

# Urine Trouble: Practical, Legal, and Ethical Issues Surrounding Mandated Drug Testing of Physicians

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## INTRODUCTION

Healthcare organizations and medical schools have increasingly adopted mandatory pre-employment and random, not-for-cause drug-testing programs for physicians.<sup>1</sup> This article discusses the history of drug testing in the United States, the recommendations of policy-making bodies, the prevalence of substance use and abuse among physicians, and the data on the costs and benefits of such drug-testing programs.

When used appropriately, random, for-cause drug testing of physicians who have been rehabilitated of a substance-abuse disorder have been successful in maintaining abstinence and preserving doctors' careers. However, mandatory pre-employment and random, not-for-cause testing programs are based on poor science, are financially wasteful, and are unlikely to meet the programs' implicit goals of creating a safer clinical environment

and diminishing errors while improving the quality of patient care. These programs usually ignore alcohol and tobacco (the major deleterious substances affecting health and performance), are often not designed to help those few doctors who abuse other substances get appropriate treatment, can create dissent among staff, and may inhibit an organization's ability to hire individuals who are unwilling to compromise their personal ethics by capitulating to what they consider to be an unjust policy.

The invasion of privacy posed by pre-employment and random, not-for-cause drug testing programs could potentially lead to other types of unwarranted testing and the dissemination of physicians' personal health data beyond the confines of their institutions. Indeed, increased drug testing is just one example of the increasing erosion of privacy in the U.S. I will describe the broader problem of erosion of individual privacy and will draw parallels with recent measures designed to protect patients' privacy.

While the public has been increasingly concerned about the erosion of patients' rights to privacy, it also has expressed a desire for greater accountability by physicians, in-

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creased disclosure regarding the overall competency of healthcare providers, enhanced standards to protect the safety of patients, and higher standards for the quality of medical care. This article will describe effective interventions that not only protect the privacy of patients and healthcare providers, but also protect patients from incompetent and impaired physicians and enhance the safety of patients and the quality of care they receive.

#### DRUG TESTING: HISTORY, PREVALENCE, POLICIES, AND RECOMMENDATIONS

Substance use involves the taking of legal or illegal substances, that does not lead to impairment of performance. Substance abuse involves a pattern of repeated, pathological use with adverse health consequences, habituation, tolerance, withdrawal symptoms, and impaired performance. "Impairment" refers to one's inability to perform competently one's duties as a result of substance use or abuse.

Drug testing in the U.S. began in the Armed Forces in the early 1970s, when reproducible assays were first developed.<sup>2</sup> By the late 1970s, prisoners were being screened, and, in the early 1980s, workers were screened at defense contractors.<sup>3</sup> Since 1986, when President Reagan instituted an executive order requiring federal agencies to institute drug-testing programs,<sup>4</sup> testing has spread throughout the public and private sectors.<sup>5</sup> The federal Drug-Free Workplace Act (DFWA) of 1988 mandates that all recipients of federal government contracts of \$25,000 or more per year, and all recipients of federal government grants, must have written drug policies on employee substance use and abuse, establish a drug-free awareness program, and make a good-faith effort to maintain a drug-free workplace.<sup>6</sup> However, the DFWA does not provide instructions on how to implement its provisions.<sup>7</sup> Under the Omnibus Transportation Employee Testing Act of 1991, employers are only required to test workers who apply for, or currently hold, safety-sensitive positions in

the transportation industry. There are no other federal laws that require private businesses to have drug-testing programs.<sup>8</sup>

Increasing use of drug testing has been noted in industry, despite opposition from the American Civil Liberties Union (ACLU) and other organizations.<sup>9</sup> In 1987, 21 percent of corporate members of the American Management Association, the nation's largest management development and training organization, had instituted drug-testing programs;<sup>10</sup> by 1996, 81 percent of major firms in the United States tested for drugs.<sup>11</sup> Among Fortune 1,000 companies, there has been a 1,200 percent increase in periodic and random employee drug testing since 1987.<sup>12</sup>

In 1988, the American Hospital Association recommended that healthcare institutions adopt comprehensive policies to address substance abuse, including pre-employment testing, for-cause testing, and post-accident testing, regardless of job description.<sup>13</sup> The American College of Occupational and Environmental Medicine finds it ethically acceptable, with appropriate constraints, to screen current and prospective employees for the presence of drugs, including alcohol, that might affect their ability to perform work in a safe manner.<sup>14</sup> The American Medical Association (AMA) also supports pre-employment drug screening.<sup>15</sup>

The purported goals of physician drug testing are to create a safer climate for patient care; to protect the university or institution from malpractice and wrongful hiring lawsuits; and to promote a positive view of the institution from patients and other "health care consumers."<sup>16</sup> In our competitive healthcare marketplace, when one hospital in a community institutes an employee drug-testing policy, others follow suit to avoid a negative image, which the public, which is generally uninformed about the nature of substance-abuse testing and treatment,<sup>17</sup> may attach to those without such a policy. To date, no court has held an employer legally liable for not having a drug-testing program. On the other hand, em-

employers have incurred substantial legal costs defending their drug-testing programs against workers' claims of wrongful dismissal.<sup>18</sup>

While only 9 to 15 percent of hospitals surveyed in the late 1980s and early 1990s required testing,<sup>19</sup> this percentage is increasing.<sup>20</sup> That this trend parallels the impressive growth of drug testing in industry is not surprising, given the increasing corporatization of American medicine. In 1999, Montoya and colleagues found that two-thirds of 44 randomly selected large teaching hospitals had formal physician drug-testing policies.<sup>21</sup> For-cause testing and pre-employment testing were most common; 13 percent of policies mandated random, not-for-cause testing. In general, the policies were vague on procedural details and unclear regarding responsibility for implementation of policy guidelines. Only half mentioned employee confidentiality, and less than 50 percent of these were explicit regarding access to and storage of records. All five major academic and community teaching hospitals in Portland, Oregon, where this author practices, now require pre-employment drug testing.<sup>22</sup>

#### SUBSTANCE USE AND ABUSE BY PHYSICIANS

Prevalence data on substance use and abuse by physicians and physician-trainees are marred by overreliance on convenience sampling, self-report, and variable definitions of substance-use and impairment.<sup>23</sup> Nevertheless, taken together, medical students do not differ significantly from age-matched peers in substance use patterns, except that they are less likely to smoke tobacco. In a survey of 23 medical schools, the AMA found that the substances most commonly used by medical students over a 30-day period were alcohol (87.5 percent), cigarettes (10 percent), marijuana (10 percent), cocaine (2.8 percent), tranquilizers (2.3 percent), and opiates (1.1 percent).<sup>24</sup> Less than 1 percent of respondents felt they were dependent on any substance other than tobacco. In a national survey, Hughes and col-

leagues found that alcohol was used by 87 percent and marijuana by 7 percent of third-year residents over the preceding 30 days, with 5 percent reporting daily alcohol use and 1.3 percent reporting daily marijuana use,<sup>25</sup> 1.5 percent reported using cocaine over the last month; 3.7 percent benzodiazepines (tranquilizers); none used these substances on a daily basis. The findings of a national survey conducted by Robert and colleagues, (which may have been affected by a 52 percent response rate), are as follows: about one-fourth of students at nine medical schools suffered symptoms of mental illness, including 7 to 18 percent with substance-use disorders.<sup>26</sup> Among house staff, emergency medicine and psychiatry residents report higher levels of substance use.<sup>27</sup> House staff self-medication with benzodiazepines was not uncommon in the early 1990s;<sup>28</sup> today, house staff who self-medicate are more likely to use antihistamines for sleep, or selective serotonin re-uptake inhibitors for depression.<sup>29</sup>

Practicing physicians are no more likely to abuse substances than other professionals.<sup>30</sup> Physicians have lower rates of use and abuse of tobacco, marijuana, cocaine, and heroin than the general population, and do not appear to be at increased risk for alcoholism.<sup>31</sup> However, unsupervised use of benzodiazepines and minor opiates within the past year was reported by 11.4 percent and 17.6 percent, respectively, with higher rates of opioid use seen among anesthesiologists.<sup>32</sup> Whether such use impairs performance, through oversedation, or improves performance, through control of anxiety and pain, depends on the user, but such self-treatment is unwise at best and unethical at worst.<sup>33</sup> Prevalence rates for lifetime impairment of practicing physicians by drugs or alcohol range from 2 to 14 percent.<sup>34</sup>

#### THE "SCIENCE" AND COSTS BEHIND DRUG TESTING

Random testing is an imperfect way to identify drug abusers and is subject to both

false-positive and false-negative results. Test characteristics relating to the metabolism of different substances can lead to situations in which a physician who snorts cocaine every Saturday night is likely to test negative on a Monday, whereas an individual who attends a party and is subjected to large amounts of second-hand marijuana smoke, or who unsuspectingly ingests a brownie made with cannabis, will test positive two to three days later.<sup>35</sup> Moderate poppy seed biscuit ingestion can cause a false-positive test for opioids,<sup>36</sup> ibuprofen a false-positive test for cannabinoids; and selegiline, an anti-Parkinson's disease drug, a false-positive for amphetamines.<sup>37</sup> Tonic water can show up as cocaine and Nyquil as an opiate or amphetamine.<sup>38</sup> Seriously impaired alcoholics, who far outnumber marijuana and opioid abusers, can easily be missed despite even though their mental and physical impairments (including withdrawal tremors, confusion/delirium, memory loss, and subtle nerve damage) are likely to cause greater morbidity. Until a Drug Enforcement Agency (DEA) ban on the use of hemp seed oil in 2003, many food products made with this ingredient contained trace amounts of tetrahydrocannabinol (THC), the active agent in marijuana. These products, which included pasta, candy bars, and salad dressings, could have caused false-positive results for marijuana.<sup>39</sup>

Multiple means of sabotaging drug tests and escaping detection, including adulteration, dilution, and the purchase of "drug-free urine" are described on a growing array of websites on the internet.<sup>40</sup> Ingesting large quantities of liquids, taking diuretics, or adding water or household bleach to a urine specimen can sometimes mask illicit drug use.<sup>41</sup> While many labs test for common adulterants, and some use temperature-sensitive cups to detect nonfresh urine and check specific gravity to detect possible dilution, it is not known how well these labs are able to recognize "fixed" samples.<sup>42</sup>

Employee drug testing is expensive. The federal government's drug-testing program

spends from \$35,000 to \$77,000 to find one user.<sup>43</sup> Most of the workers identified are occasional moderate users rather than drug abusers, and more than half test positive only for marijuana. If one out of 10 test positives is a drug abuser—what many consider to be a high estimate—then the average cost of finding one drug abuser would range from \$350,000 to \$770,000. If half of the detected drug abusers would have been detected anyway, through other means, the cost of using drug testing to find one otherwise hidden drug abuser would be as high as \$700,000 to \$1.5 million.<sup>44</sup> Costs are likely to be higher when physicians are tested, due to lower rates of substance use and abuse.

In fact, no solid data exist to show that drug testing deters drug use.<sup>45</sup> Only 8 percent of companies with drug testing have performed any cost-benefit analysis.<sup>46</sup> Frequently cited estimates of lost productivity due to drug use are based on data that the National Academy of Sciences has concluded are flawed: "the data . . . do not provide clear evidence of the deleterious effects of drugs other than alcohol on safety and other job performance indicators."<sup>47</sup> Furthermore, drug testing can have a negative impact on workplace morale, and the urine collection process itself is degrading and demeaning, particularly when it involves direct observation.<sup>48</sup> An analysis of 63 high technology firms in the computer equipment and data processing industry reports that drug testing actually reduced, rather than enhanced, productivity by creating an environment of distrust and paranoia, rather than one in which employees were treated with dignity and respect.<sup>49</sup> Some employers have dropped pre-employment screening because it unduly hindered their ability to recruit workers with the proper skills.<sup>50</sup>

#### PHYSICIANS' ATTITUDES TOWARD DRUG TESTING

Physicians' opinions regarding mandatory drug testing is mixed.<sup>51</sup> In one study of practicing physicians in the Midwest, 60 percent

of the respondents said that requiring drug testing to obtain hospital privileges infringed on their rights to privacy; 38 percent lacked confidence in the testing procedure.<sup>52</sup> While 56 percent of the surveyed doctors said that they would submit to mandatory testing without protest, 8 percent would refuse testing, 7 percent would hospitalize their patients in another institution, and 7 percent stated that they would file a lawsuit.<sup>53</sup> In a 1994 survey of family practice residency directors' attitudes toward mandatory pre-employment drug testing, almost half disagreed with mandatory substance-abuse testing and said it should not be a condition of acceptance for a house officer position.<sup>54</sup> Program directors and medical students do not see testing as a positive aspect of a program.<sup>55</sup> In one study, 22 percent of senior medical students said that they would not rank, or would rank lower, a program with mandatory pre-employment drug testing.<sup>56</sup>

#### THE PHYSICIANS' DILEMMA: TO BE OR NOT TO BE TESTED

Since no laboratory test is 100 percent specific, false-positive results are inevitable. For nondrug users, the only type of positive test that would result from their urine being examined is a false-positive test. Rational, nondrug-using physicians might not willingly choose to risk their futures in medicine from potential false-positive tests. By participating in a drug-testing program, they put their public reputation and future employability in jeopardy (and in turn may disrupt long-standing relationships with their patients), threaten the large public financial investment in their training, and risk wreaking emotional and financial havoc on their families. Even so, given financial exigencies and the ubiquity of pre-employment drug testing, there is often no real choice for such persons. Furthermore, even if their initial test is later shown to be a false positive, even temporary removal from the workplace can cause undue suspicion and embarrassment, decrease income (especially

for those paid per diem), and disrupt the continuity of patient care.

#### TESTING, TREATING, AND DISCIPLINING IMPAIRED PHYSICIANS

All rational physicians are in favor of improving the health of their professional colleagues, providing treatment in the most expeditious and confidential manner for those who have exhibited strong evidence of job impairment, and insuring the safe delivery of error-free care to their patients. Voluntary treatment programs for substance-abusing resident physicians have been supported by the Association of Program Directors in Internal Medicine,<sup>57</sup> and programs for substance-abusing doctors are available in every state and have been very successful.<sup>58</sup> This is likely due to physicians' high levels of education, motivation, and functioning, as well as possession of a professional career that provides financial and personal resources that can support and sustain treatment and recovery.<sup>59</sup> Nearly all (90 percent) of state licensure applications ask about substance abuse and inquire about functional impairment from substance use, not simply substance use *per se*.<sup>60</sup> If a physician self-reports and/or cooperates with treatment, state medical boards may not pursue disciplinary action.<sup>61</sup> Physician wellness and remediation programs have been fairly effective in ensuring the confidentiality, or at least the limited dissemination, of clients' information.<sup>62</sup>

In contrast, the medical profession has been slow to discipline adequately impaired or poorly performing doctors, which erodes the public's trust. Of 1,715 doctors who were disciplined for substance abuse by state medical boards between 1990 and 1999, only 32 (4 percent) had to stop practicing, even temporarily; others faced increased monitoring.<sup>63</sup> Stories of "bad doctors" who continue to harm patients are frequently reported in the lay press.<sup>64</sup> Some of these practitioners have not been adequately disciplined nor have they been stripped of their licenses or practice

privileges due to impaired performance secondary to substance abuse. Increased restrictions on, and suspensions of, the licenses of these physicians is clearly warranted. Additionally, medical schools and training programs should improve and mandate curricula on physicians' impairment and substance abuse<sup>65</sup> and on reducing errors.<sup>66</sup>

#### THE GROWTH OF DRUG AND OTHER PRE-EMPLOYMENT TESTING

Trends in drug testing in the healthcare sector parallel those in public education.<sup>67</sup> Over the past few years, in response to affirmative Supreme Court decisions, the number of schools that require expensive, mandatory drug testing has grown substantially.<sup>68</sup> School-based drug-testing programs promulgate misconceptions regarding drug use/abuse, increase the acceptability of drug testing in areas outside of medicine, and may enhance the public's willingness to accept the misguided notion that pre-employment and random, not-for-cause drug testing of physicians is an accurate and appropriate way to enhance patients' safety and the quality of care.

The explosive growth of drug testing in many spheres of employment has been fueled by popular misconceptions surrounding substance use and abuse, "junk science", business interests like the Institute for a Drug-Free Workplace (comprised of representatives from the United States Chamber of Commerce and corporations, including pharmaceutical and drug-testing companies),<sup>69</sup> and the public relations campaigns of a multi-billion dollar industry whose entrepreneurial interest lies in magnifying the severity of drug-related problems in the workplace and extolling the benefits of drug testing as a solution.<sup>70</sup>

In conjunction with the ascendancy of drug testing to meet the real and perceived needs of corporate employers, the following unscientific, poorly validated, and invasive (yet highly profitable) testing industries have blossomed: personality and "integrity" assess-

ment,<sup>71</sup> polygraph testing,<sup>72</sup> background checking,<sup>73</sup> "snitch" programs,<sup>74</sup> and examination of prospective employees by substance-sniffing canines.<sup>75</sup>

#### DRUG TESTING AND THE EROSION OF PRIVACY

Employee drug and other pre-employment testing programs erode individuals' privacy. Many drug-testing programs require one to divulge prescription and nonprescription medications that one is using, since some of these can cause false-positive or false-negative test results.<sup>76</sup> More than one-third of the American Management Association's members reported that they tape phone conversations, videotape employees, review voice mail, and check computer files and e-mail.<sup>77</sup> Companies frequently conduct database searches of applicants' credit reports, driving and court records, and workers' compensation claims.<sup>78</sup> Some prohibit coworkers from dating, or ban off-the-clock smoking and drinking.<sup>79</sup> Nearly half of the Fortune 500 companies report that they collect data on their workers without informing them; a majority share employee data with prospective creditors, landlords, and charities;<sup>80</sup> 35 percent check medical records before they hire or promote; and some check urine pregnancy tests, using the same sample obtained for pre-employment drug screening.<sup>81</sup> It is not surprising, then, that the Federal Trade Commission found that 80 percent of Americans polled said that they are worried about what happens to information that is collected about them.<sup>82</sup>

The slippery slope of workplace drug testing for physicians and others could lead to the analysis of employees' hair for drug use, as hair is subject to external contamination from passive exposure and different sensitivities based on hair color;<sup>83</sup> testing urine for metabolites of medications used to treat conditions that may impair performance, such as antidepressants, anti-Parkinsonian agents, antihistamines and cold remedies, anti-seizure

medications, and drugs for coronary and cerebral vascular disease; and genetic testing for diseases that may affect the length of one's potential career, such as tests for Huntington's disease or other early-onset dementias.

Today, as many as 10 percent of companies use genetic testing for employment purposes.<sup>84</sup> While 37 states have enacted legislation that prohibits discrimination in employment or insurance on the basis of genetic information, these laws provide little practical protection, as the burden of proof is on the applicant and discrimination is difficult to prove.<sup>85</sup> Some individuals who are at risk for genetic conditions have experienced discrimination based on their risk status.<sup>86</sup> Currently, only 15 states have enacted laws that help protect employees from genetic discrimination in the workplace; a few other states and the federal government have legislation pending.<sup>87</sup> In the last year of his presidency, Bill Clinton signed an executive order prohibiting federal agencies from using genetic information in any hiring or promotion decisions.<sup>88</sup> Of note, the American Medical Association opposes pre-employment genetic testing.<sup>89</sup>

There is no way to completely safeguard that information obtained through drug-testing programs will not be shared with life, home, or health insurance companies (and, by extension, with pharmaceutical companies) or with future employers.<sup>90</sup> Indeed, one state's medical board's actions may be disseminated among other states' boards through the Federation of State Medical Boards,<sup>91</sup> and, in almost all states, may be made available to the public.<sup>92</sup> The National Practitioner Databank, which one day might be accessible to the general public, may contain information on actions resulting from physician impairment.<sup>93</sup>

It is unclear to what extent Fourth Amendment protections against unreasonable search and seizure and the Americans with Disabilities Act may protect physicians with respect to disclosure of information or testing of bodily fluids.<sup>94</sup> Court challenges to drug test-

ing, based on the First, Fifth, and Fourteenth Amendments that allege violations of due process and equal protection have been generally unsuccessful.<sup>95</sup> It is interesting that the Canadian Human Rights Commission has disallowed random and pre-employment drug testing of public employees, calling it a human rights violation under the Canadian Human Rights Act.<sup>96</sup>

Ethical questions abound regarding privacy, bodily integrity, and confidentiality. These unanswered questions include: Which physicians should be tested (clinicians, researchers, administrators)? How often? Who should have access to a physician's test results (and, by extension, potentially to other personal health data)? Also, if a staff physician's test results are going to be known to his division chief, department chair, and potentially to the dean and president of the university (as required by the local policies I reviewed),<sup>97</sup> then one might argue that the staff physician should be privy to their results (which is not the case in these policies). The physician may reason that the decisions that the division chief, department chair, dean, and president make on a daily basis affect far more people (patients, employees, and members of the community) than those that the physician makes, and that, indeed, his or her superiors are the individuals responsible for the educational, clinical, and social missions and the economic well-being of the hospital and university.

#### PATIENTS' PRIVACY

Ironically, the trend toward increasing drug testing of healthcare and other professionals and the multiple erosions of privacy discussed above come at a time when patients are expressing increasing concerns over privacy and access to their confidential medical records.<sup>98</sup> A study by the Institute for Health Care Research and Policy at Georgetown University reports that between one-fifth and one-fourth of Americans polled believe that their

personal medical information has been improperly disclosed by a healthcare provider, insurance plan, government agency, or employer.<sup>99</sup> According to the same study, one in seven Americans polled, to safeguard privacy and avoid embarrassment, stigma, or discrimination, has withheld information from healthcare providers, provided inaccurate information, doctor-hopped to avoid a consolidated medical record, paid out-of-pocket for care that is covered by insurance, or avoided care altogether.<sup>100</sup> A Princeton study reports that a large majority of Americans polled oppose giving doctors free access to their medical records and are concerned about government agencies and researchers violating their privacy.<sup>101</sup> The Health Insurance Portability and Accountability Act (HIPAA) of 1996, implemented nationwide by the U.S. Department of Health and Human Services, attempts to address the public's concerns.<sup>102</sup> Unfortunately, HIPAA offers limited and burdensome protections to prevent the exchange of health information for marketing purposes.<sup>103</sup> Furthermore, implementation has been marred by confusion, which has complicated cooperative care among different providers who provide care simultaneously for the same patient.<sup>104</sup>

### CONCLUSIONS

Pre-employment and random drug testing of physicians is ill-justified. Tests are expensive, are based on poor science, represent an unwarranted invasion of privacy, and are unlikely to meet the purported goals of diagnosing functional impairment, improving patient safety, and enhancing quality of care.

Patients' and doctors' desires for privacy safeguards may clash with patients' demands for increased accountability by healthcare providers. To achieve both greater privacy and enhanced accountability, the medical profession will need to be more proactive in disciplining impaired and incompetent providers, improving substance-abuse education and training, and reducing errors through continuous quality improvement and other means.

### SUGGESTED ALTERNATIVES/MORE EFFECTIVE WAYS TO IMPROVE QUALITY OF CARE

In our efforts to protect patients while safeguarding physicians' privacy, we should not rely on public relations gimmicks or costly, unscientific, and ineffective measures like pre-employment and random, not-for-cause drug screening. Instead, we should promote reference checking of new staff members to appraise previous job performance; train supervisors to identify, confront, and refer impaired physicians to drug-treatment programs; pay increased attention to physicians' job and life-satisfaction (including the early identification and treatment of depressive disorders, especially common in female physicians,<sup>105</sup> and marital discord); and support knowledge testing (through mandatory recertification), periodic hospital recredentialing, skills appraisal by colleagues and supervisors, and intermittent impairment testing (for example, periodic evaluation of vision, reflexes, and coordination) to determine doctors' fitness to perform their jobs safely.<sup>106</sup> Impairment testing can uncover not only impairment from substance abuse, but also that resulting from important physical disabilities (including dementia),<sup>107</sup> mental illness, and sleep deprivation,<sup>108</sup> which should prompt treatment or work-modification for the impaired physician (or the impaired worker in any major industry, for that matter). If impairment testing suggests drug abuse, then screening, treatment, license restriction and/or suspension, and follow-up drug testing are not only reasonable, but also likely to benefit affected physicians and their patients.

Those institutions that are truly committed to improving job safety and quality of care should instead focus their attention and resources on the system factors that cause or contribute to a majority of medical errors.<sup>109</sup> They could invest in computerized medication-ordering systems to avoid prescribing errors<sup>110</sup> and more ancillary staff to assist residents in non-educational tasks, which contrib-



ute to sleep deprivation, and in turn can lead to errors.<sup>111</sup> They should also enhance procedural training and oversight; encourage reporting, frank discussion, and analysis of errors; improve sign-out protocols; and reverse the trend toward downsizing registered nurses in favor of less-well-trained (and less expensive) licensed practical nurses and clinical nursing assistants.<sup>112</sup>

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