Substance use disorders (SUDs) have had a major impact on the health of the US population during the past decade. Osteopathic physicians have an important role among those who can make a positive impact on this problem. This article reviews the nature of the problem, how the osteopathic medical profession is currently addressing it, and a current strategy for improvement endorsed by the American Osteopathic Academy of Addiction Medicine. Early in 2004, the Office of National Drug Control Policy—backed by the US Surgeon General, the Center for Substance Abuse Treatment, the National Institute on Drug Abuse, the National Institute on Alcohol Abuse and Alcoholism, and the National Highway Traffic Safety Administration—has requested improvement in physician education on this health problem. This request culminated in the Office of National Drug Control Policy’s establishing the Leadership Conference on Medical Education in Substance Abuse in December 2004. The osteopathic medical profession is represented in this critical review and formulation of recommendations for improving education on substance use disorders for the undergraduate, graduate, and practicing physician.

Few physicians would disagree that substance use disorders (SUDs) are a significant problem in the United States today. The most current information on prevalence of dependent use of drugs and alcohol in the United States shows rates of approximately 30% for tobacco, 2% for illicit drugs, and 3.3% for alcohol.1

Drugs
Federal data also show that 6.2% of the population used marijuana in the past month.4 Nonmedical use of prescription drugs, particularly opioid analgesics, continues to rise. From 2002 to 2003, the number of Americans who used pain relievers nonmedically at least once during their lifetime increased 5%, from 30 million to 31.2 million. Among young adults, the nonmedical use of any psychotherapeutics in the past month, or “current use,” increased from 5.4% to 6.0%. Also among young adults, current nonmedical use of pain relievers increased by 15%, from 4.1% to 4.7%.4

Health and Social Consequences
In the United State, SUDs are associated with many of the most serious and tragic problems, including violence, injury, disease, and death. It has been estimated that of the more than 2 million deaths in the United States each year, approximately one in four is attributable to alcohol, tobacco, or other drug use. The disability cost in years for these substances and all illicit drugs, and the burden of all morbidity and mortality among men in North America and Europe is estimated at 32.4%.3 Some

Medical Education in Substance Abuse: From Student to Practicing Osteopathic Physician

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Substances of Abuse and Associated Health Problems

Tobacco
Cigarettes and the oral use of tobacco are linked with 90% of lung cancer cases, 75% of chronic bronchitis/emphysema cases, and 25% of overall cases of ischemic heart disease. In the industrialized nations of the world, the annual death rate due to cigarettes was 2.1 million in 2000. This number is estimated to have grown since then and continues to rise. Cigarettes are responsible for the death of approximately half of all lifetime users.2

Alcohol
The rate for alcohol abuse and dependence combined is 7.6%, and past-month binge use of alcohol approaches 23%. Recent estimates by the World Health Organization show that alcohol is the third largest risk factor for disease burden among developed nations. Alcohol has a causal relationship with 60 different types of disease or injury. This does not take into account the social, emotional, and economic consequences of alcohol use problems.3 Patients with alcohol use problems consume more than 15% of the national healthcare budget, with 39% of these costs representing costs of morbidity from secondary health and social effects.

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groups, such as members of ethnic and cultural minority populations, are disproportionately affected by consequences of drug abuse and addiction. Moreover, it is estimated that one out of four children younger than 18 years in the United States is exposed to alcohol abuse or alcohol dependence in the family. This figure is magnified by many other children adversely affected by parents and other caregivers who are impaired by use of other psychoactive drugs.1

**Research Breakthroughs**

Scientific advancements have increased the knowledge about causes, consequences, prevention, and management of SUDs. Research funded by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and the National Institute on Drug Abuse (NIDA) has identified the primary receptors for every major class of abused drug (including alcohol), identified their genetic code, and cloned the receptors.5,6 Researchers have mapped locations of these receptors in the brain and determined the neurotransmitter systems involved.7 They have demonstrated activation of these regions during addiction, withdrawal, and craving;5 identified and separated mechanisms underlying drug-seeking behavior and physical dependence;9 and developed animal models for drug self-administration.10 There is strong evidence demonstrating the mesolimbic dopamine system as the primary site of dysfunction in the development of drug use problems.10

Outcomes studies supported by the Center for Substance Abuse Prevention (CSAP) and the Center for Substance Abuse Treatment (CSAT) have led to development of documented knowledge regarding effective drug abuse prevention programs; in addition, clear evidence has been provided showing that treatment of patients for SUDs is at least as effective as that for chronic medical problems.11 Moreover, these studies have provided direction as to how to organize prevention and treatment for specific populations to increase the likelihood of success.

Such advances have provided a clear understanding that substance abuse is a preventable behavior and that addiction is a treatable disease of the brain. This paradigm shift provides unprecedented opportunities to reduce health and social consequences of substance misuse, abuse, and dependence throughout the United States.

**The Role of Physicians**

The general healthcare system in the United States offers an ideal opportunity to identify and treat substance abusers and thereby reduce associated adverse health, family, and societal effects. Practitioners from various disciplines, including physicians, nurses, pharmacists, dentists, social workers, psychologists, and other allied health professionals, are essential participants in national efforts to deal with these problems.12 Physicians are particularly well positioned to play a role in the recognition and treatment of such patients.13 However, minimal attention has been given to educating primary care physicians and other health professionals to respond to the needs of individuals and their families affected by SUDs. As a result, primary care physicians do not identify and diagnose alcohol and drug problems with the same acuity they bring to other medical disorders. Their role in prevention, early identification, and referral remains largely untapped.

Primary care physicians are in an ideal position to provide preventive guidance, education, and intervention to children, adolescents, adults, and their families. It has been estimated that up to 20% of visits to such physicians are related to substance use problems.14 Both generalist and specialist physicians have frequent contact with patients who have SUDs.15-17 Moreover, patients with alcohol and other drug problems are twice as likely to consult a primary care physician as persons without such problems.18

Research also shows that physicians play an important role in the health decisions of their patients. For example, a recent review of brief interventions for alcohol and drug problems concluded that primary care physicians can be effective in changing the course of a patient’s harmful drinking.19,20 Smoking cessation research shows that a physician’s recommendation to quit smoking is sufficient to convince many patients to undertake such an effort. Interventions by emergency physicians have been shown to reduce subsequent alcohol use and readmission for traumatic injuries,21 as well as drinking and driving, traffic violations, alcohol-related injuries, and alcohol-related problems among 18- and 19-year-old persons.22

Strong evidence exists that the public wants such help from their caregivers. In a public opinion survey conducted by Harvard University and The Robert Wood Johnson Foundation,23 74% of respondents said they believe that addicts can stop using drugs, but that to do so, they need help from professionals or organizations outside their families. By “help,” two thirds of those surveyed said they meant intervention by a healthcare professional.

Unfortunately, though primary care physicians are the professionals most often cited by patients and families as the “most appropriate” source of advice and guidance about issues related to the use of alcohol, tobacco, and other drugs (including prescription drugs), they also are reported to be the “least helpful” in actually addressing these issues. Physicians often miss a diagnosis of drug abuse or addiction, and even when they make the diagnosis, they have a lack of knowledge as to how to do a brief intervention or develop an organized plan for patient referral or treatment.

Osteopathic physicians represent 8.3% of all practicing physicians in the United States, but 62.2% of DOs are in primary care (ie, family medicine, internal medicine, pediatrics, and obstetrics and gynecology).24 Thus, osteopathic physicians, who by design have a strong educational focus on this aspect of medicine, can assume a more significant role in helping patients currently suffering from a substance use disorder or at future risk for this condition. However, because of the lack of training in osteopathic medical schools and graduate medical education programs, there is often a missed opportunity for appropriate intervention in the physician’s office.

**The Status of Medical Education**

Osteopathic medicine, through its designation of addiction medicine as a subspecialty, has established itself as a leader...
in the field of substance use disorders. Nevertheless, in an unpublished 2000 review of osteopathic medical schools by the American Osteopathic Academy of Addiction Medicine (AOAAM), only 4 (22%) of the then 17 schools of osteopathic medicine reported that they had a required curriculum on addiction medicine. This number would seem woefully insufficient, yet it is better than the results of a similar survey of allopathic medical schools, where only 8% provided a mandatory program in this field.

In regard to tobacco education, osteopathic and allopathic medical schools have a similar record in covering 13 core content areas, 7 basic science areas, and 6 clinical science areas. More than 20% of osteopathic and allopathic medical schools require 3 hours or less of tobacco education in the entire 4 years of undergraduate education. All but one of 17 schools with four-year programs reported less than 1 hour of tobacco cessation dependence instruction in that last year. Two schools present a required course on tobacco-related illnesses.

The American Association of Colleges of Osteopathic Medicine (AACOM) compiled a survey of senior osteopathic medical students near the end of the 2003 academic year and published results in 2004. Seniors were asked to rate various topics covered in their 4 years of education; results showed that 78.2% thought they had adequate didactic instruction on drug and alcohol abuse, 18.1% stated it was inadequate, and 3.7% thought it was excessive.

AACOM also published results of an osteopathic medical education curriculum questionnaire in that same year, showing that 4606 students attended a required course on drug and alcohol problems, 347 students enrolled in an elective course on addiction, and 3107 students had clerkship rotations on the subject, for a total of 8395 students. (Some overlap could exist in these data, reflecting students who attended more than one course.) All the then 19 schools completed the survey. Therefore, of the 11,432 students enrolled in the 2002-2003 academic year, 73.4% had exposure to some aspect of alcoholism or substance abuse or both.

Despite this progress, basic clinical skills of screening, assessment, diagnosis, and ongoing monitoring—all skills that physicians routinely apply in the management of other chronic disorders—clearly need attention when it comes to SUDs.

Although several professional organizations have issued calls for greater integration of substance abuse education into osteopathic and allopathic residency training programs, the impact of these recommendations has been variable. For example, although the Accreditation Council for Graduate Medical Education (ACGME) was represented in the development of the Policy Report of the Physician Consortium on Substance Abuse Education, substantive changes in Residency Review Committee standards that would have expanded integration of substance abuse curricula into residency programs never occurred. A similar lack of impact was seen in osteopathic residency training. Recent data indicate that there are Residency Review Committee program requirements regarding substance abuse education in only 5 of the 99 specialty training programs (anesthesiology, family practice, internal medicine, obstetrics/gynecology, and psychiatry).

A survey conducted in 1988 with a 74% response rate revealed that the proportion of departments that offered a curriculum unit in substance abuse was 93 (40%) of 232 for internal medicine; 195 (68%) of 288 for family medicine; 38 (27%) of 139 for pediatricians; and 153 (91%) of 169 for psychiatrists. A recent national survey was conducted to determine the extent of substance abuse training in residency programs. This assessment of 1831 osteopathic and allopathic residency program directors in emergency medicine, family medicine, internal medicine, pediatrics, psychiatry, and obstetrics/gynecology found that the percentage of programs requiring substance abuse training ranged from 32% (pediatrics) to 95% (psychiatry). The median number of curricular hours ranged from 3 to 12 with the traditional grand rounds lecture being the most common curricular format used to teach substance abuse topics. Only family medicine (55%) and psychiatry (75%) reported that a majority of their programs required clinical rotations in addiction medicine. In recent surveys, the most commonly cited factors limiting further integration of substance abuse training into residency programs include a perceived lack of time, faculty expertise, identified training sites, and institutional support.

A National Spotlight on the Issue

In December 2004, the White House Office of National Drug Control Policy (ONDCP) convened the Leadership Conference on Medical Education in Substance Abuse. More than 60 representatives of federal agencies, organized medicine, and licensure and certification bodies met to discuss ways to enhance physicians’ motivation and ability to prevent, diagnose, and manage substance use disorders. The conference thus represented an unprecedented convergence of attention to this issue at the highest levels of both government and private sectors.

Osteopathic medicine was well represented by a board member of the AOAAM (Dr Manlandro), a representative of the AOA (Dr Vilensky), a student representative (Mr Dekker) selected by the national organization of Health Professional Students for Substance Abuse Training, and a member of the team that planned and implemented the conference and a continuing participant in following up this initiative as a panelist representing osteopathic medicine (Dr Wyatt).

In his address to conference participants, ONDCP Director John P. Walters noted that organized medicine and medical education groups have pivotal roles in addressing this challenge. Accordingly, he asked participants to develop specific plans for public and private sectors to improve training of physicians through undergraduate, graduate, and continuing medical education (CME).

All speakers acknowledged past efforts to teach physicians competencies necessary to care for patients with SUDs. Although many approaches have been effective in identifying the medical basis of SUDs and creating a clinical paradigm similar to that for other chronic diseases, presenters also agreed that the depth of initiatives varies by clinical discipline and academic institution. They called for
Checklist

Screening, Prevention, and Brief Intervention
Physicians should know:
- How and when to screen patients for unrecognized substance use disorders (SUDs).
- How to provide preventive counseling and brief interventions, as appropriate.

Identification and Management of Co-Ocurring Substance Use and Medical or Psychiatric Disorders
Physicians should be:
- Able to identify and treat or appropriately refer patients with co-occurring medical and psychiatric conditions and SUDs.
- Prepared to provide ongoing medical monitoring.
- Prepared to address needs of special populations (eg, adolescents and older adults).

Prescribing of Drugs with Abuse Potential
To minimize the risk of inducing or perpetuating prescription drug misuse or abuse, physicians should have:
- Ability to understand clinical, legal, and ethical considerations involved in prescribing medications with abuse potential.
- Skills to address these considerations.

Development of more effective tools to identify, prevent, and treat patients with SUDs in primary healthcare settings.

Identifying the Needed Competencies
Participants in the conference agreed that highest priority should be given to three areas of competence (Figure 1), all of which have direct application to the care of patients with SUDs and are relevant to all disciplines and specialties. On completion of each level of training, all medical students, residents, and physicians should be able to demonstrate mastery of this core body of knowledge and skill.

Physician education can and should be tailored to specific practice situations and patient populations. For example, pediatricians have a special need for both knowledge about SUDs as development of mental disorders and skills and to screen and provide intervention, and referral. Such physicians also need to consider issues raised by children and adolescents whose parents or other caregivers have SUDs and to acquire skills in screening and intervention in these situations. Similarly, specialists in obstetrics and gynecology need the knowledge and skills to address substance-related problems in pregnant and parenting women.

Because primary care physicians serve diverse populations of patients in terms of gender, socioeconomic status, and culture, they also must be culturally competent in communicating with patients and their families.

Recommendations for Action
Conference participants developed strategies to overcome obstacles to greater

Figure 1. Highest priority competencies with direct application to care of patients with substance use disorders and with relevance to all medical disciplines and specialties.

Figure 2. Recommended action items for upgrading undergraduate medical education on substance use disorders.
physician involvement in the prevention, identification, and management of SUDs. Nutrition and geriatrics could be used as models for how cross-cutting ideas can be incorporated into medical education and practice. Recommended action items for undergraduate and graduate medical education, as well as processes for CME, are highlighted in Figures 2 through 4.

The conferees designed a two-pronged approach to achieve the objectives for graduate medical education (Figure 3):

- Address extrinsic larger systems issues outside of medicine, such as factors that impede the identification, treatment, and referral of patients with SUD.
- Address intrinsic medical systems factors that impede physician education on SUDs, such as residency program curriculum, and the negative stigma associated with SUDs.

**The Role of Federal Agencies**

In addition to supporting faculty development programs, the conferees agreed that federal health agencies have an important role to play in physician education through the following mechanisms:

- Increase grant support for research designed to foster physician competencies in identifying and addressing SUDs to stimulate research in the field and also provide needed support to faculty with critical research agendas including determining the appropriate healthcare profession to do a brief intervention, determining critical components of brief interventions, exploring the need to adapt screening and brief intervention strategies to special populations, and determining the most effective teaching strategies for training clinicians in screening and brief interventions. Successful grantees will also serve as role models or mentors for junior faculty members.
- Develop institutional support for faculty teaching about SUDs via funding mechanisms that are designed to foster development of curriculum or research efforts. Funds that are targeted toward programs that cut across disciplines (e.g., osteopathic and allopathic medicine, social work, and nursing) will foster development of collaborative research and training efforts and help engender institutional support.
- Establish federally funded National Centers of Excellence to serve as model programs for developing, disseminating, and implementing methods of research, clinical care, and education on SUDs. Such centers could participate in a network to develop and implement a standard curriculum for undergraduate, graduate, and postgraduate osteopathic and allopathic medical education. Current federally supported initiatives with national infrastructures, such as the Area Health Education Centers (supported by the Health Resources and Services Administration), the Addiction Technology Transfer Centers (supported by CSAT), and the Clinical Trials Network (supported by NIDA), provide useful models for the proposed centers.
- Work with the AOA Bureau of Osteopathic Specialists and the American Board of Medical Specialties to strengthen the language articulating attention to SUDs.
- Compile and disseminate information about model residency training programs that incorporate teaching about SUDs.
- Offer assistance to the American Osteopathic Association (AOA) Council on Postdoctoral Training, the Accreditation Council for Graduate Medical Education, and residency review committees to help identify and disseminate information about model residency training programs that incorporate teaching about SUDs.

**Figure 3.** Recommended action items for advancing graduate medical education on substance use disorders.
Proposed Processes—Continuing Medical Education

Collaboration
- Work with the American Osteopathic Association (AOA) Council on Postdoctoral Training, the Accreditation Council for Graduate Medical Education (ACGME), and the various specialty boards to strengthen requirements for continuing medical education (CME) on substance use disorders (SUDs).
- Encourage specialty boards to include questions that test mastery of the knowledge and skills relevant to SUDs in recertification examinations.
- Work with the AOA Bureau of Osteopathic Specialists, the American Board of Medical Specialties, and state medical boards to include questions that test mastery of the knowledge and skills relevant to SUDs in their licensure examinations.

Compilation and Dissemination of Information
- Compile and disseminate information about potential model CME programs for SUDs:
  - Conferences to submit information about possible models for compilation in the project database and dissemination to interested parties.
  - Conferences to collaborate with the AOA Council on Continuing Medical Education and the Accreditation Council for Continuing Medical Education to develop a CME government Web site, where approved educational programs could be listed.
- Work with National Institute of Alcohol Addiction and Alcoholism and the National Institute of Drug Addiction (NIDA) to identify and disseminate information about sources of funding to support clinical research into prevention, identification, and management of prescription drug abuse.
- Establish public and private partnerships (eg, NIDA and the American Osteopathic Academy of Addiction Medicine) to identify or develop (or both) educational materials that physicians can give to patients for whom they prescribe drugs with abuse potential.

Facilitation
- Facilitate a connection between the Office of National Drug Control Policy (ONDCP), other leaders of the initiative, and organizations that represent the CME infrastructure (ie, those that provide and accredit CME programs) to engage the CME providers in promoting the concept that public health issues (including SUDs) should be addressed through their systems and members.
- Facilitate a connection between federal agency staff who have CME responsibilities and the group of experts within the White House ONDCP and other leaders of the initiative.*

Prescribing Decisions
- “Mainstream” education about prescribing drugs with abuse potential (ie, teach about abuse involving the prescription drugs similar to the way in which other areas of clinical knowledge and skills are taught).
- Use all educational media available, including new methods such as teleconferencing and online CME programs.
- Employ multiple focused interventions (similar to pharmaceutical manufacturers when a new drug is released) through partnerships between federal agencies and relevant private sector organizations.
- Incorporate language that reflects competency in prescribing controlled drugs into licensure standards and certification and recertification programs. Require at the time of re-registration with the Drug Enforcement Administration that physicians present evidence of CME credits or focused self-assessment to achieve this competency (or both).
- Revise patient charts to move the personal and family history of alcohol and drug problems from the “Social History” to the “Past Medical History,” where it is more likely to be considered in prescribing decisions. Add similar cues to screens of electronic medical records.
- Add reminders to physicians about prescribing considerations and cautions to the backs of prescription forms (especially state-issued forms).

Figure 4. Proposed processes for continuing medical education on substance use disorders (SUDs). *If government CME providers were to embrace the concept of partnering with private-sector organizations, the dissemination strategy would be in place. For example, the National Institutes of Health, the Centers for Disease Control and Prevention, or the Substance Abuse and Mental Health Services Administration (SAMHSA) could invite the national medical specialty societies to become partners in developing and presenting clinical modules on identifying and managing SUDs. A model is the buprenorphine training course for which curricula were developed through collaboration between SAMHSA and selected medical specialty societies.

Other recommendations included having the VA system develop models for medical education, then using its influence to renegotiate contracts with medical schools to have the models incorporated; having the Health Resources and Services Administration provide funding for development and imple-
mentation of clinical models for its target populations (eg, rural areas) in collaboration with other agencies; working together across multiple agencies, including payers such as Medicare and Medicaid and other organizations, to develop more ideas about clinical models. Such clinical models would, in turn, facilitate development of reimbursement models. (Alternatively, develop guidelines, and then allow economists to develop the models.)

Additional recommendations included government’s supporting research into strategies that promote system change and provider change; working with credentialing bodies to develop and maintain incentives for change; and testing the model efficacy with demonstration projects, funded through contracts and requests for funding.

Final recommendations were for the government to compile and disseminate information about sources of available funding to support modification of medical school curricula, residency training programs, and continuing medical education programs to include greater attention to SUDs.

The first step would be to ask the federal agency and Foundation representatives to submit information about available funding for both compilation of the project database and dissemination to interested parties.

Recommendations Specific to Osteopathic Medicine

Given healthcare providers’ current understanding of the role SUDs play in the overall health problems of the United States, it is imperative that osteopathic physicians continue to advocate within the osteopathic medical profession for improvement in the education of students, residents, and practicing physicians concerning SUDs. In this regard, the AOAAM recommends the following initiatives specific to osteopathic medical education, as a supplement to the national objectives:

- Develop a committee comprising members of AACOM and osteopathic experts in substance use problems charged with the responsibility of formulating a curriculum for enhancement of medical school education in prevention, identification, and treatment of patients with SUDs.
- Seek federal funding to establish a team of osteopathic addiction specialists to be made available to each school to assist with curriculum development, faculty training, and direct medical student didactics in the second year. As part of this effort, apply for faculty development grants described at the Leadership Conference by NIAAA Director T. K. Li, MD.
- Work with the National Board of Osteopathic Medical Examiners (NBOME) to develop exam questions on the physiology, pharmacology, prevention, diagnosis, and treatment associated with substance use disorders. Recommendations can be formulated in part from the Leadership Committee’s Core Competency Criteria.
- Encourage leaders within all the primary care residency programs and experts in the field of addiction medicine in their respective organizations to establish recommendations for inclusion of curriculum development and training in the area of addictions.
- Encourage State and Regional Osteopathic organizations (through development of funding sources and speaker lists) to include topics on the prevention, assessment, and treatment of SUDs in their educational programming.
- Develop curriculum guidelines, working closely with clinical pharmacologists, to be included in undergraduate, graduate, and postgraduate education for the proper prescribing of controlled substances. Courses in pain management and SUDs should be offered in tandem to teach the clinical pharmacology, anatomy, and physiology. Residency programs should require inclusion of curriculum didactics in clinical pharmacology of pain management and appropriate use of controlled substances. The US Drug Enforcement Administration and state licensing boards could require continuing medical education units in substance use disorders and applied pharmacology of opiates.
- Guidelines for competency development for medical students, primary care specialty education, and continuing education have been made available by the National Leadership Council on Substance Abuse Education. These guidelines can be used as a framework for curriculum development.

Comment

This initiative has continued to gain momentum since the conference. Discussions with a variety of federal agencies and medical organizations, both osteopathic and allopathic, are ongoing as the Leadership Conference Expert Panel and the AOAAM move forward with the objectives. Meetings are being scheduled with leaders of academic medicine, with an eye toward improving undergraduate and graduate medical education. The NBOME and the National Board of Medical Examiners are strongly considering giving greater weight to the diagnosis and treatment of SUDs. The CME providers for federally employed physicians are currently working on ways to enhance the exposure to these problems in their presentations. Government is giving strong support for this agenda to move forward.

A follow-up meeting is to be scheduled in December 2005 to revisit objectives, strategies, and action steps and to assess progress toward achieving the objectives. In the interim, conferees suggested that the Expert Panel continue to meet as an organizing nucleus and that task forces be appointed to pursue specific objectives. Various recommendations established at the conference have been either completed or are under way. This initiative—apart from representing good practice of medicine—has strong political and academic support to move into the mainstream of medical education.

More information on the Leadership Conference and its follow-up activities are available from the principal author of this article.

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