be articulated wherever appropriate, and so endorse them here.

## **ASSESSMENT FINDINGS AND RECOMMENDATIONS**

**Findings.** Given the results of the literature review, the case study and other data analysis, and the interviews with key informants, the outside experts agreed on the following findings:

1. While adverse drug events associated with buprenorphine have been reported, most involve the injection of the crushed sublingual tablets, rather than use of the drug as prescribed.
2. A small but measurable level of buprenorphine diversion and abuse has been identified in most nations, including the U.S., where the drug has been approved for the treatment of addiction or pain (Maxwell, 2006; Yeo, Chan et al., 2006; Chua & Lee, 2006; Jenkinson, Clark et al., 2005; Auriacombe, Fatseas et al., 2004). The most common pattern of abuse involves crushing the sublingual tablets and injecting the resulting extract (Cicero & Inciardi, 2005). When injected intravenously, addicts have described the clinical effects of buprenorphine as similar to equipotent doses of morphine or heroin (Sporer, 2004). Investigators have found that the blockade efficacy of Suboxone is dose-related, and that doses of up to 32/8 mg of buprenorphine/naloxone provide only partial blockade when subjects receive a high dose of an opioid agonist (Strain, Walsh et al, 2002).
3. Some “doctor-shopping” and other diversion may represent efforts at self-medication rather than intentional abuse. For example, it may involve patients whose physicians prescribe less than the recommended therapeutic dose of buprenorphine, or who are unable to access addiction treatment (Feroni, Peretti-Watel et al., 2005).
4. An unknown portion of the supply of buprenorphine diverted to non-medical use is accessed through sources other than prescribing physicians. Such sources include Internet pharmacies and illegally imported drugs sold on illicit street markets (Forman, Woody et al., 2006; Wilford, Smith et al., 2005).
5. Specialized physician training in the use of buprenorphine, coupled with efforts to link such physicians with addiction specialists who can serve as sources of consultation and referral, is a promising strategy for improving outcomes and reducing diversion and abuse.

**Recommendations.** In response to the foregoing findings, the outside experts formulated the following recommendations.

**Access to Treatment:** The outside experts endorsed SAMHSA/CSAT’s efforts to recruit and train additional physicians to use buprenorphine in office-based practice, because one factor in non-medical use of buprenorphine is lack of access to adequate and appropriate addiction care. Thus, the experts agreed that the answer to problems with buprenorphine (or methadone, or other opiates) involves more – rather than less – access to these important therapies.

**Reimbursement Policies:** Office-based treatment of addiction (particularly maintenance treatment) should be compensated at parity with other physician services of similar complexity. The outside experts agreed that it also is important to eliminate distortions in the payment system, such as policies that cover detoxification but not maintenance treatment with buprenorphine. Such distortions may be an underlying cause of the relatively high proportion of patients who are detoxified but do not receive the follow-up care necessary to achieve and sustain recovery.

**Physician Training:** The outside experts examined the training of physicians who prescribe buprenorphine. The curriculum – developed in concert with addiction specialty organizations – provides a structured, uniform set of materials that address a variety of important issues in the treatment of opioid-dependent patients.

Initially, the training programs attracted primarily physicians who already had an interest or experience in addiction medicine, as evidenced by the fact that 80% of the physicians who attended the courses already were treating patients with addictions. (Although physicians who already are certified to treat addictions do not need to take the 8-hour training in order to be approved to prescribe buprenorphine, many reported that they took the course to learn about buprenorphine as a new treatment modality.) Increasingly, however, the majority of physicians attending the courses are engaged in primary practice. Others are in medical school or residency training. Unlike the early participants, these physicians come to training without a solid understanding of addiction science and practice. This shift means that the training courses now must meet a different set of knowledge needs. To do so, the outside experts endorsed the following strategies:

- Physician and counselor training and mentorship should employ educational designs built around small group interaction and active learner participation, as well as educational outreach by experts or trained facilitators and the engagement of opinion leaders.
- Training programs should devote more time to patient selection and use of criteria to match patients' needs to specific treatment services, including counseling and other non-pharmacologic therapies.
- Non-physician staff should be engaged in assisting prescribing physicians with some support and coordination activities. Pharmacists should have an increased role in patient education and monitoring.

Further, the experts suggested that SAMHSA/CSAT work with medical and addiction specialty groups to explore ways to provide additional training. For example, the existing training curriculum could be separated into two parts: one for those already in addiction practice and another for physicians who are not experienced in treating addictions. Alternatively, an adjunct course could be offered to physicians who lack addiction experience, perhaps after they have used buprenorphine for 6 to 12 months in clinical practice. Yet a third option would be to require additional training as a prerequisite to continue to hold a waiver (such recertification requirements are common in many areas of medicine).

Several useful models are available. For example, Elinore McCance-Katz, M.D., has developed a buprenorphine training course for physicians and medical students who are not experienced in addiction treatment, as well as for nurses, counselors, pharmacists, nurse practitioners, and physician assistants. The 9¼-hour course is conducted on Saturdays, with a practicum the following week from Monday through Friday. The course involves ongoing expert medical support and program evaluation.

At Columbia University, Herbert Kleber, M.D., has developed a four-hour on-line course combined with a four-hour, hands-on clinical training seminar. In addition to the basic curricula covered in the standard buprenorphine trainings, topics covered include:

- Induction/stabilization
- Maintenance treatment
- Detoxification/dose tapering
- Special treatment populations (pregnancy, adolescence, pain)
- Case studies in selecting an appropriate level of care.

On-line training courses are particularly helpful in reaching physicians who practice in rural areas or who are in solo practice. The American Academy of Addiction Psychiatry and the American Psychiatric Association have developed Web-based instructional models that allow physicians to obtain the required training on-line. Users can study individual modules or the entire 13-module, 9-hour course. The American Society of Addiction Medicine also offers the course on CD-Rom.

***Expand CSAT's and the States' Ability to Track Patterns of Use:*** The manufacturer's post-marketing surveillance reports are not being provided to SAMHSA/CSAT or State SSAs on a routine basis. SAMHSA/CSAT should explore with FDA the possibility of obtaining these reports at the time they are filed with FDA, for use in executing its important monitoring and technical assistance responsibilities.

There also is a need to "fill in" missing data and to obtain clarification of some data. For example, the most widely used datasets do not differentiate among formulations or capture the indication for which buprenorphine was prescribed or used. Also, the detection by the Northern New England Poison Control Centers (and similar centers elsewhere) of buprenorphine formulations that are not approved for use in the U.S. suggests that an unknown amount is being illegally imported. In addition, medical examiners and toxicologists in emergency departments are not routinely screening for buprenorphine, which requires a separate test at additional expense. Thus, it is possible that problems with buprenorphine are being under-reported.

SAMHSA/CSAT should consider developing a template or protocol to assist the SSAs in compiling and analyzing the available information to monitor the medical and non-medical use of buprenorphine, so that early intervention can be taken to interrupt and minimize any non-medical use.

***Continue the State's Collaborative Efforts:*** A number of the findings of this assessment require additional examination. The outside experts commended the officials of Vermont and other States for their willingness to engage in such self-assessment, and endorsed SAMHSA/CSAT's willingness to assist the States with a strategic approach that engages public and private sector stakeholders in cooperative efforts.

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## **APPENDIX A**

### **FEDERAL AND STATE OFFICIALS CONSULTED FOR THE ASSESSMENT**

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The active participation and many contributions of the following State and Federal officials are acknowledged with gratitude:

- Anton C. Bizzell, M.D., Medical Director, Division of Pharmacologic Therapies, Center for Substance Abuse Treatment/SAMHSA
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## **APPENDIX B**

### **INFORMATION SOURCES CONSULTED FOR THE ASSESSMENT**

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#### **NATIONAL DATA**

Automation of Reports and Consolidated Orders System (ARCOS)  
Drug Abuse Warning Network (DAWN) – Emergency Department Data  
Drug Abuse Warning Network (DAWN) – Medical Examiner and Coroner Dataset  
National Forensic Laboratory Information System (NFLIS)  
DEA Theft and Loss Reports (106 Forms)  
Manufacturer’s Post-Marketing Surveillance System (as reported at a CSAT conference)  
RADARS data (as reported at a CSAT conference)

#### **STATE-LEVEL DATA**

New England Poison Control Center  
Vermont Treatment Program Data  
Vermont Medicaid Claims Data  
State and Local Law Enforcement and Laboratory Data  
Vermont Buprenorphine Guidelines

#### **OTHER INFORMATION**

Literature Review  
Emailed Key Informant Survey  
2003 Buprenorphine Summit Consensus Statement  
2005 Buprenorphine Summit Draft Report  
NASADAD Survey of State Directors  
WHO Scheduling Material



## APPENDIX C

### OUTSIDE EXPERTS CONSULTED FOR THE CASE STUDY

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**TECHNICAL REPORT:  
ANALYSIS OF AVAILABLE DATA ON BUPRENORPHINE AS OF APRIL 9, 2006  
BY  
JANE C. MAXWELL, PH.D.**

**Data Sources.** The data analysis conducted for this report employed data from the Automation of Reports and Consolidated Orders System (ARCOS), Vermont Medicaid records, DAWNLive! Emergency Department reports, DAWN medical examiner reports, National Forensic Laboratory Information System (NFLIS) reports, treatment data from the Vermont Office of Drug and Alcohol Programs and SAMHSA’s Treatment Episode Data Set (TEDS), the Northern New England Poison Control Center, and the Vermont corrections system.

**Data from DEA’s Automation of Reports and Consolidated Orders System (ARCOS).** In the national ARCOS data, Vermont leads in the consumption of Subutex and Suboxone tablets per 100,000 population, followed by Maine, Massachusetts, Rhode Island, and Maryland. (Exhibit 1).

**Exhibit 1. ARCOS Data: States With the Highest Consumption of Buprenorphine (in grams and dosage units per 100,000 population), January – December 2005**

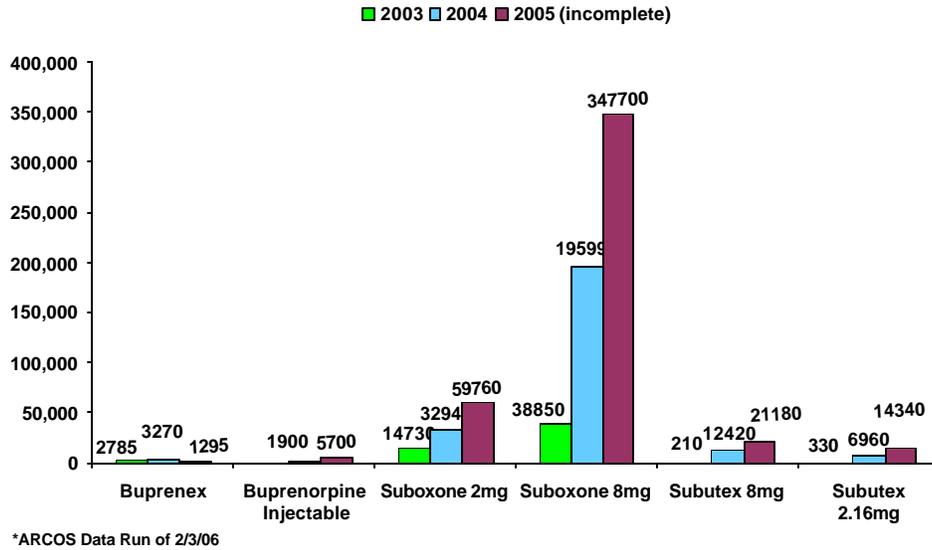
	<b>Dosage Units Per 100,000 Pop.</b>		<b>Grams Per 100,000 Pop.</b>
Vermont	82,948	Vermont	583.56
Maine	53,573	Maine	324.02
Massachusetts	37,642	Massachusetts	253.17
Rhode Island	31,783	Rhode Island	204.27
Maryland	20,588	Maryland	127.56
<b>U.S. Average</b>	<b>9,090</b>	<b>U.S. Average</b>	<b>56.73</b>

Source: U.S. Drug Enforcement Administration: Automation of Reports and Consolidated Orders System, ARCOS 2, Report 4, 01/01/2005 to 12/31/2005.

Exhibits 45 and 46 at the end of this chapter provide ARCOS data for all States.

Of the various formulations of Suboxone, the largest amount shipped to Vermont is the 8 mg. formulation (Exhibit 2). A comparison of Medicaid and ARCOS data shows that the number of dosage units per patient and the number of dosage units prescribed per physician vary greatly from one Vermont county to another. This may be partially attributable to concentrations of dispensing pharmacies in certain counties. Even given this factor, however, the ability to compare the number of patients, the number of prescribing physicians, and the number of dosage units shipped into a given county provides a useful method for tracking patterns of use and monitoring for possible diversion.

## Exhibit 2. Vermont ARCOS Data – Total Number of Dosage Units of Buprenorphine Shipped into the State, 2003-2005\*



Source: U.S. Drug Enforcement Administration: Automation of Reports and Consolidated Orders System



Exhibit 3 shows the number of Medicaid patients receiving buprenorphine in each county, the number of waived physicians, and the dosage amounts of the various formulations of buprenorphine. The last column on the right presents a calculation of the expected number of patients in each county if each patient received the dosage level recommended by Vermont State authorities (two 8mg. Suboxone pills per day) for the time period covered by the ARCOS data in

Exhibit 3. Based on this estimate (and the fact there are additional private patients receiving the dosage units reported by ARCOS), the total dosage units dispensed in Vermont is reasonable, since there are more Medicaid patients in treatment (665) than the estimated number if each received two 8 mg. pills per day (527 patients).

In addition, Exhibit 3 shows that Suboxone and Subutex are being dispensed in Vermont counties where there are no physicians who hold waivers to prescribe the drugs in office-based treatment of addiction. This may reflect patients whose physicians are located in one county and who cash their prescriptions at pharmacies in another. Or it could reflect off-label use of these products to treat pain.

**Exhibit 3. Vermont Data-Medicaid Patients Who Received Buprenorphine in FY 2005, Compared to Vermont Physicians with Waivers to Prescribe Buprenorphine and Number of Dosage Units Dispensed, by County, January-November 2005**

Vermont County	# Medicaid Patients		Subutex 2.16 DU	Subutex 8mg DU	Suboxone 2mg DU	Suboxone 8mg DU	Total # Dosage Units	DU per 10,000 Population	# Patients if each received 2 8mg pills /day*11 mos
	Receiving Buprenorphine	# Waivered Doctors							
ADDISON	18	0	1,320	300	60	9,150	10,830	3,011	13.9
BENNINGTON	29	6	960	5,280	3,090	14,370	23,700	6,406	21.8
CALEDONIA	24	9	270	1,140	2,550	15,300	19,260	6,484	23.2
CHITTENDEN	184	16	5,250	2,370	14,970	80,970	103,560	6,970	122.7
FRANKLIN	5	1	-	420	3,600	26,220	30,240	6,658	39.7
GRAND ISLE	4	0	-	-	-	90	90	101	0.1
LAMOILLE	28	4	1,350	2,100	9,060	26,250	38,760	16,683	39.8
ORANGE	18	1	30	690	90	1,650	2,460	872	2.5
ORLEANS	33	3	270	990	1,350	9,270	11,880	4,521	14.0
RUTLAND	149	13	450	4,770	3,780	61,680	70,680	11,148	93.5
WASHINGTON	79	22	2,940	1,860	8,880	57,180	70,860	12,209	86.6
WINDHAM	48	18	1,320	450	10,980	34,650	47,400	10,720	52.5
WINDSOR	46	8	180	810	1,350	10,920	13,260	2,309	16.5
TOTAL	665	101	14,340	21,180	59,760	347,700	442,980	82,948	526.8

Source: U.S. Drug Enforcement Administration: Automation of Reports and Consolidated Orders System, ARCOS 2, Report 4, 01/01/2005 to 12/31/2005.

Gretchen Feussner of DEA's Office of Diversion Control reported that the DEA field offices have not found buprenorphine diversion in Vermont as of February, 2006. However, she had concerns about who is doing the prescribing in counties without any approved physicians and if there are off-label prescriptions for pain. These concerns are being researched by Dr. Todd Mandell of the Vermont Office of Drug and Alcohol Programs.

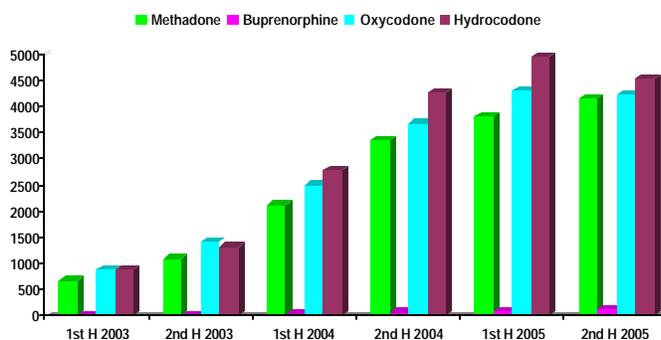
*Findings: On a per capita basis, Vermont leads all States in the number of dosage units and grams of Subutex and Suboxone distributed per 100,000 population. This may be attributable to a lack of methadone maintenance treatment, or because the State has been proactive in recruiting physicians to engage in office-based treatment of addiction. A comparison of Medicaid and ARCOS data shows that the number of dosage units per patient and the number of dosage units prescribed per physician vary from one Vermont county to another. The ability to compare the number of patients, the number of prescribing physicians, and the number of dosage*

units shipped into a given county provides a useful method for tracking patterns of use and monitoring for possible diversion. A comparison of Medicaid and ARCOS data shows that the amount of buprenorphine going into Vermont is reasonable, based on the number of Medicaid buprenorphine patients being served and the recommended dosage levels.

**Data from DAWN Emergency Department Reports.** DAWN collects data from a national sample of hospitals on emergency department (ED) visits related to recent drug use. The published DAWN reports are weighted and representative. This analysis employed data from DAWN Live!, a real-time, on-line system. The DAWN Live! data are unweighted and are not representative of all EDs nationally. The 2003 dataset is complete but 2004 and 2005 data can continue to change on a daily basis as reports are added and verified.

The number of metropolitan areas in the DAWN network decreased in 2005, therefore, Exhibits 4, 5, 6, and 7, which show trends over time, include only those metro areas that have consistently reported to DAWN from 2003-2005 (see Exhibits 34-36 at the end of this chapter for detailed drug reports by DAWN metro area).

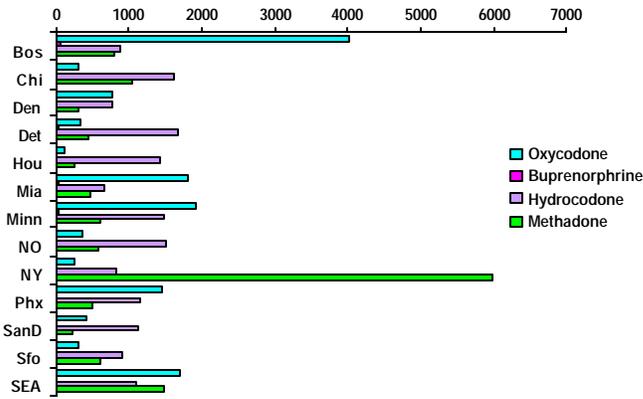
**Exhibit 4. DAWN Live! Continuously Reporting Metro Areas – Emergency Department Reports of Buprenorphine, Methadone, Oxycodone, and Hydrocodone Compared, 2003 - 2005\***



\*The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: DAWN, OAS, SAMHSA (downloaded 2/12/2006)

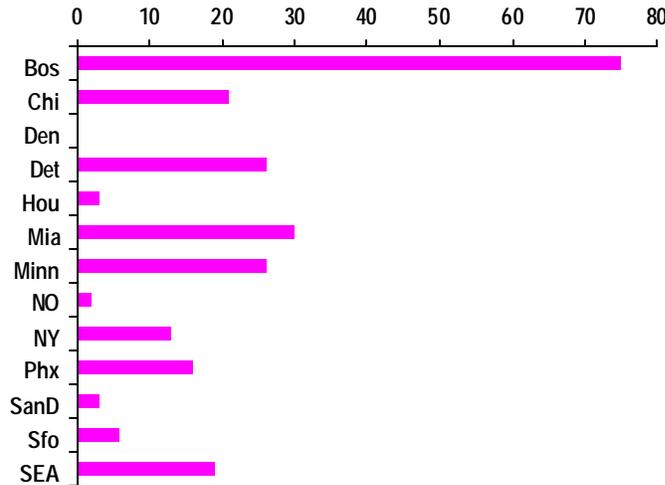
The DAWN ED data come from all reporting sites. There are no metropolitan areas in northern New England which report as DAWN sites. Boston is the closest DAWN site, and the largest number of buprenorphine reports from any single reporting site was from Boston. There appears to be a correlation between reports of buprenorphine and oxycodone in the DAWN ED data.

**Exhibit 5. DAWNLive! Continuously Reporting Metro Areas –  
Emergency Department Reports of Buprenorphine, Methadone,  
Oxycodone, or Hydrocodone, by Metro Area, 2003 – 2005\***



\*The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: DAWN, OAS, SAMHSA (downloaded 2/12/2006)

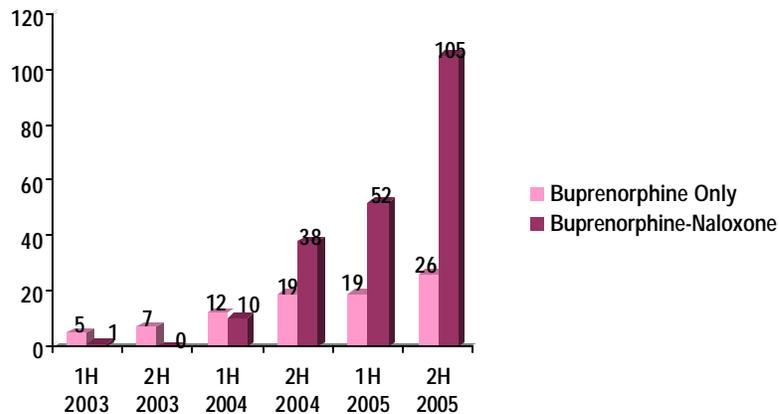
**Exhibit 6. DAWNLive! Continuously Reporting Metro Areas  
Emergency Department Reports of Buprenorphine, by  
Metro Area, 2003 – 2005\***



\*The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: DAWN, OAS, SAMHSA (downloaded 2/12/2006)

The DAWN ED dataset distinguishes between buprenorphine alone or buprenorphine+naloxone; however, only 2 percent of the DAWN ED buprenorphine cases were confirmed by toxicology tests. In all other cases, the drug category was determined from information in the patients' charts. Until the second half of 2004, reports of buprenorphine alone outnumbered reports of naloxone with buprenorphine. Since mid-2004, the number of cases of the combination drug began to increase with the use of Suboxone for opioid treatment (Exhibit 7).

**Exhibit 7. DAWNLive! Continuously Reporting Metro Areas – Emergency Department Reports of Buprenorphine, by Drug Formulation, 2003 - 2005\***

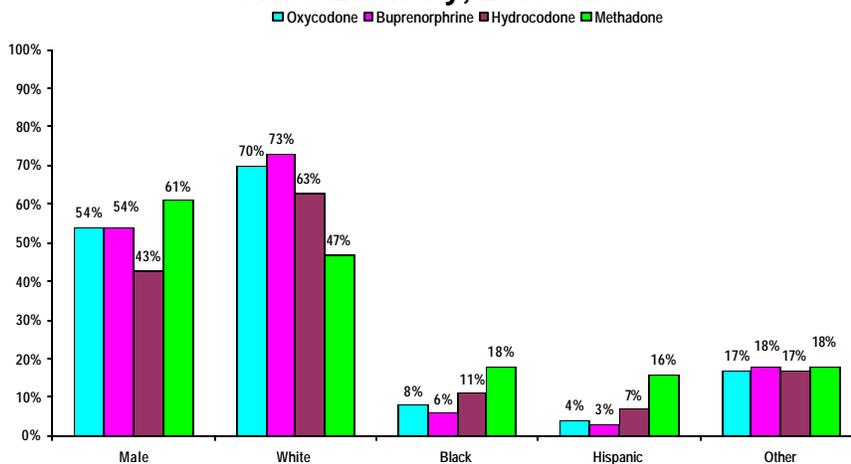


\*The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: DAWN, OAS, SAMHSA, 2/12/06

Because of the small number of buprenorphine reports, data were merged for 2003-2005 from all sites (whether continuously reporting or dropped in 2005) to develop a picture of the characteristics of patients presenting in EDs reporting use of buprenorphine in Exhibits 8-14. Nationally, there were 268 reports of buprenorphine+naloxone and 123 of buprenorphine alone for the period 2003-2005 as of February 11, 2006.

Compared to reports for the other opiate drugs, buprenorphine patients are the most likely to be White and the methadone patients are the least likely to be White (Exhibit 8).

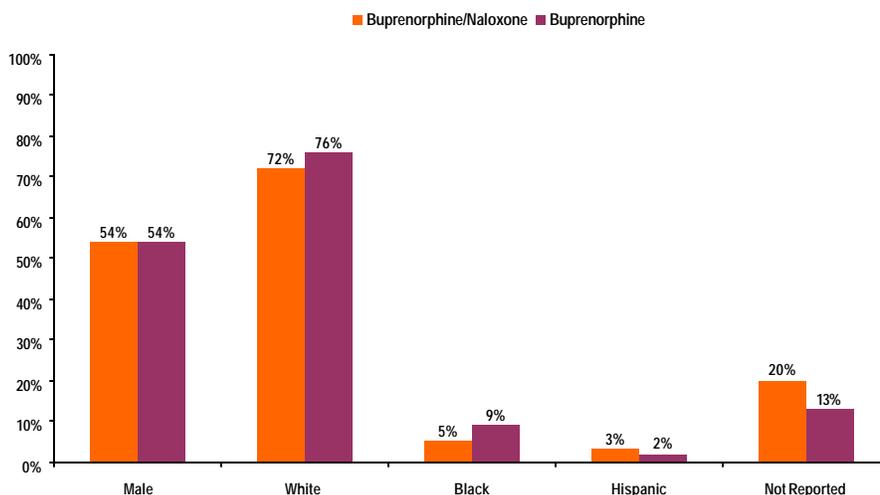
**Exhibit 8. DAWNLive! All Reporting Metro Areas – Emergency Department Reports Buprenorphine, Methadone, Hydrocodone and Oxycodone, by Race/Ethnicity, 2003 – 2005\***



\*The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: DAWN, OAS, SAMHSA, (downloaded 1/13/2006)

The demographic profiles for patients reporting use of buprenorphine alone and buprenorphine+naloxone were similar (Exhibit 9).

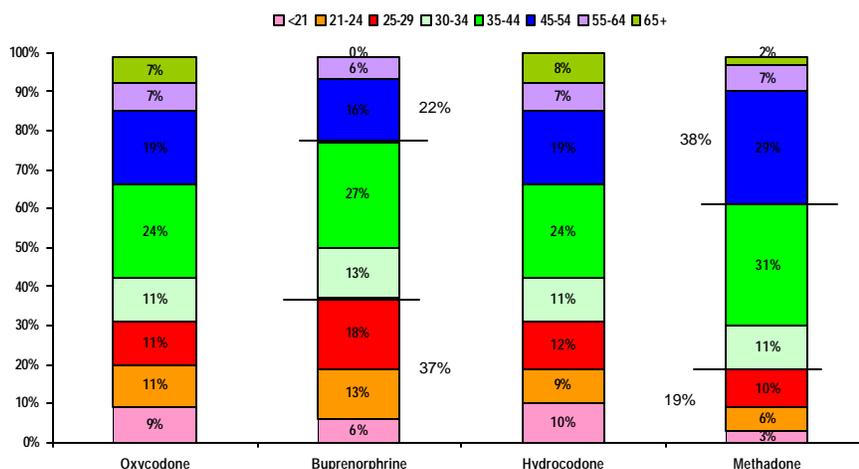
### Exhibit 9. DAWNLive! All Reporting Metro Areas – Emergency Department Reports of Buprenorphine, by Race/Ethnicity and Drug Formulation, 2003 - 2005\*



\*The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: DAWN, OAS, SAMHSA, downloaded 2/11/2006)

Buprenorphine patients were the youngest (37 percent under age 30) and methadone patients the oldest, with 19 percent under age 30 and 38 percent ages 45 and older (Exhibit 10).

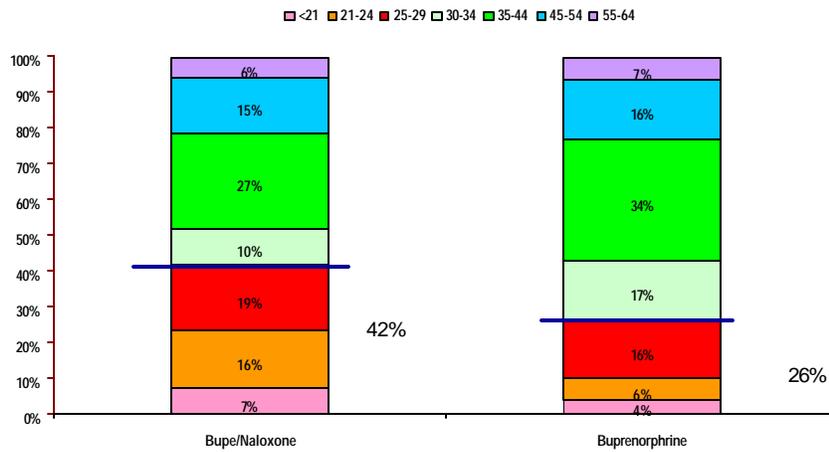
### Exhibit 10. DAWNLive! All Reporting Metro Areas – Emergency Department Reports of Buprenorphine, Methadone, Hydrocodone or Oxycodone, by Age Group, 2003 - 2005\*



\*The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: DAWN, OAS, SAMHSA, downloaded 1/13/2006.

Patients who used buprenorphine+naloxone were younger than those who just used buprenorphine: 42 percent were under age 30, as compared to 26 percent of the buprenorphine-only patients (Exhibit 11).

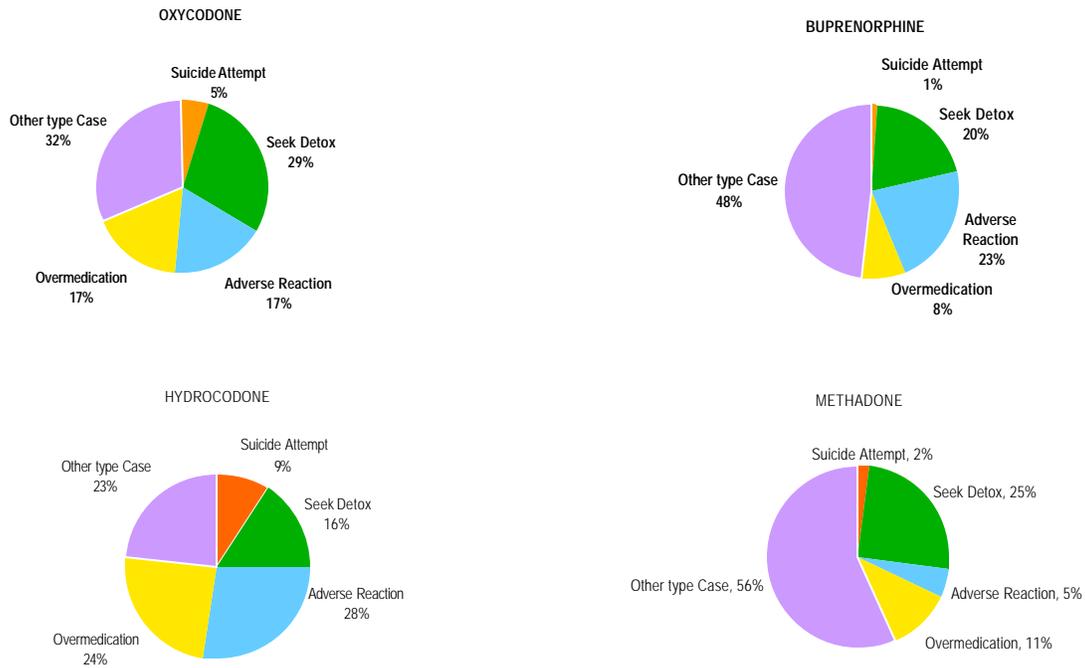
**Exhibit 11. DAWNLive! All Reporting Metro Areas –  
Emergency Department Reports of Buprenorphine, by Age  
Group and Drug Formulation, 2003 - 2005\***



\*The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: DAWN, OAS, SAMHSA, dwn 2/12/2006.

Among the Other Opiate ED admissions, oxycodone patients were the most likely to be seeking detoxification (29 percent), while hydrocodone patients were the least likely (16 percent). Hydrocodone patients were the most likely to present in the ED because of an adverse drug reaction (28 percent) and methadone patients the least likely (5 percent) (Exhibit 12). Hydrocodone patients also were more likely to seek help for overmedication (24 percent), while buprenorphine patients the least likely to do so (8 percent).

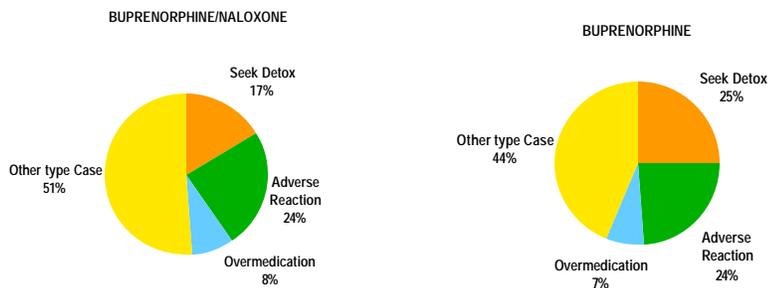
## Exhibit 12. DAWNLive! All Reporting Metro Areas – Emergency Department Reports of Buprenorphine, Methadone, Hydrocodone and Oxycodone, by Case Type, 2003 - 2005\*



\*The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: DAWN, OAS, SAMHSA, downloaded 1/13/2006.

Patients using buprenorphine alone were more likely to be seeking detoxification than were those using buprenorphine+naloxone (25 percent vs. 17 percent) (Exhibit 13).

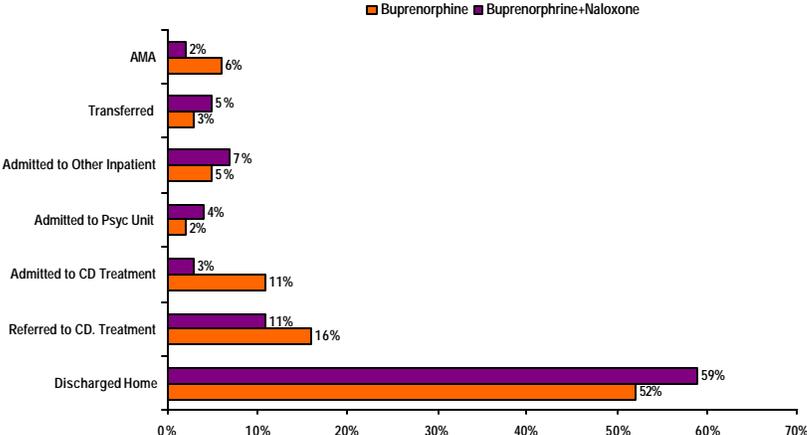
## Exhibit 13. DAWNLive! All Reporting Metro Areas – Emergency Department Reports of Buprenorphine, by Case Type and Drug Formulation, 2003 - 2005\*



\*The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: DAWN, OAS, SAMHSA, downloaded 2/12/2006.

At discharge from the ED, 52 percent of patients using buprenorphine alone and 59 percent of patients using buprenorphine+naloxone were discharged to their homes, 16 percent of buprenorphine-only and 11 percent of buprenorphine+naloxone patients were referred to substance abuse treatment, while 11 percent of buprenorphine alone and 3 percent of combination drug patients were admitted to treatment (Exhibit 14).

**Exhibit 14. DAWNLive! All Reporting Metro Areas: Emergency Department Reports of Buprenorphine, by Patient Disposition, 2003 - 2005 \***



\*The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: DAWN, OAS, SAMHSA, downloaded 2/12/2006.

By comparison, among the patients using hydrocodone, 52 percent were discharged to their homes, 11 percent were admitted to an inpatient unit, 6 percent were referred to substance abuse treatment, and 6 percent were admitted to substance abuse treatment. Of the oxycodone patients, 45 percent were discharged home, 11 percent were admitted to an inpatient unit, 10 percent were referred to substance abuse treatment, and another 10 percent admitted to such treatment. Of the methadone patients, 48 percent were discharged home, 12 percent sent to inpatient units, 9 percent were referred to substance abuse treatment and another 6 percent were admitted to treatment.

Among the patients using buprenorphine+naloxone, 28 percent ingested the drug orally (route of administration was not reported for 72 percent). Among the patients using buprenorphine alone, 25 percent ingested the drug orally and 1 percent injected it (route of administration was not reported for 74 percent).

In comparison, for hydrocodone, 52 percent reported oral ingestion, and route of administration was not reported for 48 percent. For oxycodone, 45 percent used the drug orally, 1 percent injected it, 2 percent inhaled it, and 52 percent not reported. For methadone, 22 percent ingested the drug orally, 1 percent injected it, and 76 percent not reported.

For 2003-2005, DAWNLive! contained no reports of buprenorphine-related deaths. There were 32 reports of deaths related to hydrocodone, 47 for oxycodone, and 48 for methadone.

*Findings: In comparison to DAWN patients reporting use of other opiates, the number of patients presenting for problems related to buprenorphine is small. However, the number is*

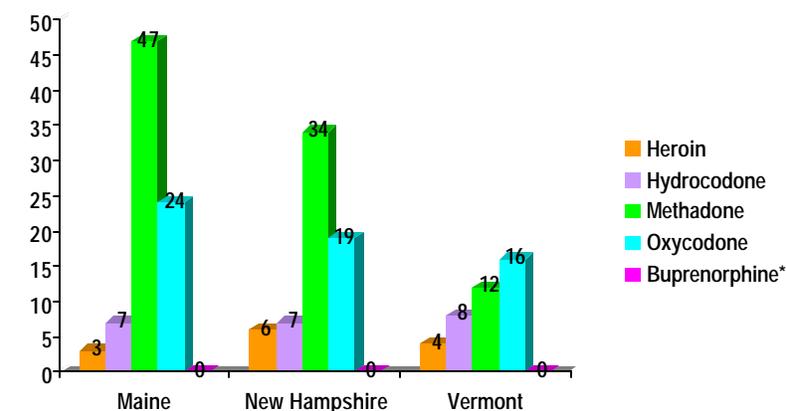
increasing, especially cases involving buprenorphine+naloxone. Overall, buprenorphine patients are younger than other opiate patients and are more likely to be referred to treatment or admitted to treatment directly from the ED, which could be an indication of a population that is self-medicating with buprenorphine and actively seeking treatment for their opioid dependence.

**Data from the DAWN Medical Examiner Reports.** Unlike DAWN ED data, DAWN ME reports are representative only of the locale for which they are reported, and they cannot be used to draw nationwide conclusions. Data from medical examiners in Vermont, Maine, and New Hampshire are included in the 2003 DAWN Medical Examiner (ME) report.

No buprenorphine deaths were reported in 2003 by any of the medical examiners in 122 jurisdictions in 35 metropolitan areas and six States, but toxicological testing for buprenorphine requires a separate test. This test was not done by the medical examiners reporting the New England cases and it may not be done on a routine basis elsewhere in the U.S.

As shown in Exhibit 15, in 2003, the largest number of drug-related deaths in Maine and New Hampshire involved methadone, while the largest number in Vermont involved oxycodone. Fewer deaths involved heroin than methadone or oxycodone.

**Exhibit 15. Vermont, New Hampshire and Maine DAWN Medical Examiner Reports – Deaths Related to Buprenorphine, Methadone, Hydrocodone, Oxycodone or Heroin, 2003**



\*Special tests to identify buprenorphine were not run.

Source: SAMHSA Office of Applied Studies: Drug Abuse Warning Network, 2003.

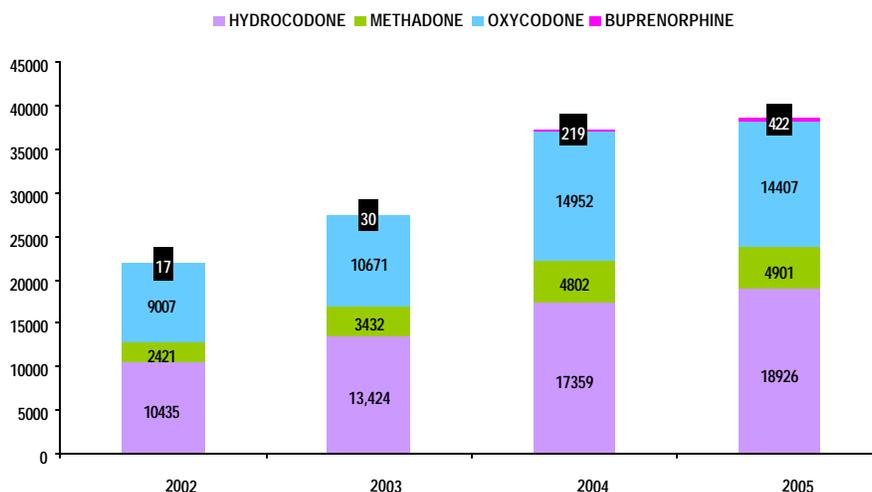
*Findings: No buprenorphine deaths were reported in 2003 in Vermont or by any of the other 122 reporting medical examiners in 35 metropolitan areas captured in the DAWN ME system. Toxicological testing for buprenorphine requires a separate test. It was not done by the medical examiners reporting the New England cases and may not have been done on a regular basis by any medical examiner. This raises the possibility that buprenorphine deaths are being under-reported.*

**Toxicology Lab Reports.** The National Forensic Laboratory Information System (NFLIS) is a Drug Enforcement Administration (DEA) program that systematically collects drug chemistry analysis results and other information from cases analyzed by State, local, and Federal forensic

laboratories. As of February 2005, 41 State forensic laboratory systems and 81 local or municipal forensic laboratories, representing a total of 244 individual labs, were participating in NFLIS. Maine reports to NFLIS but New Hampshire and Vermont do not. The 2005 data are incomplete, and on-line reporting is updated daily as more cases are received.

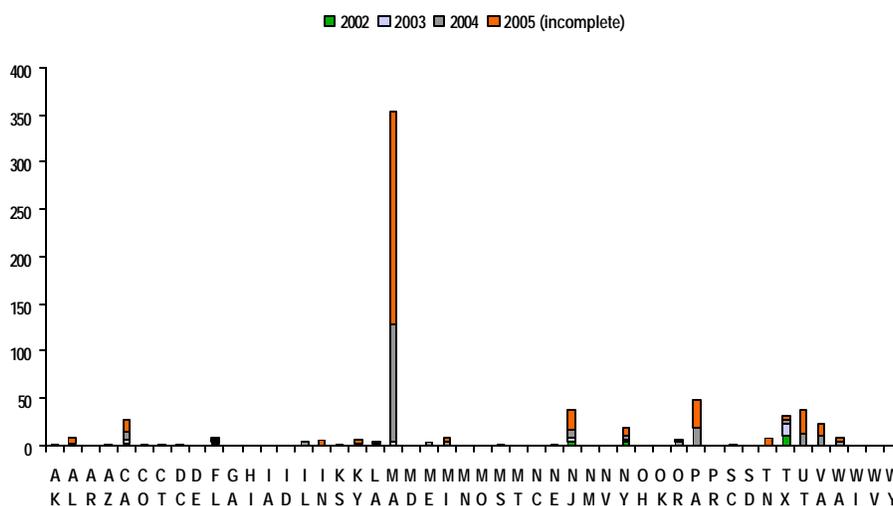
NFLIS is one of the few indicator systems that uses lab tests to confirm the identity of drugs. The actual number of buprenorphine reports is very small in comparison to the number of cases of hydrocodone and oxycodone (Exhibit 16). The largest number of cases were reported in Massachusetts (Exhibit 17).

**Exhibit 16. Buprenorphine, Methadone, Hydrocodone, or Oxycodone Items Analyzed by Forensic Laboratories Reporting to NFLIS: 2002-2005**



Source: U.S. Drug Enforcement Administration: National Forensic Laboratory Information System

**Exhibit 17. Buprenorphine Items Analyzed by Forensic Laboratories by State and Reported to NFLIS: 2002-2005**



Source: U.S. Drug Enforcement Administration: National Forensic Laboratory Information System

See exhibits 37-44 for a full listing of Other Opiate items identified by NFLIS-reporting labs by State for the years 2002-2005. There appears to be a correlation in the locations of laboratories reporting the presence of oxycodone and buprenorphine.

The head of the Vermont State Police Laboratory reported buprenorphine has been seen in only eight cases in 2004 and 2005. All were buprenorphine+naloxone. Five seizures involved one tablet each, one seizure was of two tablets, and one involved three tablets. Thus, diversion of buprenorphine does not appear to be a large problem at this time, based on the Vermont State Police laboratory records.

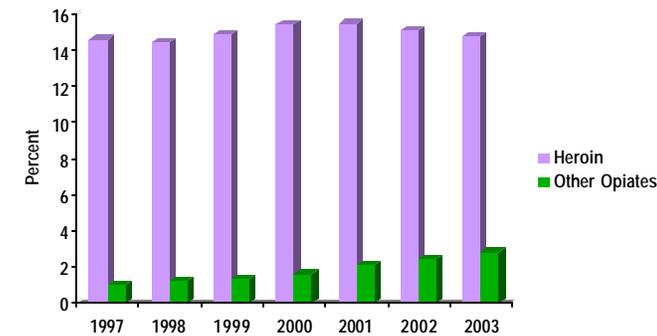
*Findings: NFLIS is one of the few indicator systems that tests and reports the presence of buprenorphine. While the number of buprenorphine items is small in comparison to the number of hydrocodone, methadone, and oxycodone items reported, buprenorphine numbers nationally are increasing. The number of buprenorphine items reported by the Vermont State Police laboratory is also low.*

**Data on Substance Abuse Treatment Admissions.** Two different datasets were used for this analysis. The Treatment Episode Data Set (TEDS) is collected on all patients served by treatment providers funded by the State and is reported to SAMHSA. Buprenorphine is not reported separately but is included in the “Other Opiate” category.

Patients who receive buprenorphine funded by Medicaid are captured in a Medicaid dataset and some of those patients also are receiving counseling services from State-funded providers and are reported in TEDS. Consequently, there is some double-counting, and there is no way to identify the buprenorphine patients who are also in the TEDS dataset. Vermont TEDS data are not complete for calendar year 2005. However, Vermont Medicaid data are complete for fiscal year 2005. TEDS collects more extensive data on each patient than does Medicaid. Data are not collected on privately-funded patients receiving buprenorphine.

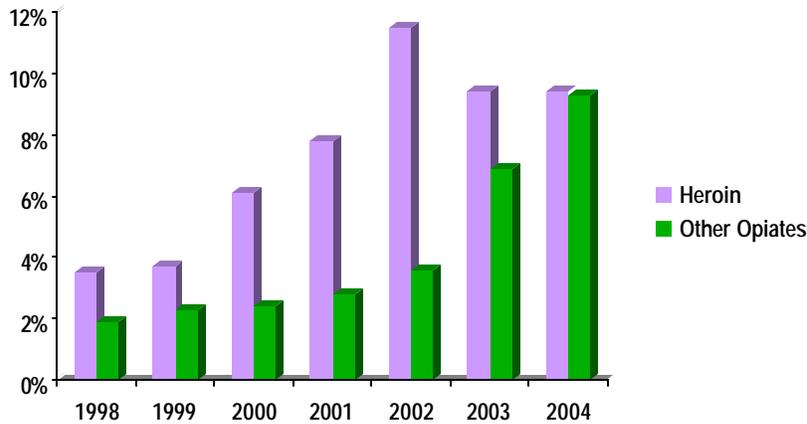
TEDS admissions of patients who report a primary problem with other opiates (which includes oxycodone, hydrocodone, and buprenorphine) are increasing nationally as well as in Vermont (Exhibits 18 and 19).

**Exhibit 18. Nationwide TEDS Data – Treatment Admissions Related to Heroin or “Other Opiates” (including Buprenorphine) as the Primary Drug of Abuse, 1997 – 2003**



Source: Substance Abuse and Mental Health Services Administration (Office of Applied Studies): Treatment Episode Data Set.

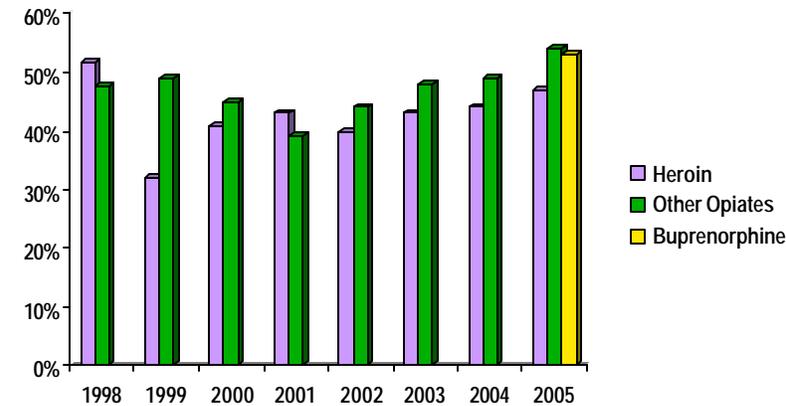
**Exhibit 19. Vermont TEDS Data – Treatment Admissions Related to Heroin or “Other Opiates” (including Buprenorphine) as the Primary Drug of Abuse, 1998 – 2004**



Source: Substance Abuse and Mental Health Services Administration (Office of Applied Studies): Treatment Episode Data Set.

To provide some context, the characteristics of Vermont patients who entered treatment with a primary problem with heroin and other opiates were analyzed, along with Medicaid data on buprenorphine clients in Exhibits 20, 21, and 22. Exhibit 20 shows that the percentages of TEDS clients in 2004 and buprenorphine Medicaid clients in 2005 who were female were similar.

**Exhibit 20. Vermont TEDS Data – Percent Female Treatment Admissions with Heroin, “Other Opiates” or Buprenorphine as the Primary Drug of Abuse: 1998 – 2005**

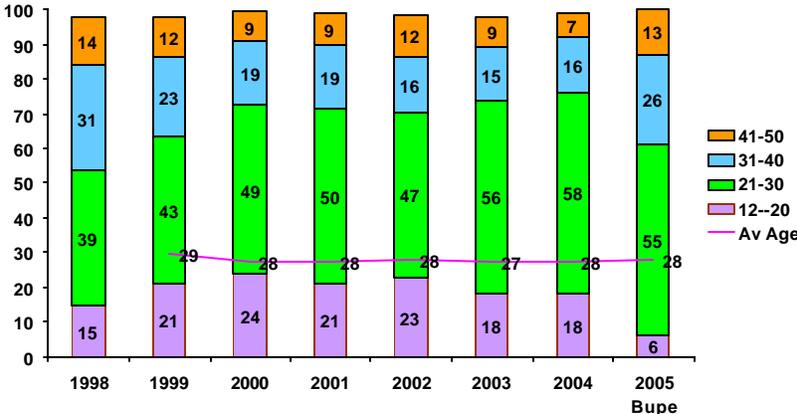


Sources: Vermont Medicaid data and Vermont Client Data System

Exhibits 21 and 22 show the age groups of Vermont patients for 1998-2004 as reported in TEDS, the age groups of Medicaid patients who received buprenorphine in 2005, and the average age of TEDS patients at the time of admission for problems with heroin or other opiates as reported in the Vermont treatment dataset. The buprenorphine patients were older than the TEDS heroin or other opiate patients. In 2004, 23 percent of the Vermont TEDS heroin patients and 35 percent of

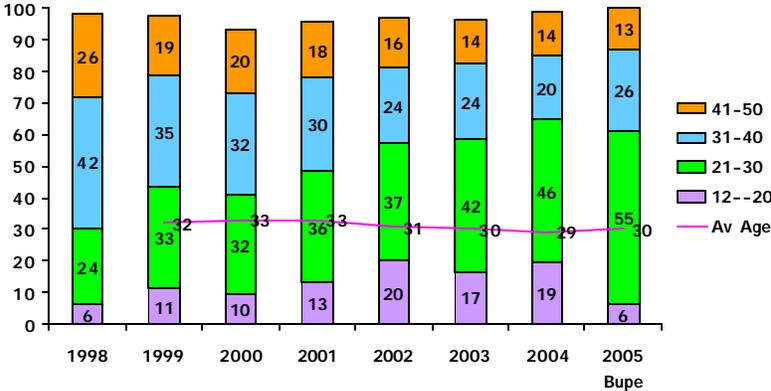
the TEDS other opiate patients were over age 30, as compared to 39 percent of buprenorphine patients in 2005. Yet Vermont patients were young when compared to treatment admissions nationwide. For 2003 (the latest year for which data are available), 69 percent of the TEDS heroin patients across the U.S. and 58 percent of the other opiate patients were over age 30.

**Exhibit 21. Vermont TEDS Heroin Treatment Admissions by Age Group: 1998-2004 and Buprenorphine Medicaid Clients: 2005**



Source: SAMHSA Office of Applied Studies: Treatment Episode Data Set, and Vermont Medicaid Data and Vermont Client Data System

**Exhibit 22. Vermont TEDS Other Opiate Admissions (including buprenorphine) by Age Group: 1998-2005 and Buprenorphine Medicaid Clients: 2005**

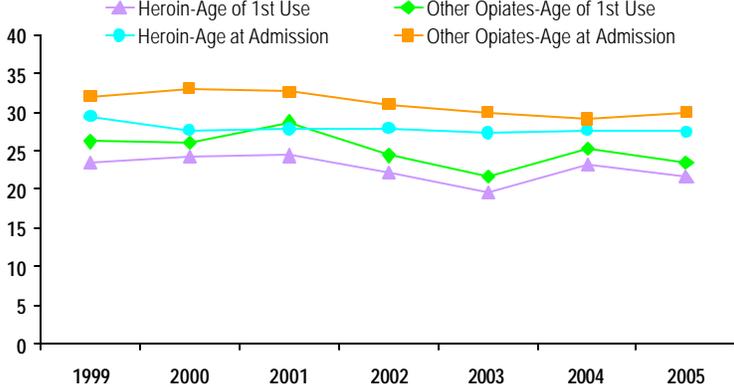


Source: SAMHSA Office of Applied Studies: Treatment Episode Data Set, and Vermont Medicaid Data and Vermont Client Data System

Although the Vermont patients were much younger than their counterparts elsewhere in the country, the patients in the other opiate category in Vermont were older than the patients being treated for heroin at the time they began using their primary drug of abuse (Exhibit 23). They also were older at the time of admission to treatment, were more likely to be employed full-time,

were less likely to be referred from the criminal justice system, and, until recently, were more likely to be first admissions to treatment and to have fewer treatment episodes in the preceding year. See Exhibit 33 for details on client characteristics by drug and by year.

**Exhibit 23. Vermont TEDS Treatment Admissions with Primary Problem of Heroin or Other Opiates: Age of First Use of Primary Problem Drug and Age at Admission: 1999-2005**

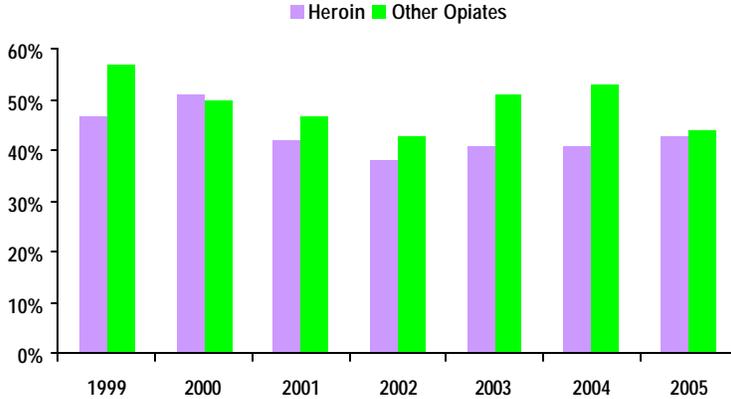


Source: Substance Abuse and Mental Health Services Administration (Office of Applied Studies): Treatment Episode Data Set

In 2005, the lag between first use of heroin and admission to treatment was less than 6 years for Vermont patients (Exhibit 23); in comparison, the lag for Texas patients was 15 years. The lag between first use and admission for other opiate patients in Vermont was slightly more than 6 years, compared to 10 years for other opiate patients in Texas. This short lag period is an indication of the recency of the opioid addiction problem in Vermont.

In addition, the decrease in the proportion of first admissions to treatment between 1999 and 2005 (and the increase in readmissions) reflects the newness of the opioid treatment system in Vermont and the growth of that system (Exhibit 24).

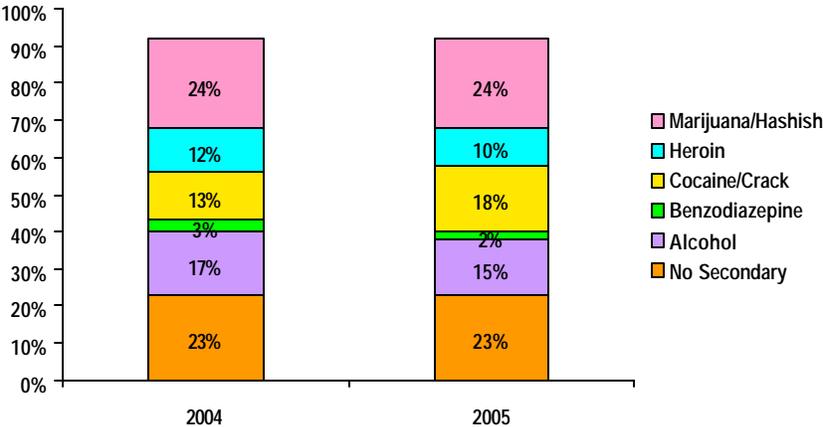
**Exhibit 24. Percent of Vermont Treatment Clients with a Primary Problem of Heroin or Other Opiates Who Are First Admissions to Treatment: 1999-2005**



Source: Substance Abuse and Mental Health Services Administration (Office of Applied Studies): Treatment Episode Data Set.

In the last two years, patients who used other opiates were more likely to use their primary drug on a daily basis but less likely to use their secondary drug on a daily basis. Patients whose primary drug was an other opiate were less likely than heroin users to have a problem with a secondary drug and, if they did, they were more likely to have a problem with marijuana. A small proportion reported problems with heroin (Exhibit 25). There was little change in the types of drugs reported as secondary drug problems between 2004 and 2005.

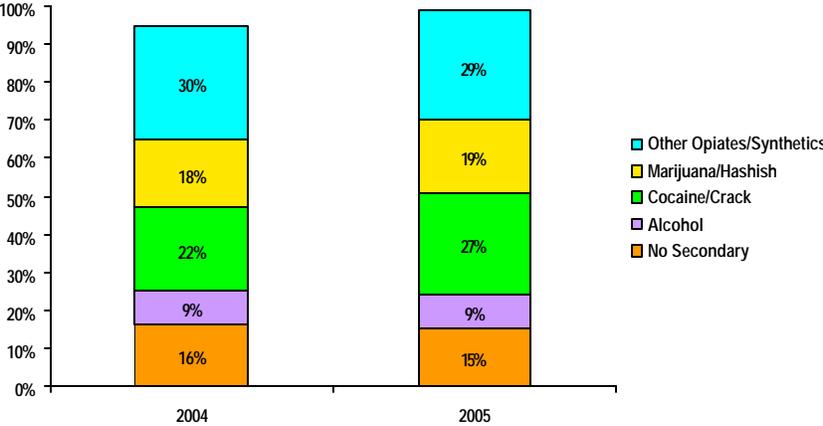
**Exhibit 25. Second Drug of Abuse of Vermont TEDS Clients with a Primary Problem with Other Opiates: 2004 & 2005**



Source: Vermont Client Data System

Vermont patients whose primary drug was heroin were more likely to have a secondary drug problem and to have a problem with other opiates or alcohol (Exhibit 26).

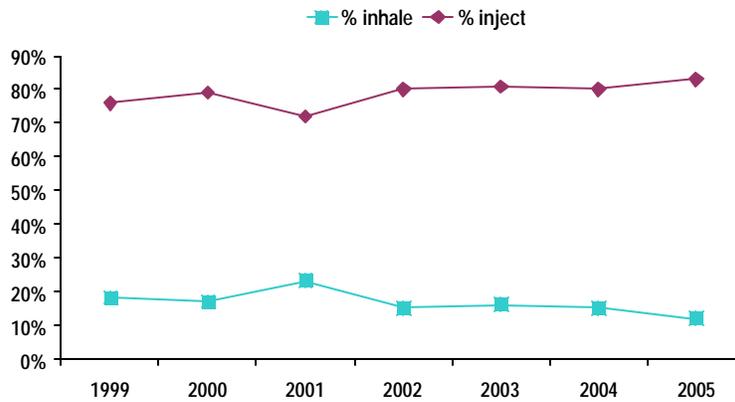
**Exhibit 26. Second Drug Problem of Vermont Clients Admitted to Treatment with a Primary Problem with Heroin: 2004 & 2005**



Source: Vermont Client Data System

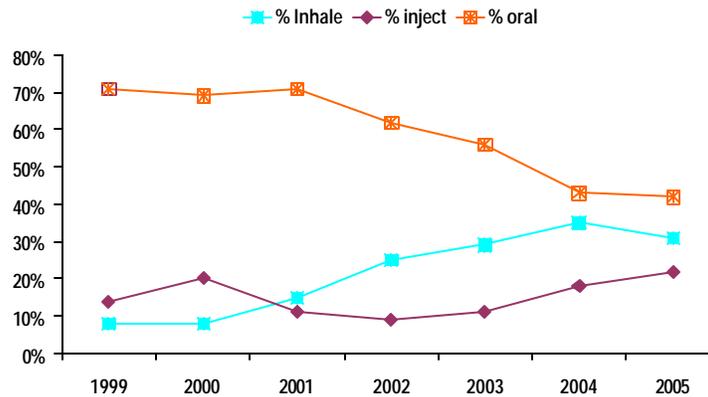
Most Vermont patients admitted for treatment of heroin were injection drug users (Exhibit 27).

**Exhibit 27. Route of Administration of Vermont Treatment Admissions with a Primary Problem with Heroin: 1999-2005**



Source: Vermont Client Data System

**Exhibit 28. Route of Administration of Vermont Clients Entering Treatment with a Primary Problem with Other Opiates (including buprenorphine): 1999-2005**



Source: Substance Abuse and Mental Health Services Administration (Office of Applied Studies): Treatment Episode Data Set.

The predominant route of administration reported by other opiate patients is changing from “oral” to “inhaling” and “injecting.” The increase in injecting is of concern because of its implications for disease transmission (Exhibit 28).

Peter Lee, Chief of Treatment for the Vermont Office of Drug and Alcohol Programs, pointed out that methadone is a recent treatment modality with a limited number of treatment slots for the estimated 2,000 Vermonters in need of treatment for opiate dependence. To meet this need, the State has worked hard to get as many physicians as possible to prescribe buprenorphine. As of March, 2006, 114 physicians had obtained a waiver to provide office-based buprenorphine. Mr. Lee felt there were still not enough slots available to treat those wanting services. He reported that some individuals were attempting to deal with their dependence and lack of methadone by

self-medicating with buprenorphine. There are problems with clients who should have been on methadone initially or who needed behavioral therapy in addition to buprenorphine.

Mr. Lee concluded that some diversion is occurring in Vermont, but he described it as “horizontal” diversion among addicts who rent pills for pill checks or who sell part of their prescription to someone who cannot yet access treatment. He had received anecdotal reports of buprenorphine being injected.

The Medicaid data included a large number of doctors who had prescribed buprenorphine who had not been waived into the program. Dr. Todd Mandell of the Vermont Office of Drug and Alcohol Programs is currently interviewing doctors who are reported on Medicaid data runs to have prescribed buprenorphine and the pharmacies which filled the scripts. Thus far, there have been a small number of doctors who report that they have been prescribing buprenorphine off label for pain. More frequently, however, data entry errors have been found which attributed prescriptions to doctors who did not prescribe the drug. Dr. Mandell and Dr. Scott Strenio, the medical director of the Medicaid program, are working on ways to correct the data entry problems.

In addition, Drs. Mandell and Strenio are working on the establishment of a capitated incentive plan to expand the availability of medication-assisted treatment in Vermont. The Vermont Legislature provided Medicaid with a one-time funding amount of \$500,000 for the incentive plan and a one-time funding amount of \$350,000 to the Vermont Office of Drug and Alcohol Programs for the purpose of training physicians and care coordination. In order to participate in this incentive plan, the physician must agree to have a Buprenorphine Coordinator assigned to his or her office. The Coordinator will help the office prepare for the treatment of opiate dependent patients and will see that recommended ancillary services for the patients are obtained. The State is planning on developing a set of tools, including screening and patient contracts, for use by the Coordinators, and outcome measures will be collected to demonstrate not only the activities of the Coordinators, but also to demonstrate the effectiveness of the program.

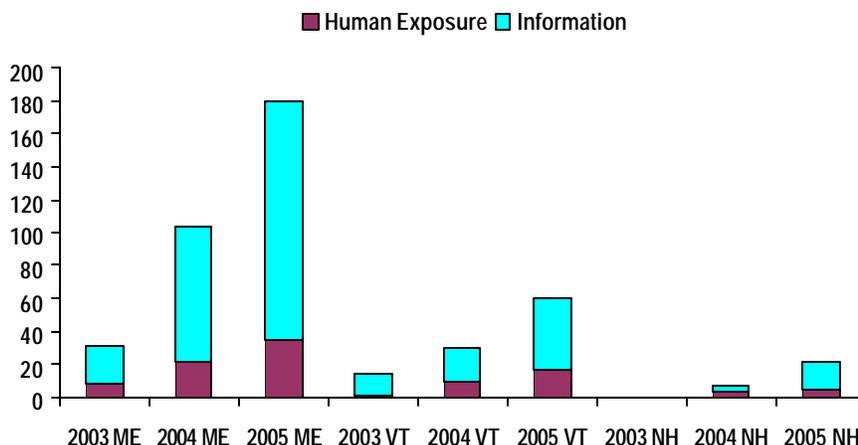
*Findings: The opioid treatment system in Vermont is relatively new, and the young age of the patients reflects the recency of the problem with heroin and other opiates in the State. The short lag time between first use and admission provides a unique opportunity to intervene with and treat these users early, before they progress to use of needles and increased risk of contracting hepatitis and HIV. Some individuals appear to be using diverted buprenorphine in an attempt to self-medicate when formal treatment is not available. This provides further evidence of the continued need to expand treatment capacity, both with buprenorphine and with methadone.*

*Treatment experts in the State concede that some buprenorphine diversion is occurring, but maintain that much of this activity involves efforts at self-medication on the part of individuals who would enter formal opioid treatment if it were available. Others are described as engaging in activities such as renting pills for “pill counts” to disguise the fact that they are taking greater amounts of the drug than prescribed, or selling off part of their prescribed dose.*

*The Medicaid claims data contain discrepancies in the number of physicians who are prescribing buprenorphine and the number who hold Federal waivers to use buprenorphine in office-based treatment of addiction. These discrepancies require further examination, and are being addressed by Vermont State officials.*

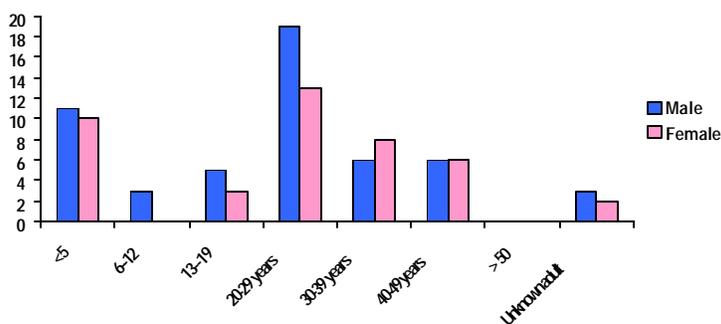
**Data from Poison Control Centers.** The number of information calls to poison control centers about buprenorphine has increased in northern New England from 36 in Maine, New Hampshire, and Vermont in 2003 to 203 calls in those States in 2005 (Exhibit 29). The increase in information calls between 2003 and 2005 may reflect increased public knowledge and questions about buprenorphine as a treatment modality.

**Exhibit 29. Northern New England Poison Control Center Buprenorphine Calls: 2003-2005\***



\*2005 data may not be complete as it was retrieved on 1/9/2006. Source: Northern New England Poison Control Center

**Exhibit 30. Northern New England Poison Control Center-Characteristics of Calls for Human Exposure to Buprenorphine: 2003-2006**



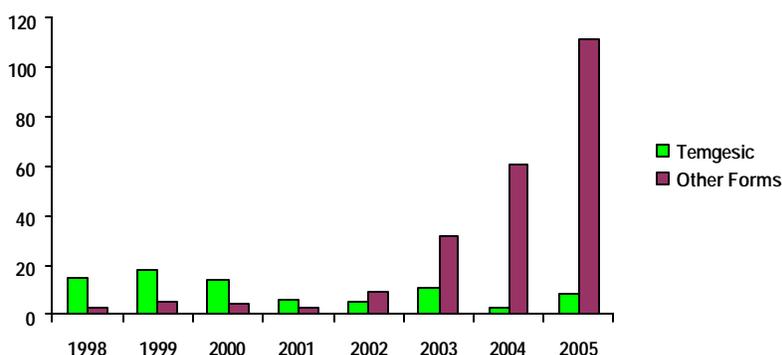
\*2005 data may not be complete as it was retrieved on 1/9/2006. Source: Northern New England Poison Control Center

The largest group of human exposure cases involves persons between the ages of 20 and 29. Cases tend to involve younger males and older females (Exhibit 30).

The Northern New England Poison Control Center reported one mention of Finibron, an Italian buprenorphine 0.2mg made by Midy. Other than that one pill, of the 464 buprenorphine mentions, 435 were suboxone, 25 were unknown forms of buprenorphine, and three were Subutex pills. Temgesic® (a formulation of buprenorphine available in other countries but not

legally available in the U.S.) has been reported in the Texas poison control center data (Exhibit 31). International brand names include Anorfin (DK); Bunondol® (PL); Buprenex® (CA); Buprex® (PT); Buprex (ES); Finibron (IT); Magnogen® (AR); Norphin® (IN); Pentorel® (IN); Prefin (ES); Subutex (AU, AT, DK, FR, DE, IT, PT, SE, CH); Temgesic® (AR, AU, AT, BE); Temgesic (BR, CZ, DK, FI, FR, DE, GB, IE, IT, LU, MX, NL, NO, ZA, SE, CH); Temgésic® (FR); Tidigesic® (IN); and Transtec® (DE). See Exhibit 32 for pictures of some of these different pills.

**Exhibit 31. Texas Poison Control Center Calls Related to Human Exposure to Buprenorphine: 1998-2005**



Source: Texas Department of State Health Services

*Findings: The number of calls to the Northern New England Poison Control Center regarding buprenorphine is increasing and may reflect increased public knowledge and questions about buprenorphine as a treatment modality. Mentions of buprenorphine formulations which are not legally available in the U.S. indicate illicit importation of buprenorphine can occur and should be monitored in the poison control center datasets.*

**Report from the Corrections System.** One official in the Vermont Department of Corrections reported that buprenorphine was coming into the State’s correctional institutions. The official thought there was more buprenorphine than methadone or oxycodone. Buprenorphine was described as easy to obtain on the street, as opposed to oxycodone, which was said to not be widely used in Vermont (this is not borne out by the medical examiner data). There were several other statements by corrections officials that perhaps buprenorphine was being used to “get high” by incoming inmates who were not in active treatment in the community. It was further suggested that buprenorphine was being brought into the corrections facilities to sell to inmates who wanted to “get high” or to help them detoxify from heroin. Some inmates dependent on heroin reported stockpiling buprenorphine prior to incarceration.

*Findings: Seizures of buprenorphine smuggled into prisons corroborate the impression that some inmates are dependent on opioids and were bringing in buprenorphine to detoxify themselves, since the corrections system does not offer medical detoxification.*

**Community Epidemiology Work Group (CEWG).** CEWG members have 20 minutes at each semi-annual meeting to report their latest findings. At the January 2006 meeting, only the members from Los Angeles and Baltimore included buprenorphine in their oral reports.

Buprenorphine was also included in the written reports from Miami and Phoenix. Ohio, which often participates in CEWG meetings, recently released a report on buprenorphine diversion and abuse.

*Findings: Only 4 of the 21 reporting sites included buprenorphine in their January 2006 reports. Ohio, which often participates in CEWG meetings, recently released a report on buprenorphine diversion and abuse.*

**Summary of the Key Findings.** The data analyses conducted for this study suggest the following findings:

1. **ARCOS:** On a per capita basis, Vermont leads all States in the number of dosage units and grams of Subutex and Suboxone distributed per 100,000 population. This may be attributable to a lack of methadone maintenance treatment, or because the State has been proactive in recruiting physicians to engage in office-based treatment of addiction. A comparison of Medicaid and ARCOS data shows that the number of dosage units per patient and the number of dosage units prescribed per physician vary from one Vermont county to another. The ability to compare the number of patients, the number of prescribing physicians, and the number of dosage units shipped into a given county provides a useful method for tracking patterns of use and monitoring for possible diversion. A comparison of Medicaid and ARCOS data shows that the amount of buprenorphine going into Vermont is reasonable, based on the number of Medicaid buprenorphine patients being served and the recommended dosage levels.
2. **DAWN ED Reports:** In comparison to DAWN patients reporting use of other opiates, the number of patients presenting for problems related to buprenorphine is small. However, the number is increasing, especially cases involving buprenorphine+naloxone. Buprenorphine patients are younger than other opiate patients and are more likely to be referred to treatment or admitted to treatment directly from the ED, which could be an indication of a population that is self-medicating with buprenorphine and actively seeking treatment for their opioid dependence.
3. **DAWN ME Report:** No buprenorphine deaths were reported in 2003 in Vermont or by any of the other 122 reporting medical examiners in 35 metropolitan areas captured in the DAWN ME system. Toxicological testing for buprenorphine requires a separate test. It was not done by the medical examiners reporting the New England cases and may not have been done on a regular basis by any medical examiner. This raises the possibility that buprenorphine deaths are being under-reported.
4. **Treatment Admissions:** Treatment data show that the opioid treatment system in Vermont is relatively new and the young age of the patients reflects the relatively recent emergence of the problem with opiate addiction. The short lag time between first use and admission to treatment provides a unique opportunity to intervene with and treat these users before they progress to injection drug use. The reports of self-medication provide evidence of the need for additional treatment capacity in Vermont.

Treatment officials concede that some buprenorphine diversion is occurring, but maintain that much of this activity involves efforts at self-medication on the part of individuals who would enter formal opioid treatment if it was available. They describe others as

engaging in activities such as renting pills for “pill counts” to disguise the fact that they are taking greater amounts of the drug than prescribed, or selling off part of their prescribed dose.

The Medicaid claims data contain discrepancies in the number of physicians who are prescribing buprenorphine and the number who hold Federal waivers to use buprenorphine in office-based treatment of addiction. These discrepancies require further examination, and are being addressed by Vermont State officials.

5. **NFLIS:** NFLIS is one of the few indicator systems which tests and reports the presence of buprenorphine. While the number of buprenorphine items is small in comparison to the number of hydrocodone, methadone, and oxycodone items reported, buprenorphine numbers are increasing nationally. Vermont does not report to NFLIS, but the number of cases and amounts seized in Vermont in 2004 and 2005 were small.
6. **Poison Control Center Data:** The Northern New England Poison Control Center (which includes Maine, New Hampshire, and Vermont) reported that the number of information calls related to buprenorphine increased from 36 in 2003 to 203 calls in 2005. The increase may reflect growing public knowledge of and interest in buprenorphine as a treatment modality.

The presence of Finibron® (like Temgesic®, a formulation of buprenorphine available in other countries but not legally available in the U.S.) in the New England Poison Control Center data may indicate illegal importation and should be closely monitored.

7. **Community Epidemiology Work Group:** Only 4 of the 21 reporting sites included buprenorphine in their January 2006 reports. Ohio, which often participates in CEWG meetings, recently released a report on buprenorphine diversion and abuse.

Exhibit 32. Appearance of the Various Formulations of Buprenorphine



Subutex 2mg (Reckitt Benckiser)-USA



Temgesic Tabs—Australia (Reckitt Benckiser)



Suboxone tabs (Reckitt Benckiser)-USA



Indian Temgesic?  
Temgesic tabs (source India?)



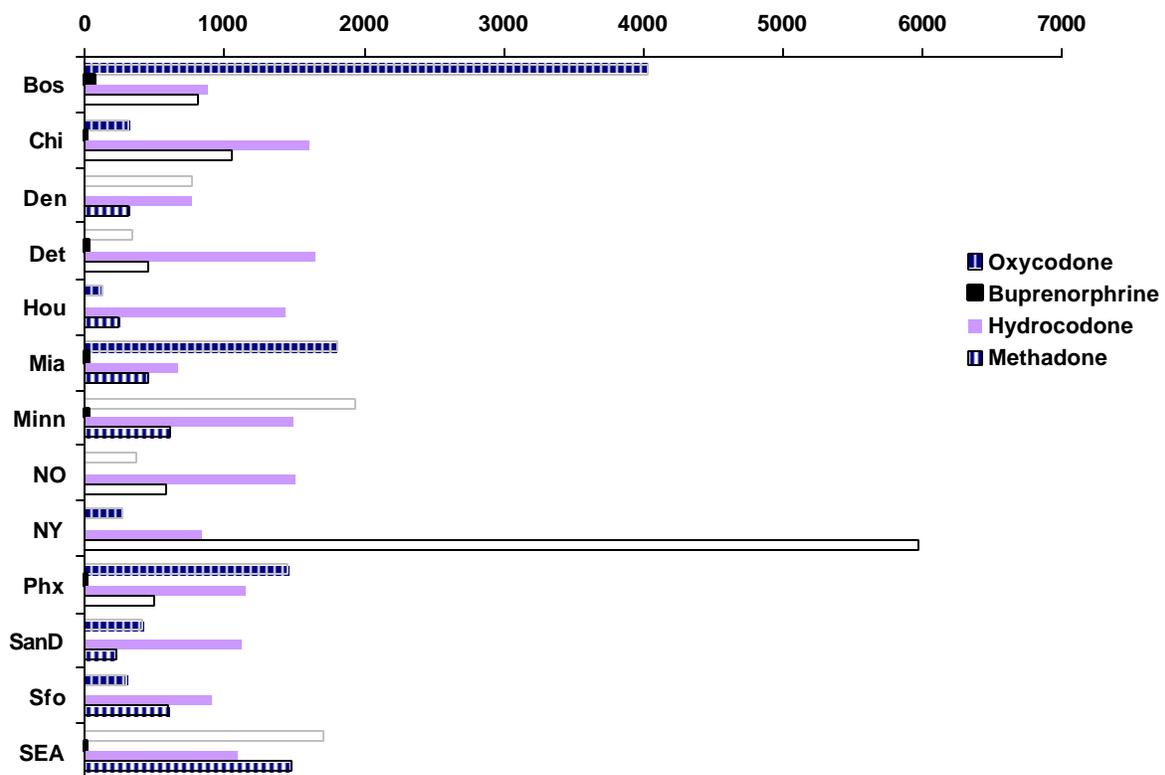
Temgesic tablet in Australia is a very small white 'low-sheen' tablet. It looks to be 'scored' but in fact it is a 'sword' logo on closer inspection. On the reverse is the capital letter 'L'. Dr. Andrew Byrne of Sydney, who supplied the two photos, reports managing to cut them in half with some difficulty, using a pill cutter, for those on very small doses.

**Exhibit 33. Characteristics of Vermont Patients at Admission to Treatment by Primary Drug Problem: 1999-2005**

*Note--2005 data are not complete and clients who receive Medicaid buprenorphine but no counseling services from State-funded programs are not included*

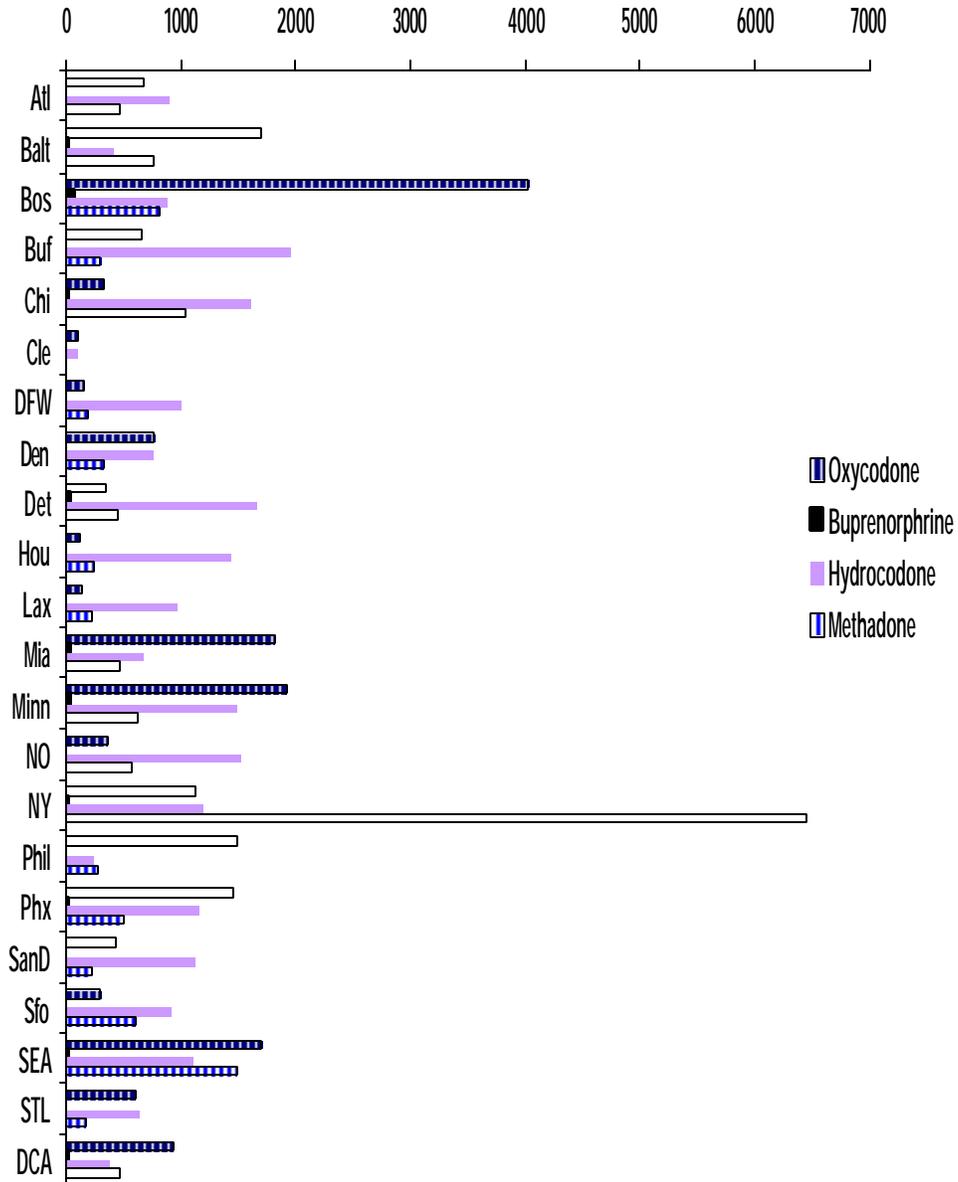
<b>Heroin</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
n	300	562	699	1029	821	847	550
% female	32%	41%	43%	40%	43%	44%	47%
% inhale	18%	17%	23%	15%	16%	15%	12%
% inject	76%	79%	72%	80%	81%	80%	83%
Adm Age	29.4	27.6	27.7	27.9	27.3	27.6	27.5
Lag	5.9	3.4	3.4	5.7	7.7	4.4	5.8
% 1st Admits	47%	51%	42%	38%	41%	41%	43%
% full time emp	21%	15%	14%	11%	10%	14%	13%
% cj	16%	15%	20%	20%	21%	23%	22%
% use heroin daily	65%	68%	54%	55%	49%	35%	37%
% use drug2 daily	30%	24%	24%	24%	26%	21%	26%
Mean # PY Tmt Episodes	1.3	1.2	1.3	1.6	1.5	1.6	1.6
<b>Other Opiates</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
n	182	202	232	317	600	815	684
% inhale	8%	8%	15%	25%	29%	35%	31%
% inject	14%	20%	11%	9%	11%	18%	22%
% oral	71%	69%	71%	62%	56%	43%	42%
% female	49%	45%	39%	44%	48%	49%	54%
Adm Age	32.0	33.0	33.0	30.9	30.0	29.1	29.9
Lag	5.8	6.9	4.0	6.6	8.3	3.9	6.4
% 1st Admits	57%	50%	47%	43%	51%	53%	44%
% full time emp	28%	24%	18%	17%	18%	20%	21%
% cj	7%	10%	9%	16%	15%	17%	15%
% use other opiates daily	64%	66%	61%	51%	55%	42%	43%
% use drug2 daily	24%	24%	26%	26%	24%	15%	17%
Mean # PY Tmt Episodes	1.0	1.2	1.4	1.4	1.1	1.4	1.8
<b>Illicit Methadone</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
n		6	3	5	19	14	31
% oral		50%	67%	80%	89%	64%	74%
% female		67%	0%	20%	32%	64%	42%
Adm Age		39.3	29	26.4	32.2	30.9	32.5
Lag		2.8	7	2.2	6.8	2.4	5.2
% 1st Admits		83%	100%	80%	47%	79%	29%
% full time emp		17%	0%	0%	16%	0%	16%
% cj		33%	0%	0%	0%	0%	10%
% use illicit methadone daily		33%	67%	100%	68%	43%	52%
% use drug2 daily		0%	67%	100%	37%	29%	29%
Mean # PY Tmt Episodes		0.2	0.0	1.0	1.2	0.6	2.0
Source: Vermont Client Data System							

## Exhibit 34. DAWN*Live!* Continuously Reporting Metro Areas – Emergency Department Reports of Buprenorphine, Methadone, Oxycodone, and Hydrocodone Compared, 2003 - 2005



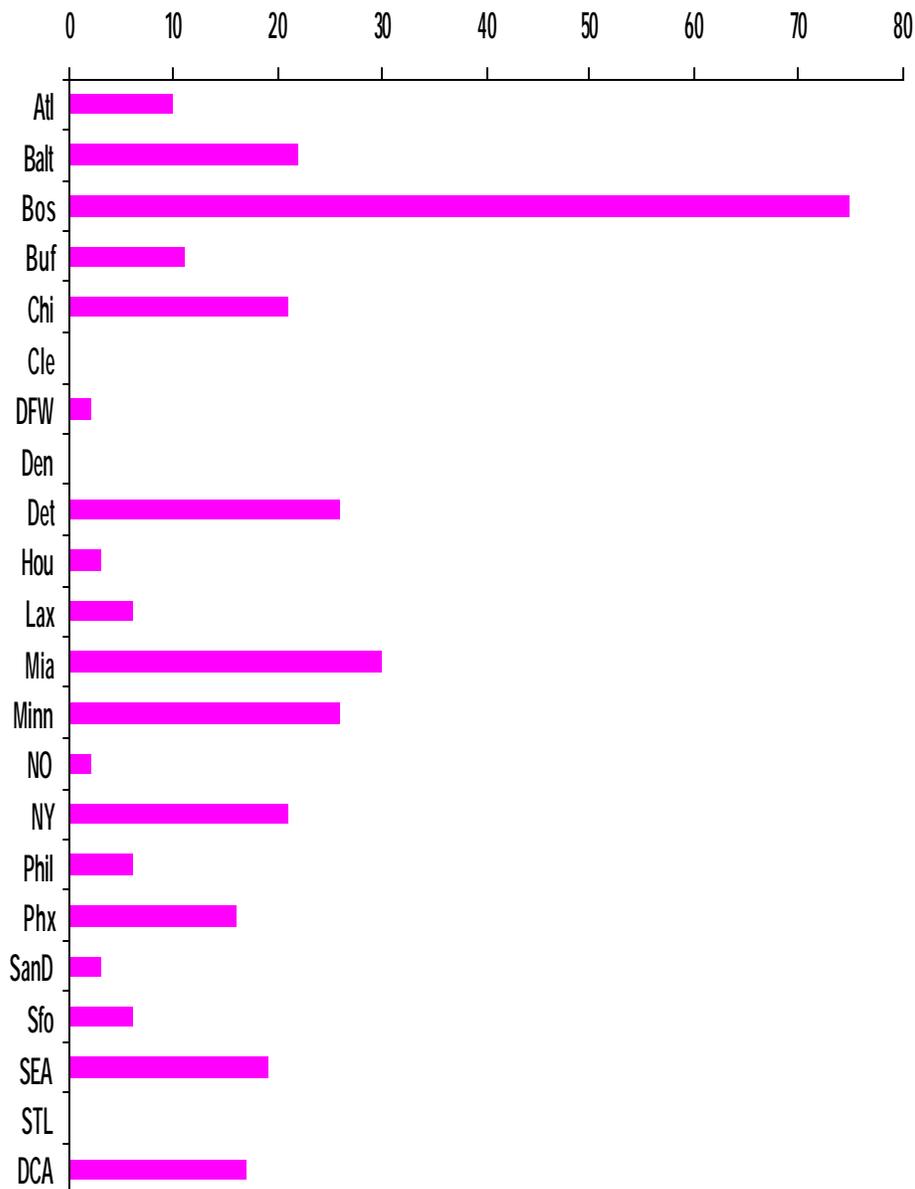
\*The unweighted data are from all U.S. emergency departments reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: SAMHSA Office of Applied Studies; downloaded 2/12/2006.

## Exhibit 35. DAWN *Live!* ED Reports by Metro Areas Including Areas Which No Longer Report to DAWN: 2003-2005



The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: DAWN, OAS, SAMHSA, downloaded 2/12/2006.

## Exhibit 36. DAWN *Live!* Emergency Department Reports of Buprenorphine Including Metro Areas that No Longer Report to DAWN: 2003-2005

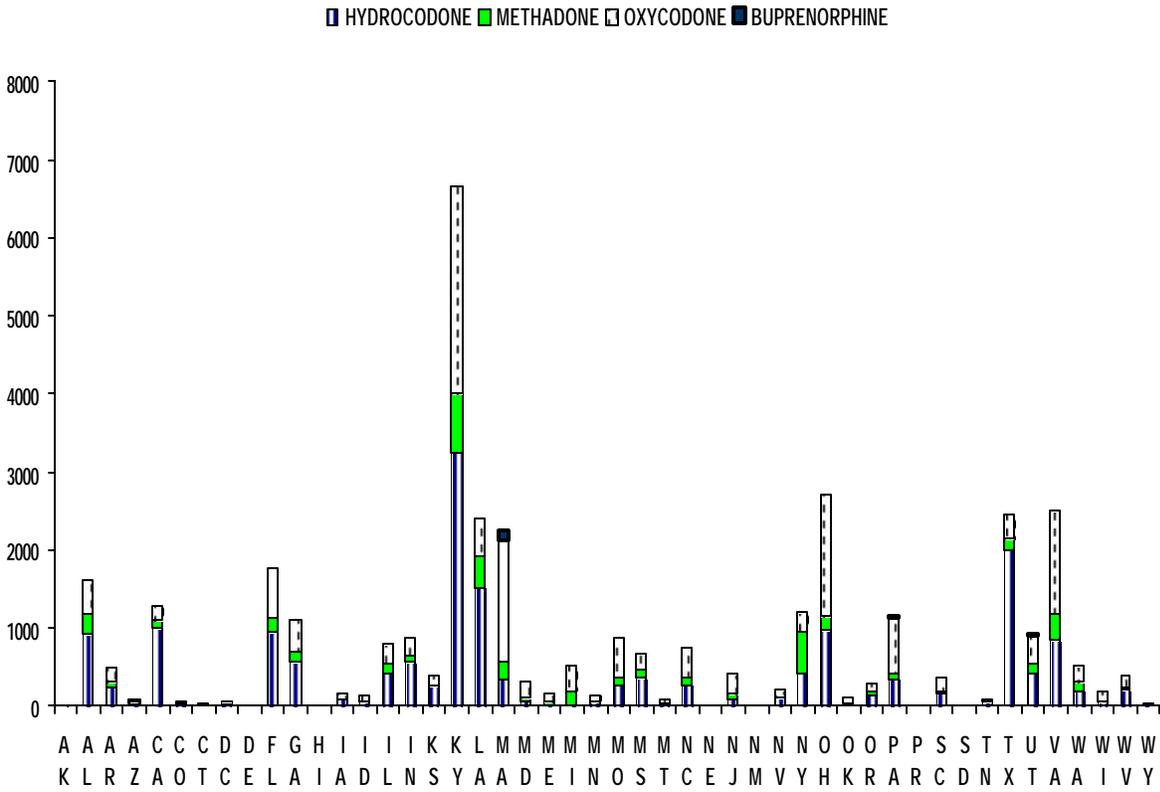


The unweighted data are from all U.S. EDs reporting to DAWN. All DAWN cases are reviewed for quality control. Based on this review, cases may be corrected or deleted, and, therefore, are subject to change. SOURCE: DAWN, OAS, SAMHSA, downloaded 2/12/2006.





# Exhibit 39. Items Analyzed by Forensic Laboratories and Reported through NFLIS: 2004

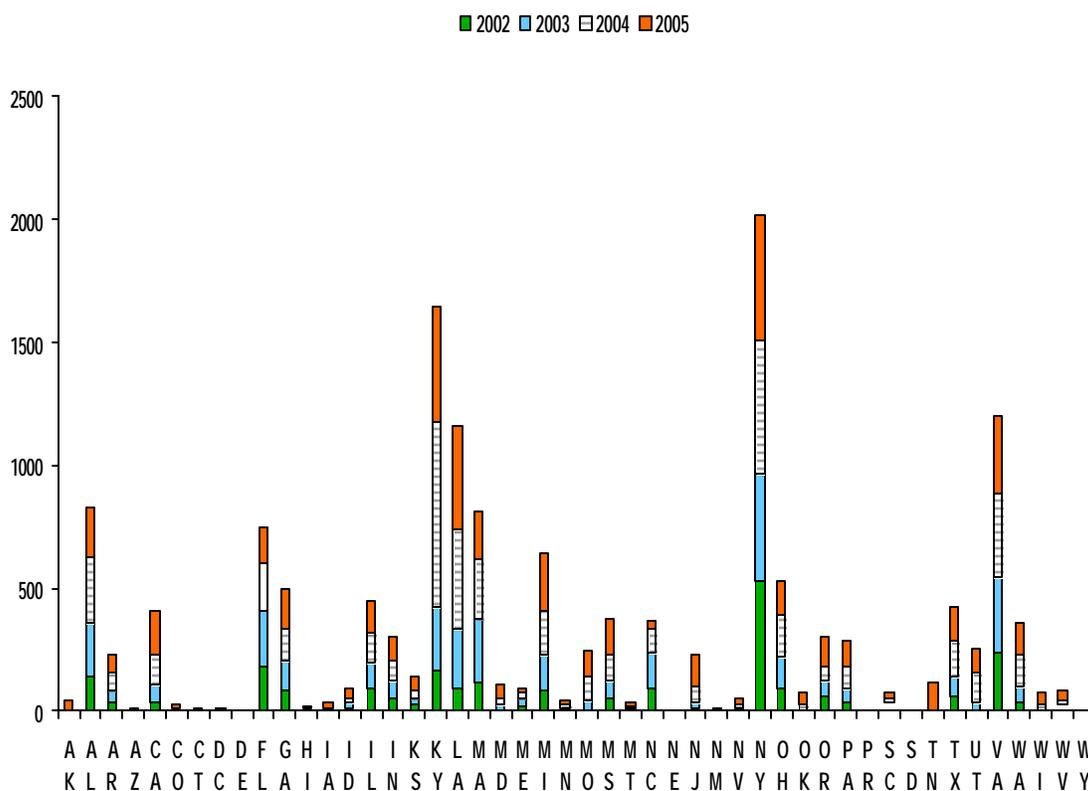


Source: U.S. Drug Enforcement Administration, National Forensic Laboratory Information System





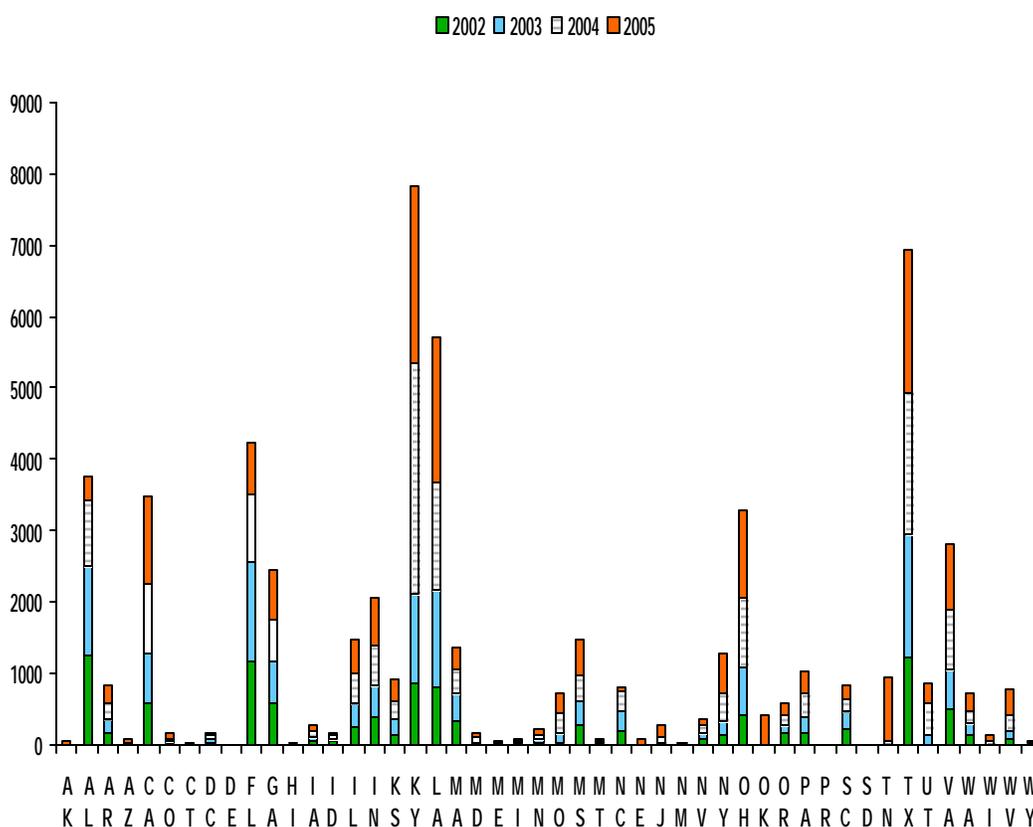
## Exhibit 42. Methadone Items Analyzed by Forensic Laboratories and Reported through NFLIS: 2002-2005



Source: U.S. Drug Enforcement Administration, National Forensic Laboratory Information System



## Exhibit 44. Hydrocodone Items Analyzed by Forensic Laboratories and Reported through NFLIS: 2002-2005



Source: U.S. Drug Enforcement Administration, National Forensic Laboratory Information System



