

Opioid Abuse Among Nurse Anesthetists and Anesthesiologists

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Abuse and dependency on potent opioids have long been recognized as problems among nurse anesthetists and anesthesiologists. Research has provided insight into the incidence of abuse, risk factors associated with this type of dependency, identification of an impaired provider, treatment for abuse and dependency, and prevention strategies. Although several factors influence the development of abuse and dependency, access to potent opioids likely has a large role. This access also makes returning to practice while in recovery extremely difficult because the temptation for relapse continually surrounds a recovering anes-

thesia provider. There is research supporting successful reentry of anesthesia providers into the practice of anesthesia; however, research also reveals high relapse rates among anesthesia providers who return to the practice of anesthesia. This article reviews the literature regarding opioid abuse and dependency among nurse anesthetists and anesthesiologists and offers implications for future research.

Keywords: Addiction, anesthesiologist, nurse anesthetist, opioid dependency, substance abuse.

It is no secret that some healthcare providers have problems with substance abuse and chemical dependency. Nor is it surprising that certain healthcare specialties, such as anesthesiology, are associated with increased risk for abuse of and dependency on certain classes of drugs. In particular, opioids and other potent anesthetics such as propofol are common drugs of abuse among anesthesia practitioners. Alarming, abuse is often not recognized until a fatal or near fatal overdose occurs.^{1,2} Debate also surrounds the issue of reentry to anesthesia for recovering opioid-dependent practitioners. Some practitioners believe the chance for relapse is too high to risk allowing return to anesthesia practice, whereas providers who support reentry believe it should be dealt with on an individual basis. This article reviews the research on substance abuse and dependency among anesthesiologists and nurse anesthetists, with a focus on opioid use.

Substance Abuse Among Anesthesiologists

Although the Substance Abuse and Mental Health Services Administration estimates that the overall rate for substance abuse in the general population has consistently remained at 8% since 2002,³ determining the incidence of substance abuse and chemical dependency among anesthesia providers is particularly difficult. The sensitivity of the issue, legal issues associated with practice, and implications for patient care are just some con-

sequential factors discouraging disclosure, and it is likely that any reports underestimate the scope of the problem.

Early research mostly contains anecdotal reports of physician chemical dependency and abuse. Even as far back as the late 1800s, William Halstead, known as the “father of modern surgery,” was described as having a cocaine addiction related to experimentation with the anesthetic.¹ Studies from the 1980s and early 1990s describe the prevalence of substance abuse among physicians and helped the medical community recognize the problem.⁴⁻⁷ In 1987, Talbott et al⁴ reviewed specialties of the first 1,000 physicians to complete the Georgia Impaired Physician Program and noted that anesthesiologists were overrepresented. At the time of the study, anesthesiologists represented 4% of physicians in the United States, yet almost 3 times (12%) that of the program’s participants were anesthesiologists. Also overrepresented were younger anesthesiologists; anesthesiology residents younger than 35 years accounted for more than one third of the physician residents in the program.⁴

Among anesthesiologists, data from several studies support that abuse of potent opioids is greater than the general population and among physicians in general. In 1988, Gallegos et al⁵ reexamined the data of Talbott et al⁴ and revealed differences in drugs of abuse and route of administration between anesthesiologists and other physician specialties; anesthesiologists were more likely to abuse opioids and to abuse these medications intrave-

nously. The authors also estimated that anesthesiologists are 5 times more likely to abuse opioids than the general public.⁵ Other state physician programs also report higher opioid abuse among anesthesiologists and anesthesiology residents in treatment for substance abuse and dependency compared with other physician specialties.⁶

In the 1990s, surveys sent to 1,754 resident physicians from 11 medical specialties⁷ (1992) and to 5,426 physicians from 13 specialties⁸ (1999) found that psychiatrists had the highest rate of overall substance abuse. In the 1992 study, anesthesiology residents reported high rates of substance abuse for amphetamines, while the 1999 study revealed that anesthesiologists had the highest rate for abusing potent opioids such as fentanyl, alfentanil, and sufentanil. Consistent with other studies, Lutsky et al⁹ (1993) assessed the use of psychoactive substances among anesthesiologists older than 30 years and identified drug impairment in 5.5% of the anesthesiologists who responded. In 2002, Booth et al¹⁰ reported about a 1% incidence of controlled-substance abuse among residents and a 1.6% incidence among faculty ($P < .05$) in academic anesthesiology programs. Fentanyl was the most commonly abused controlled substance, followed by ketamine and thiopental ($P < .05$). Sadly, in 18% of the anesthesia residents and faculty found to be abusing, death or near death due to an overdose was the initial indicator of abuse. Results from these studies only begin to illustrate the scope of the problem.

Being an anesthesia provider seems to be an independent risk for dying of drug-related causes. In 2000, Alexander et al¹¹ compared mortality rates and causes of death between 2,458 anesthesiologists and 2,376 internists. By adjusting for age, race, and gender, they found that an anesthesiologist was 2.79 times more likely to die of drug-related causes than an internist and 4.06 times more likely to die of viral hepatitis, which is likely due to the increased use of intravenous anesthetic medications. It is interesting that most drug-related deaths in anesthesiologists occurred within the first 5 years after graduation, substantiating early development of a pattern of abuse.¹¹

Incidence of Substance Abuse Among Nurse Anesthetists

Although research reveals fewer formal reports about the prevalence of substance abuse among nurse anesthetists compared with anesthesiologists, opioid addiction has long been recognized as a problem. As early as 1962, the *AANA Journal* published an article describing opioid dependency as an occupational hazard for nurse anesthetists.¹²

Nurse anesthetists are likely grouped into general nursing profession estimates of substance abuse, which is thought to be between 6% and 10%.¹³ In 2002, Diane Quinlan, CRNA, MA, chair of the American Association of Nurse Anesthetists (AANA) Peer Assistance Advisors

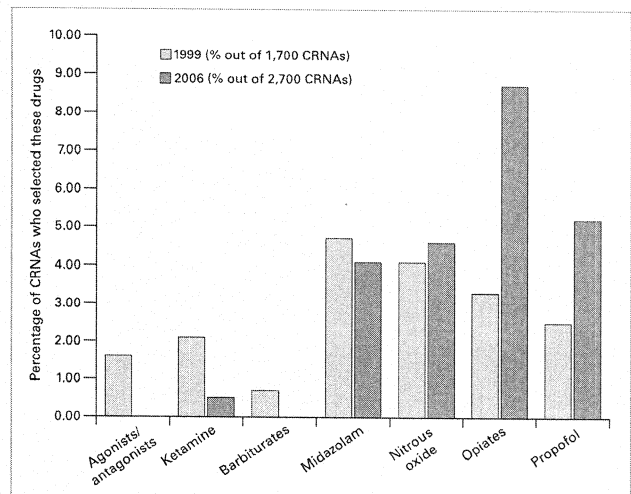


Figure 1. Most commonly used substances misused by CRNAs.

(Compiled from Bell et al¹⁴ and unpublished data by Bell, 2006).

Committee used these statistics when presenting to the American Nurses Association Biennial Convention (June 29 to July 2, 2002, Philadelphia, Pennsylvania) about the incidence of general substance abuse among nurses and nurse anesthetists. Quinlan also provided statistics from the National Council for State Boards of Nursing that reported more drug-related complaints and disciplinary actions related to nurse anesthetists than other advanced-practice nurses.

A 1999 study by Bell et al¹⁴ was the first large-scale study that looked at the prevalence of substance abuse among nurse anesthetists. This seminal study revealed 10% of nurse anesthetists admitted to misusing powerful anesthetic medications during their career as nurse anesthetists. The 4 most common medications abused were benzodiazepines, nitrous oxide, potent opioids, and propofol.¹⁴ With a grant from the AANA Foundation, Bell replicated this study in 2006 (Bell, unpublished data, 2006). Unpublished reports revealed little difference, except that opioid and propofol use increased overall (Figure 1) (Bell, unpublished data, 2006).¹⁴ In both studies, most of the participants who admitted to misusing these drugs had been in practice between 10 and 20 years, which is an interesting contrast from the younger age associated with anesthesiologists. There was, however, a subset of participants in the second study who admitted misusing substances during their first 3 to 5 years of practice.

Even though little formal research exists, nurse anesthetists are recognized as sharing a risk for opioid abuse with anesthesiologists. In a recent *American Society of Anesthesiologists Review* on chemical dependency, Berry¹⁵ acknowledged that abuse of anesthetic medications, "can occur in all groups of anesthesia professionals, including physicians in practice, residents in training, anesthetists

Biological	Psychological	Occupational
Neurobiological	Comorbid psychiatric disorders	Stress
Genetics	Sensation- and/or excitement-seeking personality traits	Medication access
		Pharmacologic knowledge
		Occupational exposure

Table 1. Major Factors Influencing the Development of Substance Abuse and Dependency Among Anesthesiologists and Nurse Anesthetists^{1,2,5,19-34}

(CRNAs [Certified Registered Nurse Anesthetists] and anesthesiology assistants), and student anesthetists.”

Editorials singling out anesthesia providers are noted in operating room nursing journals. For example, the *Journal of PeriAnesthesia Nursing* published an article titled, “The Alarming Trend of Substance Abuse in Anesthesia Providers,”¹⁶ and a recent issue of *OR Manager* contains an editorial series about substance abuse in the operating room and discusses the increased risk for anesthesia personnel.^{17,18}

Causes of Chemical Dependency

Causes of chemical dependency are multifactorial. Understanding how neurobiological, genetic, psychological, personality, and occupational factors influence the development of addiction is important to understanding the increased risk for addiction in anesthesia providers. See Table 1^{1,2,5,19-34} for an overview.

- **Neurobiological Factors.** A neurobiological basis for addiction involves several areas of the brain. In particular, alterations in neurotransmission of the reward system are noted. The reward system is responsible for the sense of pleasure and a feeling of wanting whatever it was that brought the sense of pleasure.¹⁹ This area of the brain comprises primarily the ventral tegmental area and nucleus accumbens and is modulated by several neurotransmitters, although the stimulation of dopamine receptors in the nucleus accumbens is ultimately responsible for the feeling of pleasure. Neuropathways between the ventral tegmental area and nucleus accumbens modulate the importance and salience (ie, wanting) of the substance that resulted in pleasure. In addiction, the reward associated with the substance of abuse is inflated, as is the sense of salience associated with the substance.¹⁹ The acquisition of the reward becomes top priority, compelling the person to seek out the substance despite negative consequences associated with its use.¹⁹ Salience can also be elicited by cues associated with the substance, such that events (cues) before the stimulation of the nucleus accumbens are also associated with exaggerated importance. For example, during a 2004 AANA Peer Assistance Workshop, a recovering fentanyl-dependent nurse anesthetist described the feeling of picking up and holding a fentanyl vial as a cue that triggered anticipation and craving. Managing triggers such as these are critical in preventing relapse.

- **Genetic Factors.** There is also strong evidence for genetic susceptibility to addictive behavior, especially in the transition from substance abuse to substance dependency.²⁰ When exposed to addictive substances, a genetically susceptible person is more likely to develop a pattern of dependency than someone who is not genetically susceptible. Indeed, a family history of addiction is one of the strongest predictors for the relapse of opioid abuse among anesthesia providers.²¹ It is thought that genetics account for about 50% of alcohol addiction.²² Although not as strong as the genetic predisposition for alcoholism, there is also likely a genetic predisposition toward cocaine and opioid addiction.²³

- **Psychological Factors.** There is thought that the use of mood-altering substances begins as a method of self-treatment for underlying psychological disorders.^{1,24} Evidence supports that many nurses and anesthesiologists with a chemical dependency have comorbid psychiatric disorders.^{21,24,25} As well, anesthesia providers with abuse and dependency issues frequently relate some form of traumatic or emotional event at a young age, and reports of childhood physical and emotional abuse are common.^{21,24,25}

- **Personality Factors.** Sensation-seeking and impulsivity personality traits have been associated with substance abuse and addiction.^{26,27} It has been demonstrated that nurses with substance impairment are more likely to have higher scores on sensation-seeking scales compared with nonimpaired nurses.²⁶ McDonough²⁷ assessed sensation-seeking traits in nursing students obtaining a master’s degree in nurse anesthesia or another nursing field. McDonough²⁷ correlated sensation-seeking scores with a tool designed to detect alcohol abuse and predict who may become symptomatic at a later date. Results revealed that more nurse anesthesia students had a greater number of positive alcohol abuse scores than did students in other nursing fields (22.2% and 5.7% respectively). As well, nurse anesthesia students with positive alcohol scores tended to score higher on excitement-seeking trait scales did than students without positive alcohol scores ($P = .000$).²⁷

- **Occupational Factors.** Common to all healthcare professionals, factors influencing the development of substance abuse can be grouped into 3 major occupational hazards: stress, access, and attitude.^{1,24,25,28-32} There also may be a unique environmental factor associated

with the handling of opioids that is specific to anesthesia providers.^{33,34}

- **Stress.** Stress seems to have a large role in the development of substance abuse. The substance is perceived as a mechanism for coping with stressful situations and relieving the anxiety associated with the stressor. Although stressors outside the workplace influence substance-abuse behavior, the stress of working as an anesthesia provider or nurse is an occupational risk for the development of substance abuse. Working long hours or nights, strained working relationships, responsibility to patients, and high acuity of patient conditions are common stressors described by substance-abusing or addicted nurses and anesthesiologists.^{25,28-31} Stress among nurse anesthesia students has been studied, and it has been noted that the stress of nurse anesthesia education may contribute to the development of substance abuse.³²

- **Access.** Access to major opioids is a powerful factor influencing the development of substance abuse among healthcare professionals in general. This factor may even have an instigating role for anesthesia providers in the evolution of opioid or other anesthetic medication abuse or dependency.^{5,31} Anesthesia providers have unique access to medications, especially controlled substances. Unlike the handling of most controlled substances, in which a physician writes a prescription for the medication and a nurse administers what is ordered, anesthesia providers determine the dose, obtain the medication from the pharmacy or medication administration system, and administer the medication directly to the patient, often in large quantities. Although the controlled medications must be accounted for and excess medication wasted or returned to the pharmacy, it is not difficult to divert these powerful medications from the hospital.

Research supports a link to access and abuse. Trinkoff et al²⁹ demonstrated that increasing access to medication increases the potential for abuse. A recent study by Wischmeyer et al² revealed that propofol abuse among anesthesia personnel has increased in the past 10 years. One explanation for this increase is the fact that propofol is not a controlled substance, and, therefore, anesthesia providers are not accountable for its use.

- **Attitude.** Healthcare professionals, including anesthesia providers, are trained to relieve pain with medication. This training includes in-depth pharmacological education about the medications they administer. As well, anesthesia providers are comfortable controlling minute-to-minute changes in their patient's vital organs with medications. Trinkoff et al²⁹ describe this knowledge of and comfort with medications as "pharmacological optimism," which promotes an attitude of invincibility regarding self-medication and a feeling of immunity against untoward effects of medications.

- **Occupational Exposure.** Gold et al^{33,34} hypothesize that secondhand exposure to opioids in the operating

Comes to work during scheduled time off and loiters around departmental drug supply
Isolates and withdraws from peers
Expresses desire to take extra call
Increasing or unexplained tardiness or absenteeism
Gradual decline in work performance
Consistently signs out more narcotics than do peers
Has patterns of inappropriate drug choices and doses for patients
Increasing mood lability with frequent, unexplained anger and overreaction to criticism
Increasing difficulty with authority
Becomes forgetful, unpredictable, and confused and lacks concentration
Has frequent illnesses or physical complaints
Is dishonest, often over trivial or unimportant matters
Makes elaborate excuses
Has tremors or "Monday-morning shakes"
Has signs of alcohol or drug use, such as odor of alcohol on breath, heavy perfume or mouthwash, wearing long sleeves
Seems intoxicated at social functions
Is found comatose or dead

Table 2. Patterns of Behavior and Consequences Associated With Substance Misuse and Dependency (Adapted from the AANA Peer Assistance Website.³⁵)

room alters the reward pathway, predisposing anesthesia providers to the development of opioid dependency. This hypothesis stems from case reports of practicing anesthesiologists with no family history of abuse and no personal history of abuse who experimented with opioids in the operating room 1 time and quickly became addicted.³³ Gold et al³⁴ developed an assay for measuring airborne fentanyl and propofol levels in cardiovascular operating rooms where large amounts of opioids are used frequently. Fentanyl and propofol were detected in the air, with the highest levels near the patient's head, where anesthesia providers typically spend most of their time. More research is needed for validation; however, the theory is interesting and may hold some promise in explaining some of the increased risk of abuse among anesthesia providers.

Identification of Substance-Abusing Anesthesia Providers

Early identification of substance-abusing anesthesia providers reduces harm to the abuser and the patients they might care for while impaired. No review of addiction among healthcare providers is complete without identifying signs and symptoms of impairment, such as changes in

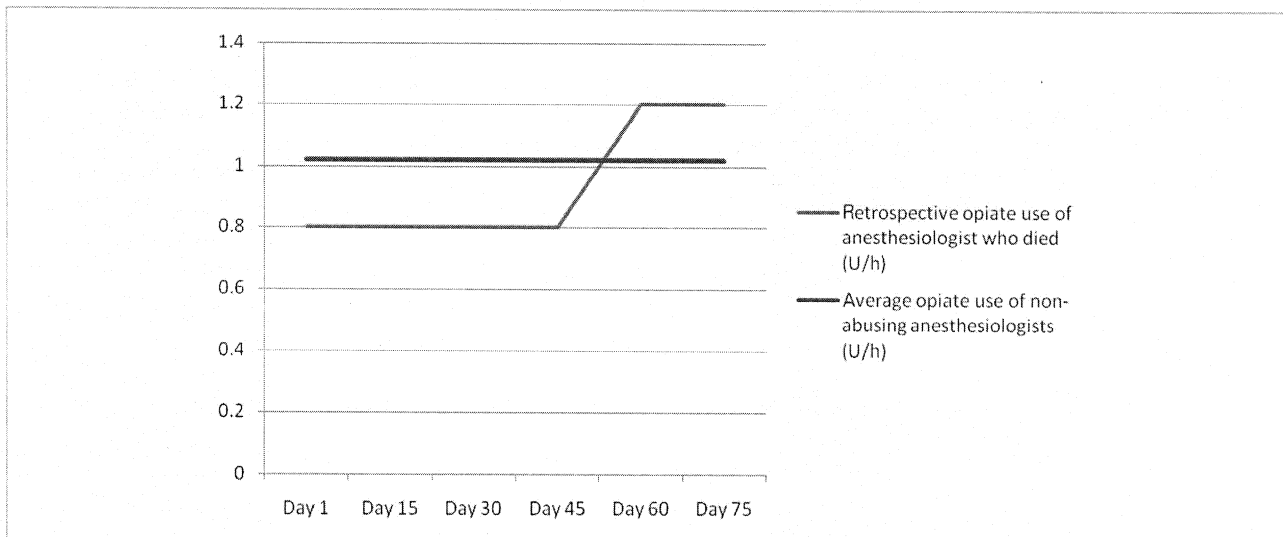


Figure 2. Retrospective 4-Month Average of Reported Use of Drugs for Patients by 1 Anesthesiologist Who Died of an Overdose and 8 Nonabusing Anesthesiologists (Extrapolated from Chisholm et al.³⁸)

work habits, personal appearance, and interaction with coworkers. (Table 2).³⁵ Once abuse of potent opioids begins, tolerance and dependence can develop quickly, and use can rapidly escalate out of control to the point of discovery. The typical time frame for discovery is 1 to 1.5 years.⁷

Diversion of substances from the workplace is often detected because complaints of pain increase by patients in whom pain medication was documented but never administered. By developing systems for stricter supervision of controlled substances in the workplace, hospitals have a role in early identification of diversion. Large hospitals are transitioning to computerized dispensing systems and charting systems that provide more accountability for obtaining, documenting, and wasting controlled substances. The Mayo Clinic, Rochester, Minnesota, instituted random quantitative assays of controlled substances returned to the pharmacy, and Berge et al³⁶ noted an anecdotal reduction in diversions from 1 per year to 1 in 7 years. Epstein et al³⁷ found distinctive drug-removal patterns of diversion by tracking records of a medication administration system. The authors noted anesthesia providers who diverted were likely to sign out medications to their patient within 1 hour of transferring the patient to the postanesthesia care unit. They also noted that diversion happened at remote, less-commonly used dispensing sites.³⁷

Tracking the reported use of controlled-substance drugs for patients reveals frequent discrepancies and increased drug removal by providers diverting medications from the workplace. A retrospective comparison of reported opioid use for patients over time of 1 anesthesiologist who died of an overdose compared with 8 nonabusing anesthesiologists showed a distinctive increase by the addicted anesthesiologist.³⁸ The 8 anesthesiolo-

gists' reported opioid use for patients was tracked for 4 months and compared with a 4-month retrospective review of 1 opioid-using anesthesiologist beginning with the date of his death. It is interesting that the overall use by the opioid-using anesthesiologist did not exceed the average overall use in a 4-month period for the 8 nonabusing anesthesiologists, which were calculated as 0.8 and 1.02 U/h, respectively. It is likely that differences in anesthesia technique influenced the overall use. Further examination of the records of patients cared for by the anesthesiologist who died showed a definite trend in increased use that began at day 60 until his death (Figure 2).³⁸ This trend illustrates the rapid progression of tolerance and dependence.

Treatment and Prevention of Relapse Among Anesthesia Providers

The road to recovery in addiction is difficult, although, apparently, recovery is even more difficult for providers addicted to potent opioids. Domino et al²¹ calculated hazard risks for physician relapse during the first 5 years after treatment. A physician with a family history of substance abuse and coexisting psychological disorders and who used a major opioid was 5.79 times more likely to have a relapse than a physician without any of these added factors.²¹

Even with these hazard risks, treatment programs are successful. A longitudinal review by McLellan et al³⁹ assessed outcomes of substance-abuse treatment for 904 physicians from 16 physicians' health programs after 5 years. Of all 904 physicians, 802 were followed up, and, of these, 36% had a contract extension or did not complete their contract; however, despite these statistics, 80% of the physicians ultimately completed the program

Chemical dependency and psychological evaluation by licensed provider with experience treating substance abuse and dependency
30 to 90 days' inpatient treatment in a facility designed for healthcare providers
Abstinence from the practice of anesthesiology for a minimum of 1 year
Initial return to practice with no narcotic privileges followed by incremental return of privileges
Abstinence from alcohol and use of nonprescribed mood-altering medications
Intensive outpatient treatment and follow-up
<ul style="list-style-type: none"> • Weekly appointments with addictionologist • Attendance at 12-step support groups from 1 to 3 times per week • Family involvement with program • Monitoring with random drug screens once every couple of weeks to once a month for a minimum of 5 years
Documented compliance with all aspects of program to complete the program

Table 3. Typical Characteristics of a Treatment Program for an Opioid-Dependent Anesthesia Provider
(Adapted from Talbott et al,⁴ Dupont et al,⁴⁰ and Trossman.⁴¹)

and were actively practicing medicine. If a drug screen found positive for mood-altering substances is used as an indicator of relapse, 19% of physicians who completed the program had at least 1 positive drug screen during the monitoring period. Although anesthesiologists tended to have more intense monitoring programs and to be monitored longer, relapse was not significantly different from that for other specialties.³⁹

Characteristics of the recovery program contribute to success (Table 3).^{4,40,41} The programs are holistic and often designed such that successful completion protects the person's license. Successful programs begin with a thorough chemical dependency evaluation and treatment recommendation by an addiction specialist. Treatment programs for nurses and physicians are abstinence-based to include all mood-altering substances for the duration of the contract.^{40,41} Initial treatment typically involves 30 to 90 days in a residential or an intensive outpatient care setting. This setting is designed specifically for physicians and higher-educated healthcare providers because healthcare providers have specific needs, such as concern for anonymity, which are better dealt with among people with similar circumstances.^{7,40,41} Advanced-practice nurses, including nurse anesthetists, fall into this category, as do pharmacists, dentists, veterinarians, and physician's assistants.²¹

Most treatment programs are based on the Alcoholics Anonymous 12-step recovery program. After initial treatment, less-intense outpatient follow-up therapy involves attending community-based meetings such as Alcoholics Anonymous or Narcotics Anonymous plus meetings designed for recovering healthcare providers (eg, Caduceus meetings), and family involvement is encouraged. After initial treatment, participants may go back to work in a supervised setting, although with the high rate of relapse associated with opioid abuse, more time away from the workplace may be needed to reduce the risk of relapse.

Bryson and Silverstein²⁵ and DuPont et al⁴⁰ recommend at least 1 year away from anesthesiology. Random drug testing continues throughout this entire process and continues for a substantial period, often 5 years or more after treatment.

Pharmacological treatment for addiction among physicians in the form of opioid agonist-antagonists or antagonists is an option. Although only 1 physician of 904 of the physicians in the study by McLellan et al³⁹ was given the partial opioid agonist methadone for continued opioid dependence and 46 (6%) were treated with the opioid antagonist naltrexone, pharmacological therapy, especially in the form of naltrexone, is a recommended treatment option for recovering opioid-dependent healthcare providers. In particular, naltrexone competes for opioids at the receptor, preventing the euphoria associated with receptor agonism. In 1 study, 20 opioid-dependent healthcare professionals, including nurses, 2 of whom were nurse anesthetists, and 1 pharmacist, were given a common dose of naltrexone of 350 mg per week for an average of 9.4 months.⁴² Although 3 participants abruptly dropped out of the program, presumably because of relapse, 17 of 18 participants remained abstinent during follow-up for an average of 34.8 months.

Reentry Into the Workforce

Reentry of a recovering opioid-dependent anesthesia provider is complicated by the constant access of opioids and possibility of relapse. Bryson and Silverstein²⁵ recently advocated cautious reentry of anesthesia providers into the practice of anesthesia, supporting reentry on an individual basis. An editorial by Berge et al⁴³ in the journal *Anesthesiology* in relation to the article by Bryson and Silverstein²⁵ suggested the development of a "One Strike You're Out" policy in anesthesia, prohibiting reentry of any opioid-addicted anesthesia provider. This suggestion spurred debate within the anesthesia community.

Letters to the editor quickly appeared after this editorial supporting the view of Berge et al.⁴⁴ There were also contrasting opinions that this view represented a step back to earlier times when actions against substance-abusing healthcare providers were more punitive. Proponents of such a policy cite low success rates of opioid-addicted anesthesia residents returning to anesthesia⁴⁴ based on the findings of Menk et al reported in 1990⁴⁵ evaluating the success of reentry into training by recovering anesthesiology residents as reported by program directors. Program directors of anesthesiology resident programs responded to surveys documenting that 180 of 8,810 anesthesiology residents had a substance abuse problem. Not surprisingly, the drug of choice was parenteral fentanyl (132/180). All residents were followed up by program directors for about 2.5 years after reentry, and of the opioid abusers, only 34% were successful during the follow-up period. In contrast, 70% of nonopioid abusers were successful.⁴⁵

Data for the study by Menk et al⁴⁵ were collected in the late 1980s, and, since then, McLellan et al³⁹ have shown that although anesthesiologists addicted to opioids have more intense monitoring programs, their relapse rate is not significantly different from those of other specialties. As well, Paris and Canavan⁶ performed a retrospective case control study looking at relapse rates among 32 anesthesiologists and 36 other physicians from the New Jersey Health Program. While opioid dependence was more common among anesthesiologists, 13 anesthesiologists (41%) had a relapse, and 16 other physicians (44%) had a relapse. There was no significant difference in relapse rates between the 2 groups, nor was there a difference in physicians who changed specialties among the 2 groups.⁶ Although this study illustrates no difference in relapse rates between anesthesiologists, a relapse rate of about 40% is concerning. Consequently, high relapse rates are the argument against reentry. Although there have been some instances of harm to patients by an impaired provider, fortunately, the numbers are low.^{21,46} However, the ethical dilemma exists that an impaired provider who has a relapse likely is not providing care according to standards of care set by the profession, and a profession dedicated to protecting patients should not risk patient care by allowing providers with such problems to practice.

Skipper et al⁴⁶ used the data set from the study by McLellan et al³⁹ of 904 physicians treated in physician health programs. Residents were excluded, and some physicians were lost to follow-up. Therefore, a total of 780 physicians were counted: 83 anesthesiologists and 697 nonanesthesiologists. Of the 102 lost to follow-up, 78 transferred their contract to a different state while in good standing, and 24 left care without referral. This study evaluated their occupation at 5 years in addition to their success (or failure) of treatment as measured by the number of positive drug screens during the monitoring stage, reports to state licensing boards, and completion

of contract. Not surprisingly, anesthesiologists were more likely to have a history of opioid abuse and intravenous drug use. There was no difference in number of drug screens positive for mood-altering substances, revoked licenses, contract completion rate, or occupational status. Among participants studied, 76% of the anesthesiologists and 73% of the nonanesthesiologists were licensed and practicing medicine at the end of the 5-year follow-up, although it was not determined whether physicians were practicing in their original specialty or had changed to another specialty.⁴⁶

Of a survey sent to 250 nurse anesthetists in recovery, 62 responded.⁴⁷ The goal of the study was to evaluate the components of reentry. Of the 62 nurse anesthetists, 39 (63%) were practicing anesthesia. They identified the most helpful factor for successful reentry as their commitment to community-based programs, both 12-step and nurse-support groups. The next most helpful factor was random drug screens. The most difficult factors were dealing with state boards of nursing and finding employment.⁴⁷ The low response rate in this study limits the usefulness of the results, although this study helps illustrate some facilitators and barriers to recovery.

Some legal issues accompany reentry. It should be noted that opioid-addicted healthcare providers in treatment or recovery have some protection by the Americans with Disabilities Act. Providers actively using illicit psychoactive drugs are not protected. This protection differs for providers with an alcohol dependency, because the use of alcohol is not a crime, even providers with alcoholism who are actively drinking have protection.⁴⁸

Prevention

In the literature, prevention traditionally begins with education, although the nature and extent of education is inconsistent. Even today, no standard for substance-abuse education in medical schools or nurse anesthesia programs exists, and the education given varies. Research on this topic is in the information-gathering stage, finding out how programs educate their students about substance abuse and chemical dependency. Booth et al¹⁰ revealed that formal substance-abuse education has increased in 123 anesthesiology resident programs by 47% since 1990. Much of this education is mandatory. The AANA provides a model curriculum for educating nurse anesthesia students about substance abuse, although data on the implementation of this curriculum are not available.⁴⁹

Most institutions have preemployment drug screening and policies that allow drug screening of workers whose behavior is suspicious. There is consideration for routine random drug screening for all anesthesia providers. In fact, the AANA's model policy for random drug and alcohol screening recommends not only preemployment drug screening but also frequent random urine drug screening of small numbers of employees.⁵⁰

Recommendations for Future Research

Research provides evidence of a risk of opioid abuse that is unique to anesthesia providers and that the prevalence is difficult to assess. While the study by Bell et al¹⁴ targeted nurse anesthetists in the United States, many of the large-scale physician research projects targeted only academic institutions or physicians already in treatment for substance abuse or chemical dependency. Incorporating all anesthesia providers in research projects would provide generalizable results about the practice of anesthesia.

Easy drug access, a family history of substance abuse, and coexisting psychological disorders are key factors related to the risk of developing a chemical dependency problem. Most reports are retrospective. An interesting research question might ask how the presence of these factors in anesthesiology residents and nurse anesthesia students influences the development of substance abuse during their professional careers. Results could provide the foundation for a program of research involving the development of risk identification and substance-abuse prevention strategies during anesthesia education. The program could include identification of and counseling for high-risk people.

Would-be anesthesia providers must be aware they are entering a profession associated with potential risk for the development of substance abuse. Increasing awareness of the risks through substance-abuse education for students is another research avenue. Developing, implementing, and evaluating such programs might result in the establishment of national standards regarding substance abuse education among anesthesia students and residents.

Although evidence supports successful reentry of recovering anesthesia providers, some healthcare professionals believe the possibility of relapse is not worth the risk, especially if opioids were the drug of choice. Treatment plans include trigger management. Trigger management in the form of simulation may warrant investigation. Desensitization of the trigger response through controlled introduction in a simulated operating room might be one such avenue. Developing, implementing, and evaluating this type of innovative simulation technology provides interesting opportunities for research.

Anesthesia providers have an increased risk of opioid dependency. Fortunately, the medical, nursing, and nurse anesthesia communities recognize this risk and have taken steps to improve prevention, early identification, and treatment of the problem. To accomplish these goals, continued dedication from these professions is crucial. Improving practitioners' health can only improve patient care. Future research that keeps this goal in mind will no doubt result in helpful information.

REFERENCES*

1. Baldissari M. Impaired healthcare professional. *Crit Care Med*. 2007; 25(2 suppl):S106-S116.
2. Wischmeyer P, Johnson B, Wilson J, et al. A survey of propofol abuse in academic anesthesia programs. *Anesth Analg*. 2007;105(4):1066-1071.
3. SAMSHA. Results from the National Survey on Drug Use and Health: national findings. 2008. <http://oas.samhsa.gov/12k8/12k8nsduh/2k8nsduh/2k8Results.cfm#Fig2-2>. Accessed April 16, 2010.
4. Talbott G, Gallegos K, Wilson P, Porter T. The Medical Association of Georgia's Impaired Physicians Program: review of the first 1,000 physicians: analysis of specialty. *JAMA*. 1987;257(21):2927-2930.
5. Gallegos KV, Browne CH, Veit FW, Talbott GD. Addiction in anesthesiologists: drug access and patterns of abuse. *QRB Qual Rev Bull*. 1988;14(4):116-122.
6. Paris R, Canavan D. Physician substance abuse impairment [abstract]. *J Addict Dis*. 1999;18(1):1-7.
7. Hughes PH, Baldwin DC Jr, Sheehan DV, Conard S, Storr CL. Resident physician substance abuse, by specialty. *Am J Psychiatry*. 1992; 149(10):1348-1354.
8. Hughes PH, Storr CL, Brandenburg NA, Baldwin DC Jr, Anthony JC, Sheehan DV. Physician substance abuse by medical specialty. *J Addict Dis*. 1999;18(2):23-37 (abstract only).
9. Lutsy I, Hopwood M, Abram SE, Jacobson GR, Haddox JD, Kampine JP. Psychoactive substance abuse among American anesthesiologists: a 30-year retrospective study *Can J Anaesth*. 1993;40(10):915-921.
10. Booth JV, Grossman D, Moore J, et al. Substance abuse among physicians: a survey of academic anesthesiology programs. *Anesth Analg*. 2002;95(4):1024-1030.
11. Alexander BH, Checkoway H, Nagahama SI, Domino KB. Cause-specific mortality risks of anesthesiologists. *Anesthesiology*. 2000;93(4): 922-930.
12. Lundy JS, McQuillen FA. Narcotics and the anesthetist: professional hazards. *AANA J*. 1962;30(3):147-176.
13. Naegle MA. An overview of the American Nurses' Association's action on impaired practice with suggestions for future direction. *J Addict Nurs*. 2003;14(3):145-147.
14. Bell DM, McDonough JP, Ellison JS, Fitzhugh EC. Controlled drug misuse by Certified Registered Nurse Anesthetists. *AANA J*. 1999;67(2):133-140.
15. Berry A. Chemical dependence: understanding the disease and its treatment. In: Schwartz A, Matjasko J, Gross J, eds. *The American Association of Anesthesiologists Review*. Vol 33. Philadelphia, PA: Lippincott; 2005:13-21.
16. Luck S, Hedrick J. The alarming trend of substance abuse in anesthesia providers. *J Perianesth Nurs*. 2004;19(5):308-311.
17. Saver C. Substance abuse in the OR: why managers should not ignore it. *OR Manager*. 2008;24(5):1, 11-12.
18. Saver C. Substance abuse in the OR: saving lives through treatment, prevention, 2. *OR Manager*. 2008;24(6):12-13.
19. Koob GF, Volkow ND. Neurocircuitry of addiction [published correction appears in *Neuropsychopharmacology*. 2010;35(4):10517]. *Neuropsychopharmacology*. 2010;35(1):217-238.
20. Hiroi N, Agatsuma S. Genetic susceptibility to substance dependence. *Mol Psychiatry*. 2005;10(4):336-344.
21. Domino KB, Hornbein TF, Polissar NL, et al. Risk factors for relapse in health care professionals with substance use disorders. *JAMA*. 2005;293(12):1453-1460.
22. Prescott CA, Caldwell CB, Carey G, Vogler GP, Trumbetta SL, Gottesman II. The Washington Twin Study of alcoholism. *Am J Med Genet B Neuropsychiatr Genet*. 2005;134B(91):48-55.
23. Matthews J, Moylan A. Substance-related disorders: cocaine and narcotics. In: Stern A, Herman J, eds. *Massachusetts General Hospital Psychiatry and Board Preparation*. New York, NY: McGraw Hill; 2005:85-96.
24. Darbro N. Alternative diversion programs for nurses with impaired practice: completers and non-completers. *J Addict Nurs*. 2005;16(4): 169-185.
25. Bryson EO, Silverstein JH. Addiction and substance abuse in anesthesiology. *Anesthesiology*. 2008;109(5):905-917.
26. Acton GS. Measurement of impulsivity in a hierarchical model of personality traits: implications for substance use. *Subst Use Misuse*. 2003;38(1):67-83.

27. McDonough JP. Personality, addiction and anesthesia. *AANA J.* 1990; 58(3):193-200.
28. Talbert J. Substance abuse among nurses. *Clin J Oncol Nurs.* 2009;13(1):17-19.
29. Trinkoff AM, Zhou Q, Storr CL, Soeken KL. Workplace access, negative proscriptions, job strain, and substance use in registered nurses. *Nurs Res.* 2000;49(2):83-90.
30. Hornbein T, Wales D. *Wearing Masks: The Series* [DVD]. Park Ridge, IL: American Association of Anesthesiologists; 2003.
31. Trinkoff AM, Storr CL. Substance abuse among nurses: differences in specialties. *Am J Public Health.* 1998;88(4):581-585.
32. Wildgust BM. Stress and the anesthesia student. *AANA J.* 1986;54(3):272-278.
33. Gold MS, Byars JA, Frost-Pineda K. Occupational exposure and addictions for physicians: case studies and theoretical implications. *Psychiatr Clin N Am.* 2004;27(4):745-753.
34. Gold MS, Melker RJ, Dennis DM, et al. Fentanyl abuse and dependence: further evidence for second hand exposure hypothesis. *J Addict Dis.* 2006;25(1):15-21.
35. Signs and behaviors of an impaired colleague. AANA Website. <http://www.aana.com/peerassist.aspx>. Accessed May 4, 2010.
36. Berge KH, Seppala MD, Schipper AM. Chemical dependency and the physician. *Mayo Clin Proc.* 2009;84(7):625-631.
37. Epstein RH, Gratch DM, Grunwald Z. Development of a scheduled drug diversion surveillance system based on an analysis of atypical drug transactions. *Anesth Analg.* 2007;105(4):1053-1060.
38. Chisholm AB, Harrison MJ. Opioid abuse amongst anaesthetists: a system to detect personal usage. *Anaesth Intensive Care.* 2009;37(2):267-271.
39. McLellan AT, Skipper GS, Campbell M, DuPont RL. Five year outcomes in a cohort study of physicians treated for substance use disorders in the United States. *BMJ.* 2008;337:a2038. doi:10.1136/bmj.a2038.
40. DuPont RL, McLellan AT, White WL, Merlo LJ, Gold MS. Setting the standard for recovery: physicians' health programs. *J Subst Abuse Treat.* 2009;36(2):159-171.
41. Trossman S. Nurses' addictions. *Am J Nurs.* 2003;103(9):27-28.
42. Roth A, Hogan I, Farren C. Naltrexone plus group therapy for the treatment of opiate-abusing health-care professionals. *J Subst Abuse Treat.* 1997;14(1):19-22.
43. Berge KH, Seppala MD, Lanier WL. The anesthesiology community's approach to opioid- and anesthetic-abusing personnel: time to change course [editorial]. *Anesthesiology.* 2008;109(5):762-764.
44. Letters to the Editor. *Anesthesiology.* 2009;110(6):1422-1428.
45. Menk EJ, Baumgarten RK, Kingsley CP, Culling RD, Middaugh R. Success of reentry into anesthesiology training programs by residents with a history of substance abuse. *JAMA.* 1990;263(22):3060-3062.
46. Skipper GE, Campbell MD, DuPont RL. Anesthesiologists with substance use disorders: a 5-year outcome study from 16 state physician health programs. *Anesth Analg.* 2009;109(3):891-896.
47. Sibert RR, Demenes M. Criteria for successful re-entry as a CRNA provider post-addiction treatment [abstract]. *AANA J.* 1996;64(5):454. Abstract 51.
48. Drug addiction as an impairment. Americans with Disabilities Act Title II Technical Assistance Manual Covering State and Local Government Programs and Services. <http://www.ada.gov/taman2.html#II-2.3000>. Accessed April 30, 2010.
49. Clark GD. A model didactic and clinical substance abuse curriculum developed for schools of nurse anesthesia. AANA Website. 1994. <http://www.aana.com/wearingmasks.aspx>. Accessed May 4, 2010.
50. AANA Peer Assistance Advisors. Model policy: fitness for duty: random drug screening for drug and alcohol. Published October 2006; updated February 2010. AANA Website. <http://www.aana.com/Resources.aspx?id=6179&terms=random+drug+screening>. Accessed May 4, 2010.

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