ORIGINAL ARTICLE

Prognosis for the Recovery of Surgeons From Chemical Dependency

A 5-Year Outcome Study

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Hypothesis: Rates of relapse, monitoring contract completion, and return to medical practice may differ between surgeons and nonsurgeons being monitored for diagnosed substance use disorders.

Design: Retrospective 5-year longitudinal cohort study.

Setting: A sample of 16 state physician health programs in the United States.

Participants: Nine hundred four physicians who underwent treatment for a substance use disorder and were consecutively admitted to 1 of 16 state physician health programs between September 1, 1995, and September 1, 2001. The study analyzed a subset of data comparing 144 surgeons with 636 nonsurgeons.

Main Outcome Measures: Rates of continued drug and alcohol misuse (relapse), monitoring contract completion, and return to medical practice at 5 years.

Results: Surgeons were significantly more likely than nonsurgeons to enroll in a physician health program because of alcohol-related problems (odds ratio, 1.9; 95% CI, 1.3-2.7; $P=.001$) and were less likely to enroll because of opioid use (odds ratio, 0.5; 95% CI, 0.3-0.8, $P=.002$). Surgeons were neither more nor less likely than nonsurgeons to have a positive drug test result, complete or fail to complete the monitoring contract, or extend the monitoring period beyond the original 5 years specified in their agreements. Fewer surgeons than nonsurgeons were licensed and practicing medicine at the conclusion of the monitoring period, although this difference was not statistically significant.

Conclusions: Surgeons in this study had positive outcomes similar to those of nonsurgeons. However, further research is necessary to conclude whether surgeons are less likely than their nonsurgeon peers to successfully return to medical practice following chemical dependency treatment.

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Little is known about the prevalence of substance use disorders (SUDs) among surgeons practicing in the United States. Similar to the risk in the general population, it is estimated that 10% to 12% of all physicians will experience impairment because of alcoholism or drug dependency over the course of their careers.[1-4]

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Recent studies[5-7] of surgeon health have reported problematic alcohol use in approximately 7% to 8% of participants. However, most literature focuses on burnout, mental illness, and suicidal ideation. Numerous studies demonstrate that a substantial number of surgeons, anywhere from 30% to 38%,[6-9] experience high levels of stress and burnout, placing them at risk for anxiety, depression, suicidal ideation, SUDs, dysfunction among familial or professional relationships, and early retirement.[6,8-11] Indeed, workplace characteristics, such as long hours and intense responsibility, combined with obsessive personality traits and perfectionistic qualities that are hallmarks of the practice of surgery, create pressures that often manifest in personal and professional distress.[8,11]

See Invited Critique at end of article

Physician health programs (PHPs) are established on a state-by-state basis to raise awareness of issues related to physician health and to monitor potentially impairing conditions.[12] In many states, PHPs are granted authority by regulatory boards and state laws to coordinate treatment and

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monitor SUDs and other mental health concerns.[13] Physician health programs do not provide substance abuse treatment but rather promote early detection, evaluation, and referral to residential treatment facilities, followed by a 5-year monitoring period. The monitoring period includes random urine toxicology testing and professionally facilitated counseling and/or Alcoholics Anonymous, Narcotics Anonymous, or Caduceus meeting attendance.[14] Seventy percent of programs also require a worksite monitor.[14] According to available data,[4,15] surgeons are neither overrepresented among the population of physicians enrolled in PHPs nationally nor overrepresented among populations undergoing treatment for substance dependence.

The objective of this study was to compare 5-year outcomes for surgeons vs nonsurgeons enrolled in PHPs. Physicians enrolled in a PHP for monitoring of an SUD have abstinence rates ranging from 75% to 90% during the 5 years following chemical dependency treatment, which are markedly greater than rates among the general population of individuals in recovery.[4,16-18] To date, there are no studies on whether these rates hold among surgeons specifically or whether employment and recovery outcomes for surgeons differ significantly from those of nonsurgeons.

This study represents the first long-term outcome report for surgeons being monitored for an SUD and uses data from a cross section of 16 PHP monitoring programs. All the participants were observed for 5 years following diagnosis and treatment of chemical dependency. We sought specifically to identify rates of relapse (continued drug and alcohol misuse), monitoring contract completion, and return to medical practice at 5 years. We hypothesized that society's expectation of perfection from surgeons, reinforced through the duration and rigor of surgical training, would cause this population to perform better than nonsurgeon physicians with regard to incidents of relapse and monitoring and employment outcomes.

METHODS

DESIGN

We used data from a previously reported 5-year longitudinal cohort study[4] of 904 physicians having diagnoses of substance abuse or dependence who were admitted to 1 of 16 state PHPs between September 1, 1995, and September 1, 2001. The characteristics and outcomes of a subset of 144 surgeons were compared with those of 636 nonsurgeons. Surgical specialties included general surgery, obstetrics and gynecology, ophthalmology, orthopedic surgery, otolaryngology, plastic surgery, thoracic surgery, and urology. The following 5 medical specialties represented more than 70% of nonsurgeon physicians: family practice (25.1%), internal medicine (16.3%), anesthesiology (13.1%), emergency medicine (8.8%), and psychiatry (8.2%). Comparisons were restricted to objective data from official records (eg, treatment services, attendance, sanctions by the program, and reports to licensing boards) and from laboratory records (findings from urine tests and other specimens). To protect the confidentiality of the physicians in the study, members of each PHP's medical records staff collected and reported the data. Data were collected between November 2006 and January 2007, under training, supervision, and monitoring by the original investigators (M.D.C., R.L.D., and others).[4] All components of the original study were reviewed and approved by the institutional review board of the Treatment Research Institute, Philadelphia, Pennsylvania.

PARTICIPANTS

Of 904 participants in the original study, 42 (4.6%) were residents, all of whom were excluded from this study, as they constituted a population of physicians younger than the average practicing physician and presumably at higher risk for substance abuse. Furthermore, although no significant differences were noted between residents and practicing physicians (including surgical residents) on any outcome variable measured, their numbers were deemed too small to be conclusive (6 surgical residents and 36 residents in other specialties).

Of the remaining 862 participants, 156 (18.1%) were surgeons. At the time these participants enrolled in PHPs, surgeons composed 20.1% of approximately 749 000 physicians (excluding residents) providing patient care in the United States.[15] This does not constitute a statistically significant underrepresentation of surgeons enrolled in PHPs or included in this study (odds ratio [OR], 0.9; 95% CI, 0.7-1.0; $P=.15$).

LOSS TO FOLLOW-UP

During the study period, 82 of 862 participants (9.5%) moved out of their state program's jurisdiction. Because there was no access to any continuing records for those participants, they were excluded from the final study analyses. This group included 12 surgeons and 70 nonsurgeons. Comparisons between those lost to follow-up and those retained in the study revealed no significant differences between groups in age at enrollment, sex, primary substance of abuse at admission, prior treatment, or enrollment status (mandatory vs voluntary). Among those lost to follow-up, no significant differences were noted between surgeons and nonsurgeons on these same variables. Two-thirds of surgeons (66.7%) and nonsurgeons (65.7%) who could not be followed up for 5 years had transferred in good standing to PHPs in other states. Final analysis was performed comparing 144 surgeons with 636 nonsurgeons for whom 5 years of follow-up data were available.

STATISTICAL ANALYSIS

Commercially available statistical software (SPSS for Windows, version 15; SPSS, Inc, Chicago, Illinois) was used for the analyses. Demographic and outcome variables for surgeons and nonsurgeons were compared using χ^2 test for proportions and t test for means. Univariate ORs (95% CIs) were computed to compare the 2 physician groups on selected binomial characteristics and outcomes.

RESULTS

This study used treatment records from 16 programs that had previously participated in a survey of 42 PHPs. The original study[4] described the structure, function, funding, and characteristics of the PHPs, as well as the monitoring procedures and activities provided after treatment. The 26 PHPs that did not participate in the treatment record review herein listed lack of resources, regulatory impediments, or both as reasons for declining to participate. The programs that did and did not par-

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Table 1. Characteristics of Surgeons vs Nonsurgeons Monitored by State Physician Health Programs for Substance Use Disorders

Characteristic	Surgeons (n=144)	Nonsurgeons (n=636)	*P* Value[a]
Age at enrollment, y			
Mean (SD)	47 (10)	44 (8)	<.001
Range	27-47	26-75	
Sex, No. (%)	(n = 143)	(n = 634)	
Male	127 (88.8)	543 (85.6)	.32
Female	16 (11.2)	91 (14.4)	
Enrollment status, No. (%)		(n = 635)	
Mandatory	89 (61.8)	353 (55.6)	.17
Voluntary	55 (38.2)	282 (44.4)	
Prior treatment, No. (%)		(n = 634)	
Yes	50 (34.7)	248 (39.1)	.33
No	94 (65.3)	386 (60.9)	
Type of monitoring agreement, No. (%)		(n = 636)	
Substance dependence for 5 y	122 (84.7)	565 (88.8)	.17
Diagnosis of abuse	22 (15.3)	71 (11.2)	
Primary substance of abuse, No. (%)	(n = 143)	(n = 629)	
Alcohol	89 (62.2)	295 (46.9)	<.01
Opioids	33 (23.1)	230 (36.6)	
Stimulants	11 (7.7)	46 (7.3)	
Sedatives	4 (2.8)	23 (3.7)	
Other	6 (4.2)	35 (5.6)	
Intravenous drug use history, No. (%)	(n = 136)	(n = 590)	
Yes	11 (8.1)	85 (14.4)	.05
No	125 (91.9)	505 (85.6)	
No. of substances abused, No. (%)			
1	82 (56.9)	300 (47.2)	.03
>1	62 (43.1)	336 (52.8)	
Drug testing period, mo			
Mean (SD)	46 (25)	48 (25)	.84
Range	2-82	0-155	
No. of drug tests			
Mean (SD)	74 (55)	86 (71)	.06
Range	2-336	1-435	

[a] χ^2 Test for proportions and *t* test for means as appropriate (2 tailed).

ticipate in the study were not statistically or clinically significantly different relative to evaluation, referral, treatment, supervision, support, or monitoring practices. The 16 participating PHPs tended to be large: 31.3% were in the largest quartile of programs. The mean number of physicians in each program was 56 (range, 11-119). Although these 16 programs may not be considered nationally representative, they showed no obvious clinical, administrative, or organizational differences from those not participating.

The 780 participants in the present study were distributed among 16 programs such that, on average, there were 9 (range, 1-26) surgeons and 40 (range, 8-80) nonsurgeons per PHP. Surgeons did not constitute more than 33% of participants in any of the 16 programs. Examination of demographic, treatment, and outcome variables across PHPs did not reveal significant clustering by program, nor was a relationship found between any of these variables and the year of enrollment in a PHP. Because there was no evidence of clustering by time or program, we compared 144 surgeons with 636 nonsurgeons on a wide range of demographic, drug and alcohol use, and outcome measures.

Descriptive characteristics of surgeons and nonsurgeons are given in **Table 1**. On average, program enrollees were in their 40s, with men constituting at least 86% of each group. Most physicians in both groups were mandated to participate in the program. According to intake records, 34.7% of surgeons and 39.1% of nonsurgeons had a history of treatment for substance use when they enrolled in the program. In each group, at least 85% of enrollees signed a 5-year monitoring agreement for a diagnosis of substance dependence. The others signed a diagnostic monitoring agreement, a more limited and shorter-duration agreement used when a diagnosis of substance dependence was suspected but was unclear.

The 2 groups differed in their primary substance of abuse. The percentage of surgeons (62.2%) enrolled because of alcohol-related problems was significantly higher than the percentage of nonsurgeons (46.9%) (OR, 1.9; 95% CI, 1.3-2.7; *P*=.001). Surgeons (23.1%) were significantly less likely than their nonsurgeon peers (36.6%) to enroll in a PHP because of opioid use (OR, 0.5; 95% CI, 0.3-0.8; *P*=.002).

Perhaps because most surgeons enrolled in a PHP because of alcohol dependence, they were less likely to have a history of intravenous drug use (8.1%) than nonsurgeons (14.4%) (OR, 0.5; 95% CI, 0.3-1.0; *P*=.05). Similarly, fewer surgeons (43.1%) than nonsurgeons (52.8%) had been abusing more than 1 substance immediately before enrollment (OR, 0.7; 95% CI, 0.5-1.0; *P*=.03). Although these differences were statistically significant, the OR for each indicated a 95% CI with the upper bound at 1.0; therefore, we cannot report with confidence that these differences were significant.

Random drug testing was required of physicians participating in the programs.Table 1 summarizes that surgeons (46 months) and nonsurgeons (48 months) were subject to testing for similar mean periods. During this time, the mean number of drug tests administered to surgeons (n=74) was slightly lower than the mean number administered to nonsurgeons (n=86); however, this difference was not significant (t_{763}=1.86, *P*=.06).

Table 2 compares surgeons and nonsurgeons on the following primary outcome measures examined in this study: positive test results for drugs of abuse during monitoring, physicians reported to the state licensing board, program status at 5-year follow-up, occupational status at 5-year follow-up, and deaths. The PHP records, which documented each instance in which a participant tested positive for drugs or alcohol, revealed that slightly more than 20% of physicians in each group had at least 1 positive test result. Approximately 20% of participants in both groups were reported to their state licensing boards because of relapse or noncompliance with the terms of the PHP agreement.

At the end of the 5-year follow-up period, 62.5% of surgeons and 65.1% of nonsurgeons had completed their monitoring contracts and were no longer required to be monitored (OR, 0.9; 95% CI, 0.6-1.3; *P*=.56) (**Table 3**). About 16% of each group had their contracts extended beyond the initial monitoring period (OR, 1.0; 95% CI, 0.6-1.6;

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$P = .91$). The reasons for continued monitoring included relapse, failure to comply with contract requirements (such as group attendance or therapy), and voluntary continuation to help prevent relapse or demonstrate continued recovery to others. Approximately 20% of each group failed to complete the program (OR, 1.2; 95% CI, 0.7-1.9; $P = .41$). These results indicate that surgeons were neither more nor less likely than nonsurgeons to have a positive drug test result, complete or fail to complete the monitoring contract, or extend the monitoring period beyond the original 5 years specified in their agreements.

The final outcome examined was participants' occupational status at 5-year follow-up. Of primary interest was the extent to which physicians who had participated in the programs were licensed and practicing medicine after 5 years. The study found that the proportion of physicians continuing their medical practice did not differ significantly between surgeons (67.4%) and nonsurgeons (74.5%) (OR, 0.7; 95% CI, 0.5-1.0; $P = .10$) (Table 3). In addition, no statistically significant differences were noted between surgeons and nonsurgeons in the percentage who had their medical license revoked or the percentage reported to have died. However, when pooling the number of surgeons vs nonsurgeons who had retired or left their practice voluntarily, those whose medical license was revoked, and those who had died, 25.7% of surgeons and 16.8% of nonsurgeons did not return to medicine, representing a statistically significant difference (OR, 1.7; 95% CI, 1.1-2.6; $P = .02$) (Tables 2 and 3).

Table 2. Outcomes at 5-Year Follow-up of Surgeons vs Nonsurgeons Monitored by State Physician Health Programs for Substance Use Disorders

Outcome	No. (%) Surgeons (n=144)	No. (%) Nonsurgeons (n=636)	*P* Value
Positive drug test result[a]	(n = 143)	(n = 630)	
Yes	31 (21.5)	134 (21.3)	.91
No	112 (78.3)	496 (78.7)	
Reported to state licensing board		(n = 635)	
Yes	27 (18.8)	128 (20.2)	.70
No	117 (81.3)	507 (79.8)	
Monitoring program status			
Completed	90 (62.5)	414 (65.1)	.68
Extended	23 (16.0)	104 (16.4)	
Failed to complete	31 (21.5)	118 (18.6)	
Occupational status			
Licensed and practicing medicine	97 (67.4)	474 (74.5)	.01
Licensed and working, not clinical	8 (5.6)	31 (4.9)	
Retired or left practice voluntarily	12 (8.3)	19 (3.0)	
Medical license revoked	16 (11.1)	68 (10.7)	
Died	9 (6.3)	20 (3.1)	
Unknown	2 (1.4)	24 (3.8)	
Did not return to medicine[b]	37 (25.7)	107 (16.8)	.02

[a] For substance of abuse, including alcohol.
[b] Includes retired or left practice voluntarily, medical license revoked, and died.

COMMENT

The surgeons in this study were older at PHP enrollment than nonsurgeons, they were significantly more likely to enroll because of alcohol dependence and significantly less likely to enroll because of opioid abuse, and fewer had been abusing more than 1 substance before enrollment. No statistically significant differences were noted between surgeons and nonsurgeons in rates of relapse, reports to state licensing boards because of noncompliance, or monitoring contract completion or failure.

When comparing surgeons vs nonsurgeons on occupational status after 5 years, significantly more surgeons than nonsurgeons had retired or left the practice of medicine voluntarily, had their medical license revoked, or died. These findings support the hypothesis that surgeons may experience greater professional barriers in returning to medical practice following chemical dependency treatment than nonsurgeons. Surgery, like other interventional specialties, is by nature highly safety sensitive. As such, these professions are often subject to more litigious scrutiny. According to a 2007-2008 survey of American physicians, the specialties with the highest incidence of medical liability claims are general surgery and obstetrics and gynecology,[19] and this may provoke a more punitive position from medical boards and hospital credentialing committees when surgeons with an SUD history attempt to return to practice. It has been the experience of the Washington Physicians Health Program in monitoring more than 900 physicians with SUDs that credentialing boards are more apt to intervene and less likely to reinstate privileges when there are questions of safety and competence in surgeons compared with nonsurgeons. This stigmatization and scrutiny may contribute to greater reluctance among surgeons intending to return to practice following chemical dependency treatment.

Furthermore, it is remarkable that 12 surgeons herein had retired or left the practice of surgery voluntarily. One might speculate that this may be partially attributed to burnout stemming from the demanding and perfection-driven nature of surgical practice, which may have contributed to the initial expression of the SUD. The number of nights on call and the number of hours worked per week have been independently associated with burnout and substance dependence among surgeons (Shanafelt et al[20] and M.R.O., unpublished data, 2010). Therefore, the severe nature of the occupation may further dissuade surgeons in recovery from attempting a return to their careers. Regardless, in an era in which many surgical specialties are projected to experience shortages[21] and millions of Americans are imminently likely to gain improved access to medical care, the loss of 12 surgeons, although not statistically significant, has a profound effect on access to surgical care. On average, a surgeon will perform 19 380 surgical procedures over the course of his or her career.[22] For every year lost from practice, 550 patients may not receive the surgical procedure they need in a timely fashion.

Questions remain about this population of physicians. Although surgeons were not underrepresented or overrepresented among the participants in this study, it

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Table 3. Odds Ratios (ORs) for Selected Characteristics and Outcomes at 5-Year Follow-up of Surgeons vs Nonsurgeons Monitored by State Physician Health Programs for Substance Use Disorders

Variable	No. (%) Surgeons (n=144)	No. (%) Nonsurgeons (n=636)	OR (95% Confidence Interval)	*P* Value
Sex	(n = 143)	(n = 634)		
Male	127 (88.8)	543 (85.6)	1.3 (0.7-2.3)	.32
Primary substance of abuse	(n = 143)	(n = 629)		
Alcohol	89 (62.2)	295 (46.9)	1.9 (1.3-2.7)	.001
Opioids	33 (23.1)	230 (36.6)	0.5 (0.3-0.8)	.002
Intravenous drug use history	(n = 136)	(n = 590)		
Yes	11 (8.1)	85 (14.4)	0.5 (0.3-1.0)	.05
>1 Substance abused	62 (43.1)	336 (52.8)	0.7 (0.5-1.0)	.03
Prior treatment		(n = 634)		
Yes	50 (34.7)	248 (39.1)	0.8 (0.6-1.2)	.34
Enrollment status		(n = 635)		
Mandatory	89 (61.8)	353 (55.6)	1.3 (0.9-1.9)	.17
Positive drug test result[a]	(n = 143)	(n = 630)		
Yes	31 (21.7)	134 (21.3)	1.0 (0.7-1.6)	.91
Reported to state licensing board		(n = 635)		
Yes	27 (18.8)	128 (20.2)	0.9 (0.6-1.5)	.70
Monitoring program status				
Completed	90 (62.5)	414 (65.1)	0.9 (0.6-1.3)	.56
Extended	23 (16.0)	104 (16.4)	1.0 (0.6-1.6)	.91
Failed to complete	31 (21.5)	118 (18.6)	1.2 (0.7-1.9)	.41
Occupational status				
Licensed and practicing medicine	97 (67.4)	474 (74.5)	0.7 (0.5-1.0)	.10
Medical license revoked	16 (11.1)	68 (10.7)	1.0 (0.6-1.9)	.88
Died	9 (6.3)	20 (3.1)	2.1 (0.9-4.6)	.09
Did not return to medicine[b]	37 (25.7)	107 (16.8)	1.7 (1.1-2.6)	.02

[a] For substance of abuse, including alcohol.
[b] Includes retired or left practice voluntarily, medical license revoked, and died.

is relevant to question whether there is a greater level of shame or stigma among practicing surgeons associated with seeking help for potentially impairing conditions. In a study[10] of suicidal ideation among surgeons, the investigators found that 60% of those experiencing suicidal ideation in the preceding 12 months were reluctant to seek help because of potential employment repercussions. These data would tend to suggest that surgeons may avoid seeking necessary help for fear of jeopardizing their career. More studies are needed that specifically explore the obstacles surgeons face when seeking assistance with mental health or chemical dependency issues.

There are several limitations to this study, including the retrospective cohort design. Unfortunately, almost all studies of physician health topics are retrospective in design. There is no state, regional, or national registry of problems that pertain to physician health, so determination of actual period prevalence of disorders that could affect one's ability to safely practice surgery or medicine is impossible. Another significant limitation relates to whether each participating state PHP had equivalent penetration into its medical community in the acquisition of clients for monitoring. We are unable to determine the degree to which physicians from each of these states came forward or received intervention relative to the medical community at large. Finally, there is no adjustment made for the degree of patient endangerment associated with surgical vs nonsurgical practices. Investigations, including one by the Institute of Medicine,[23] have demonstrated that surgical adverse events account for a significant cause of annual patient morbidity and mortality.[24] Further studies are needed to determine the actual incidence of patient harm associated with relapse of monitored physicians.

In conclusion, this study supports the finding that surgeons who have been diagnosed as having SUDs and who are being monitored by PHPs have recovery, program completion, and employment outcomes similar to those of their nonsurgeon colleagues. However, surgeons were less likely to return to the practice of medicine following chemical dependency treatment. This may in part be owing to perceived shame or stigma associated with an SUD history in a perfection-driven profession. Given the potential for harm by surgeons and nonsurgeons alike with potentially impairing conditions, the medical community should continue to raise awareness about resources available to distressed physicians. Family, colleagues, and employers should receive education about and remain vigilant to the signs and symptoms of SUDs and other potentially impairing conditions to maintain our population of healthy surgeons and to minimize the risk of patient harm.

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Author Contributions: Ms Buhl had full access to the study data and takes responsibility for the integrity of the data and accuracy of the analysis. *Study concept and design:* Buhl, Oreskovich, Campbell, and DuPont. *Acquisition of data:* Buhl, Oreskovich, Campbell, and DuPont. *Analysis and interpretation of data:* Buhl, Oreskovich, Meredith, Campbell, and DuPont. *Drafting of the manuscript:* Buhl, Oreskovich, and Campbell. *Critical revision of the manuscript for important intellectual content:* Buhl, Meredith, and DuPont. *Statistical analysis:* Oreskovich and Campbell. *Obtained funding:* Oreskovich. *Administrative, technical, and material support:* Buhl, Oreskovich, and DuPont. *Study supervision:* Buhl, Oreskovich, Meredith, and DuPont.
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INVITED CRITIQUE

Substance Abuse Among Surgeons

The Perils of Losing Your Credentials

Alcohol and drug abuse are a significant issue among physicians in general and surgeons in particular. A recent 7000-member survey of the American College of Surgeons demonstrated a prevalence for alcohol abuse among male surgeons at 13.8% and for female surgeons at 25.4%.[1] Substance abuse, when identified early, treated, and monitored is a reversible condition with an excellent prognosis. But can rehabilitated surgeons reenter the workforce and fully practice their profession again? Unfortunately, the results from this important study showed that the surgeons' rate of reentry is significantly less than their nonsurgeon counterparts.[2] Further research needs to be done to determine the cause for this discrepancy. Most of us have en-

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