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The Offshoring of American Medicine: Scope, Economic Issues and Legal Liabilities

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I. INTRODUCTION

The “offshoring” of American jobs, that is, outsourcing jobs to foreign countries, is not a new phenomenon. Because of the relatively large wage-benefit differential between American and foreign labor, it became more cost effective to ship overseas many American blue-collar manufacturing jobs in the 1970s. While wage-benefit differentials are an important part of the calculus behind job exportation, other factors, like technology, play an important role in this phenomenon. In fact, the Internet and standardized software technology has as much to do with the recent offshoring of white-collar service jobs as the magnitude of wage-benefit differentials between American and foreign white-collar labor markets. Once considered immune to outsourcing, fourteen million American white-collar service sector jobs, 11% of the nation’s entire work force, are now

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3. Drezner, supra note 2; Brainard & Litan, supra note 2, at 3.
considered vulnerable to shipment abroad due to technological innovations. For most Americans, the exportation of blue-collar jobs is a tragedy, but the offshoring of white-collar jobs could be devastating. While the exportation of white-collar jobs has captivated the press, little has been written about the offshoring of American medical jobs, which may now increase because of recent technological innovations in the fields of telemedicine and cybersurgery.

Accordingly, the purpose of this article is to examine the outsourcing of American medical jobs. Part II contains two subparts. The first subsection reviews the socioeconomic forces that drive the exportation of jobs. The second subsection provides a brief overview of recent changes in the law that, along with various socioeconomic forces, will facilitate the offshoring of medical jobs. Together, the subsections of Part II make clear that, like other white-collar industries, the medical profession cannot resist having much of its workforce shipped overseas. Part III surveys the field of telemedicine, demonstrating that many fields of medicine have already succumbed to offshoring, and nothing is preventing the remaining fields of

5. There are many definitions of telemedicine. As used in this article, telemedicine is the practice of medicine “across distance via telecommunications and interactive video technology.” AM. MED. ASS’N JOINT REPORT OF COUNCIL ON MED. EDUC. & COUNCIL ON MED. SERV., THE PROMOTION OF QUALITY TELEMEDICINE (June 1996). Herein, telemedicine is distinguished from e-health, which is broader in scope as it includes not only health care delivery but also health information and physician credentialing. SPECIAL COMM. ON PROF’L CONDUCT AND ETHICS, FED’N OF STATE MED. BOARDS, MODEL GUIDELINES FOR THE APPROPRIATE USE OF THE INTERNET IN MED. PRACTICE (Apr. 2002). With a few exceptions, this article addresses the exportation of physician’s jobs. Discussion of non-physician medical jobs is generally beyond the scope of this article, except to the extent that it demonstrates a trend in the offshoring phenomenon generally.
6. A widely quoted, but somewhat antiquated, view of cybersurgery is that it “encompasses both the emerging complementarity between clinicians and machines (particularly computers) and the integration of diverse digital technologies into the full spectrum of surgical care.” CYBERSURGERY ADVANCED TECHNOLOGIES FOR SURGICAL PRACTICE 4 (Richard M. Satava ed. 1998) [hereinafter Satava]. What distinguishes telemedicine, which is basically a diagnostic modality, from cybersurgery is that the latter is a therapeutic modality, “which raises either the immediate or short-term potential that the patient may experience loss of life or limb.” See Thomas R. McLean, Cybersurgery: An Argument for Enterprise Liability, 23 J. LEGAL MED. 167, 169 n.20 (2002) [hereinafter Cybersurgery].
medicine from following suit.\textsuperscript{8}

Part IV addresses legal liability associated with the exportation of medical jobs. In particular, while malpractice will be at least as common in cyberspace as it is in the real world, international law and the legal "lag phase" associated with technology\textsuperscript{9} leaves many unanswered questions on cyberspace medical malpractice. Finally, Part V returns to the topic of money. If America is to preserve its hegemonic position in the field of health care, particularly telemedicine, the best defense is a good offense. That is, if America wants to minimize the number of medical jobs that are exported during the next decade, it must embrace telemedicine wholeheartedly, regardless of the upfront costs. This article concludes with the observation that America is on the threshold of purchasing its health care services from the vendors who provide quality medical care at the cheapest price, even if those vendors are located overseas.

II. OFF-SHORING OF JOBS

\textit{A. The Birth of Offshoring: A Blue-collar Perspective}

For the most part, the offshoring of American jobs is a post-World War II phenomenon. Before the war, laborers had very little power to demand concessions from employers. For example, as World War I ended, the anemic labor movement could not even gather enough popular support to protect children.\textsuperscript{10} Even as late as the 1930s, the labor movement could not muster enough support to keep President Roosevelt's pro-labor legislation alive.\textsuperscript{11} In contrast, by the end of the second World War, not only was the labor movement better organized,\textsuperscript{12} but it also had increased its negotiating capabilities.

\textsuperscript{8} In this paper, where a distinction is not critical, the word "telemedicine" is used to mean both diagnostic telemedicine and therapeutic cybersurgery.


\textsuperscript{11} A central piece of New Deal Legislation was the National Industrial Recovery Act (NIRA), 15 U.S.C. § 709 (1933) \textit{amended by 49 Stat. 375, ch. 246 (1935)} (giving labor the right to collectively organize). However, NIRA was quickly challenged and overturned by the Supreme Court. See \textit{Panama Refining v. Ryan}, 293 U.S. 388 (1935) (holding NIRA's reliance on the Commerce Clause was misplaced); \textit{A.L.A. Schechter Poultry v. United States}, 295 U.S. 495 (1935) (holding NIRA was an improper delegation of power to the executive branch).

\textsuperscript{12} Although the American Federation of Labor (AFL) had been formed years earlier to protect laborers working in the garment industry, the AFL was not interested in supporting "industrial" unions. Accordingly, the workers in industrial settings formed their own union,
power for three reasons. First, war casualties caused a labor shortage. Second, many of the returning service personnel opted not to enter the workforce, but rather elected to attend school under the G.I. Bill, thereby exacerbating the labor shortage. Third, as the demand for consumer goods skyrocketed during the post-war economic boom, the demand for labor needed to increase if consumer demands were to be met. This was not possible, of course with loss of life during the war and returning service personnel opting to attend college.

After the American Federation of Labor (AFL) and the Committee for Industrial Organization (CIO) merged in 1955, the mismatch of labor supply and employer demand resulted in allegations that labor had a monopolistic hold on the market place. Regardless of whether a labor monopoly truly existed, it was nonetheless true that for the first time, labor had such negotiating power that it could demand wage concessions from major corporations like General Motors. However, labor-driven wage escalation forced manufacturers to raise the prices of their goods, thereby stimulating inflation. Consequently, by the mid-1960s, major employers were attempting to mitigate inflationary pressures of wage concessions by granting employee medical benefits. From the employers' point of view, such an exchange actually lowered the total cost of labor because the employers purchased group health insurance for less than employees could purchase on their own for comparable coverage. Unfortunately, by the end of the 1970s, this strategy of substituting employee benefit programs for wage concessions created its own set of problems because medicine became increasingly expensive while life expectancy grew significantly.

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13. See R. Lamont Jones, Jr., GI Bill Changed the Face of U.S. Education, PITTSBURGH POST-GAZETTE, June 22, 1994, at A1. The GI Bill, which has been amended multiple times since its passage in 1944, directly changed the United States's education system and, secondarily, the labor market. Id.


18. See Thomas R. McLean & Edward P. Richards, Healthcare's "Thirty Year's War";
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The zenith of labor's power came in the mid-1970s when it had the ability to shut down plants. At that time, the U.S. labor force commanded wages and benefits that were unprecedented in any other market. The cost of benefits proved particularly vexing to employers because the rate of inflation in the medical sector exceeded the inflation rate for the national economy. Businesses needed to control these expenses, but lacked the negotiating power to affect labor costs. Some large employers turned to the federal government for relief. In response, the Nixon and Ford administrations enacted, respectively, the Federal Health Maintenance Organization (HMO) Act and the Employees Retirement Income Security Act (ERISA). The purpose of the HMO Act was to initiate what we know today as the managed care industry. The Act sought to facilitate the replacement of indemnity insurance by creating a more efficient substitute insurance option. ERISA, on the other hand, sought to provide uniform procedures for managing health and pension plans. Uniform procedures benefit employers because they decrease the employers' administration costs to operate employee benefit plans. A key consideration in passing the HMO Act and ERISA was the government's desire to help employers control the cost of medical benefits.

Unfortunately, a double-digit rate of inflation in both the medical sector and the general economy negated any advantages gained by employers after the HMO Act and ERISA were enacted. General inflation was driven not only by Vietnam War costs, but also by the Arab oil embargo, which demonstrated that we all live in a global world. Where the general rate of

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The Origins and Dissolution of Managed Care, 60 N.Y.U. ANN. SURV. AM. L. 283, 316 (2004).

19. See Lester C. Thurow, The Birth of a Revolutionary Class, N.Y. TIMES, May 19, 1996, at A46 (demonstrating that when Medicare was enacted in 1964, only 3% of the population lived beyond the age of 65; today, 13% of an even larger U.S. population lives beyond age 65, and this percentage will double as the baby boomers age).


22. Id.


26. Id. at 446.

inflation increased, medical-sector inflation exploded. Both forms of inflation greatly impacted employers who were locked into long-term labor contracts containing cost-of-living-allowance (COLA) provisions.

In the late 1960s and early 1970s, strong labor negotiators extracted COLAs from employers. The idea behind COLAs was that labor was not going to allow any hard-earned benefits to be eaten up by future inflation. Having a COLA provision in a labor contract meant that each year, employees’ wages and benefits automatically increased according to the previous year’s inflation rate. Consequently, the double-digit inflation rates of the 1970s mixed explosively with these COLA provisions to raise the cost of providing medical benefits to unprecedented levels. In time, COLA provisions, medical inflation, and other economic forces such as population growth synergistically combined in such a way that employers now pay a half billion dollars per year to cover employees’ health care benefits.

As the 1970s came to a close, the detrimental impact of escalating health care costs became increasingly apparent: health benefit costs had become many employers’ largest expense. For example, during President Reagan’s first term, GM was paying Blue Cross as much for health insurance as it was paying U.S. Steel for the raw material to make its cars. Once again, employers looked to Washington for some form of health insurance and pension cost relief because the cost of these benefits effectively levied a

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30. Id.
31. Id.
32. Id.
33. Id.
tax on American goods sold abroad, forcing American goods to trade at a competitive disadvantage on the global market. Some commentators have openly wondered why employers must continue to provide health care benefits at their detriment. Tinkering with employer-provided health insurance has not controlled medical inflation, leading large employers to search for other solutions to reduce or eliminate the high wage and benefit costs of labor.

In the 1980s, employers used one of two methods to control the cost of employee benefit packages: demand more sophisticated managed care products from insurers or export jobs overseas to exploit more favorable labor markets. For many reasons, managed care techniques, which have attempted to control physician autonomy with nonspecific incentives, have proved less than satisfactory. The reality is that managed care products have only stabilized medical inflation at best, holding it to a rate of about ten percent per year. That is, managed care products have seemed to only cap off the rise of medical inflation, without necessarily making health care more cost effective.

Sending jobs offshore, which continues today, proved to be the more durable solution to controlling labor costs. By shifting their manufacturing

34. See Danny Hakim, Carmakers In for a Long Haul In Paying Retiree Healthcare, N.Y. TIMES, Sept. 15, 2004, at A1; McLean, supra note 32, at 511. Presently, GM must add an average $1,200 to the price of each car to cover health benefits for its United Auto Workers (UAW) union members. Hakim, supra note 20, at C1. This helps explain why Princeton University economist Uwe Reinhardt calls the Big Three automakers “a social insurance system that sells cars to finance itself.” Id.


36. For brevity’s sake, this article intentionally takes the myopic view that only excessive labor costs drive the offshoring of manufacturing jobs. In reality, wages and benefits are only one part of the calculus for outsourcing America’s manufacturing work force. Another significant economic factor is the regulatory burden of complying with the Occupation Safety and Health Act (OSHA), Pub L. No. 91-596, 84 Stat. 1590 (1970). See Richards & McLean, supra note 21, at 447.

37. Hakim, supra note 34, at A1. Note that today, the onerous problems associated with providing employee health benefit packages, even with managed care cost-control techniques, continues to haunt major employers. For example, the two biggest costs for the airline industry are labor with all its benefits and fuel. Maynard, supra note 32, at 35.
operations to a more labor-friendly location, employers not only reduced their direct labor costs by paying lower wages but also reduced or eliminated many indirect labor costs like health care and pension benefits.

Accordingly, over last 20 years, America has increasingly exported its blue-collar manufacturing jobs while the country as a whole shifted to a white-collar, service-based economy. Exporting blue-collar jobs may not have been an ideal solution to rising labor costs; nevertheless, such job exportation has helped American manufacturers stay competitive in the global market place.

B. More Than Meets the Eye: A White-Collar Perspective

As many blue-collar workers lost their jobs, those in white-collar industries looked the other way, smugly believing that service sector jobs were safe from exportation. However, while companies outsourced their manufacturing jobs in the 1980s, they also laid the groundwork to send white-collar service sector and medical jobs offshore. At first glance, it would seem that the corporate rationale for offshoring white-collar and medical jobs would be the same as that used for outsourcing blue-collar positions: capitalizing on a low-cost labor market. To some degree, this is true. Yet, as the following discussion on offshoring white-collar positions demonstrates, the increase in exportation of non-manufacturing jobs over the past decade is more complicated.

1. Requirements for Offshoring White-collar Jobs

As in the manufacturing sector, the offshoring of white-collar service jobs is partly driven by a favorable employee wage-benefit differential between the U.S. and the foreign host country. An Indian graduate of an American business school who returns to work in Calcutta has thirty percent fewer cost-of-living expenses than if he remained working in Chicago, although the Calcutta businessman earns only fourteen percent of

39. Of course, the employer would have to weigh the costs associated with the translocation of their manufacturing plants and the cost of shipping the finished product back to the U.S. to determine whether offshoring a manufacturing plant was in the company's best interest.

40. As used in this article, the concept of offshoring white-collar jobs is entirely analogous to the offshoring of blue-collar jobs. This is to be distinguished from the offshoring of a business operation to gain tax advantages through the use of a foreign distribution operation, see Edmund L. Andrews, A Civil War Within a Trade Dispute, N.Y. Times, Sept. 20, 2002, at C1, or corporate inversion, see David Cay Johnson, Perfectly Legal, Portfolio (2003).


42. See David Stires, The Breaking Point, FORTUNE, Mar. 3, 2003, at 105-12.
the salary an American businessman would earn. Moreover, by relocating MBA positions to Calcutta, not only would a corporation cut the cost of its wages, it would also substantially cut the cost of medical benefits. To corporate America, the elimination of medical benefit expenses has particular appeal because these expenses are increasing at an unsustainable rate.

Between 1999 and 2004, the balance sheets for corporate America were more negatively influenced by the rise in medical benefit expenses than by wages. In fact, General Motors recently reported a $1.1 billion first quarter loss, its worst quarterly loss in over a decade, citing rising health care costs as a primary factor in lost profits now and for the future. The automaker projected that its union-based health care costs were approaching $6 billion for this year, possibly forcing it to withdraw funds from a $20 billion cash reserve allocated for retiree health care expenses. General Motors reportedly provides health care for over one million people, including workers, retirees, and their families, who pay no deductibles or monthly premiums.

Nevertheless, successfully offshoring white-collar jobs involves more than a favorable wage-benefit differential; two other factors contribute to the emigration's success. First, cost-effective telecommunication technology must be available to link the offshore location with the home office. As used here, telecommunication technology contemplates both an appropriate telecommunications connection and compatible standardized software, including spreadsheets and word processing software. Thus, even though the Internet and personal computers have been available for

47. Id.
48. Id.
49. A communication link is less critical for offshoring blue-collar jobs because large amounts of data are not transmitted at one time.
almost two decades, the software enabling global communication only became available in the early 1990s. American Express became the first company to invest significant capital in offshoring some of its backroom call center operations to India.51 Many other corporations could not follow suit until the software became more affordable.52 Today, however, because of improvements in software quality and the decreasing cost of software, large corporations can no longer afford "to ignore information technology, or relegate it to the back burner," because offshoring white-collar jobs has become essential for corporate survival.53

The second, and more problematic, requirement is that the host country providing the cheap laborers must have a large number of educated, English-speaking people. But even India, which has a particularly large English-speaking population, cannot yet support the importation of American white-collar jobs to a significant degree because so few Indians are truly fluent in English. In fact, several U.S. companies have already had to repatriate their telephone call centers because the Indian operators could not sufficiently understand slang and idiomatic English phrases.54 More generally, an inability to make subtle distinctions in English means that certain white-collar jobs are not easily exportable because creative ideas cannot be communicated effectively.55 Generally, if a corporate job description cannot be written in the context of a finite set of rules, the job is not exportable.56

Yet despite concerns over language skills, 2.8 million jobs were shipped overseas from 2001 to 200357 and an estimated fourteen million more service jobs are vulnerable for exportation over the next five years.58 At first, the exportation of white-collar jobs was limited to low-level service jobs. A decade ago, all that American Express was willing or able to send offshore was its overnight reconciliation accounting operations.59 But in recent years, corporate firms export aeronautical engineers, software

51. Drezner, supra note 2.
52. Hal R. Varian, Economic Scene; IT may or may not matter, it depends on how you use IT, N.Y. TIMES, May 6, 2004, at C2.
56. Id.
59. Drezner, supra note 2.
designers, and stock analysts. China, Russia, and India, "with [their] big stocks of educated workers, [are] merg[ing] rapidly into the global labor market." Corporate firms exported their more sophisticated white-collar jobs after experimenting with sending simpler or lower risk jobs offshore; job exportation in the medical sector followed the same strategy.

For many reasons, however, these demographic figures on white-collar job exportation provide an incomplete picture. First, America is not the only country exporting white-collar jobs. Indeed, some high-wage countries like Japan run a trade surplus with low-wage trading partners. Second, even if America exported one million jobs per year, that would represent less than one percent of the American workforce. Accordingly, while the absolute number of white-collar jobs sent offshore appears alarming, the significance of that number is on the same order of magnitude as the round-off error associated with the calculation of net jobs. Third, the concept of net jobs is important because many of the jobs that have disappeared from the American workplace were not exported, but were rendered obsolete and are no longer being filled. Finally, some corporate executives received generous incentives to export blue-collar and white-collar jobs overseas.

2. Setting the Stage to Export Medical Positions

The exportation of medical jobs is likely to increase as telemedicine gains a greater foothold in the medical market place. It is not surprising that the medical community already exports some of its backroom operations, like medical billing and transcription, and specialty care based

60. Uchitelle, supra note 57, at 124.
61. For example, both Germany and Canada export white-collar jobs. Carol Matlack et al., Job Exports: Europe's Turn, BUS. WK., Apr. 19, 2004, at 50; Ian Austen, Canada, the Closer Country for Outsourcing Work, N.Y. TIMES, Nov. 30, 2004, at W1.
62. Jeffery Pfeffer, Stop Picking Worker's Pockets, BUSINESS 2.0, July 2004, at 64.
63. Brainard & Litan, supra note 2, at 2 (estimating the American workforce at 137 million).
64. Net jobs, as used here, is defined as existing job market + jobs created - jobs destroyed by obsolesce - exported jobs.
65. Although the actual figures for white-collar positions that have become obsolete are fuzzy, job obsolescence for blue-collar positions is more firm. Geoffrey Colvin, Value Driven: Worrying About Jobs Isn't Productive, FORTUNE, Nov. 10, 2003, at 60. During a recent seven year period, the "world's 20 largest economies lost 22 million manufacturing jobs." Id.
on image analysis, like radiology. But successfully exporting medical jobs require more than telecommunication technology and a large number of English speakers. It also requires: (1) a solid regulatory lattice; (2) evolution in doctor-patient relationship; and (3) the medical community gaining greater experience with newer business models and marketing techniques.

a. Regulatory Facilitation of Telemedicine


Congress enacted the Telecommunications Act to force telephone companies to provide universal service in remote areas and to ensure that residents in those areas were not charged an exorbitant amount for telephone access. Before the mid-1990s, telephone companies rarely provided access to rural areas because it was not cost-effective: those regions would not generate enough revenue to pay off of the initial connection costs. But because of the federal government’s intervention, urban physician-specialists could, for the first time, communicate with rural physicians or patients in a cost-efficient manner. This technology laid the


68. Susan E. Volkert, Telemedicine: Rx for the Future of Healthcare, 6 MICH. TELECOMM. TECH. L. REV. 147, 161 (2000). Professor Volkert provides a detailed discussion of these legislative acts in her article.


72. Volkert, supra note 68, at 192-93. To “ensure that no rural community is left behind” in the telemedical era, the Institute of Medicine is recommending that all regulatory barriers to telemedicine, in the field of telecommunication, be eliminated. INST. OF MED., QUALITY THROUGH COLLABORATION: THE FUTURE OF RURAL HEALTHCARE 13 (2005).

73. Cybersurgery, supra note 6, at 172-73.

74. Volkert, supra note 68, at 162. In the wake of the Telecommunication Act, the FCC, on its own initiative, did much to insure that American telecommunication standards become
groundwork for telemedicine.

The BBA further enabled the development of telemedicine by providing a reimbursement mechanism for providers.75 The federal government initially did not reimburse telemedicine services because it was not widely practiced and little research addressed the "cost, quality and access" of telemedicine.76 Even as late as 2001, a congressional report on telemedicine listed a "lack of reimbursement" as a critical barrier to the expansion of telemedicine.77

However, the BBA directed the Centers for Medicare and Medicaid Services (CMS) to reimburse health care providers for certain telemedicine services, particularly teleconsultations, thereby providing physicians with new incentives to enter the telemedicine market.78 Today, reimbursable telemedicine services include: office and other outpatient visits, professional consultations, psychiatric interviews, individual psychotherapy, and pharmacologic management.79 Private insurers also reimburse some telemedical services,80 undoubtedly because six states have mandated some telemedical coverage.81 Reimbursement, however, is contingent on whether the telemedical system qualifies as an interactive telecommunications system. A telemedicine system is considered interactive for reimbursement purposes if: (1) the audio and video equipment permits two-way, real-time interactive communication between the patient and the remote physician; and (2) the patient is in the office of a physician or in a hospital.82

The Telecommunication Act and the BBA directly impacted

the standard for the rest of the world. Id. at 162 n.67.
75. Id. at 231-32.
77. Id. at 372.
79. Smolensky, supra note 76, at 376-78. See also DEPT. OF HEALTH & HUMAN SVCS., MEDICARE CARRIERS MANUAL PART 3 — CLAIMS PROCESS 15-95 (2003). In general, subject to certain geographic restrictions, Medicare reimburses telemedicine services at the same rate it would reimburse the same service rendered in a face-to-face interaction. This means that Medicare is not reimbursing providers for the out-of-pocket expenses associated with setting up the telemedicine network.
80. Smolensky, supra note 76, at 380. However, Thus far most of the cost of developing and implementing telemedicine has been borne by the federal government. Volkert, supra note 68, at 154.
81. See CA. INS. CODE § 10123.85 (2003) (applicable for disabled patients only); COLO. REV. STAT. § 10-16-102(21)(a) (2002); HAW. REV. STAT. § 432D-23.5(c) (2000); KY. REV. STAT. ANN. § 304.17A-138(1)(a) (2001); LA. REV. STAT. ANN. § 22:657(F) and TEX. INS. CODE ANN. art. 21.53F, § 3(a) (2001) (reimbursement cannot be denied simply because there is no face-to-face consultation).
82. Smolensky, supra note 76, at 376-78.
telemedicine. Conversely, Congress’s amendments to the FFDCA had a less direct impact on telemedicine. The Food and Drug Administration (FDA) does not have jurisdiction to regulate medical devices directly under the FFDCA; rather, the FDA’s jurisdiction arises from the Medical Device Amendments (MDA) to the Act.\(^{83}\) The FDA primarily regulates medical devices through the pre-market approval (PMA) process.\(^{84}\) Medical device manufacturers may apply for mandatory PMA under section 360 or 510(k) of the amendment,\(^{85}\) but they may not sell medical devices on the open market without one or the other form of PMA.

However, the FDA is limited in its ability to police medical devices once they are on the market. In 1996, pursuant to its authority under the MDA, the FDA established the Center for Devices and Radiological Health (CDRH) to supervise clinical telemedicine.\(^{86}\) Using the CDRH, the FDA has been able to expand its jurisdiction over telemedical devices. The CDRH determines whether the machines used to transport telemedical video, voice, and data information and the algorithms that control telemedical devices are allowed on the market.\(^{87}\)

The CDRH not only adopts the policies and procedures that define

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83. Medical Device Amendments of 1976, Pub. L. No. 94-295 § 3, 90 Stat. 539, 12-18 (1976). Herein the discussion of the FDA’s pre-market approval has been simplified to focus on class III medical devices. A more detailed discussion of the pre-market approval can be found in Cybersurgery, supra note 6, at 187-92.


85. See id. § 360. See also 21 U.S.C. § 510(k) (1994). Under § 360, a manufacturer must meticulously document a device’s safety to obtain PMA. However, if the FDA grants § 360 approval, the manufacturer will not be subject to state products liability actions. See Medtronic v. Lohr, 518 U.S. 470, 501 (1996); Horn v. Thoratec Corp., 376 F.3d 163, 169 (3d Cir. 2004); Mitchell v. Collagen Corp., 126 F.3d 902, 910 (7th Cir. 1997); Goodlin v. Medtronic, 167 F.3d 1367, 1371 (11th Cir. 1999); Kemp v. Medtronic, 231 F.3d 216, (6th Cir. 2000). On the other hand, § 510(k) PMA is less onerous, but leaves the manufacturer exposed to products liability actions. See Cybersurgery, supra note 6, at 189-90.


87. CTR. FOR DEVICES & RADIOLOGICAL HEALTH, U.S. FOOD & DRUG ADMIN., REPORT ON HOME USE MEDICAL DEVICE MEETINGS (June 6-7, 2002), available at www.fda.gov/cdrh/meetings/FLDI-home.html (last visited Apr. 16, 2005). Whether FDA approval is granted turns on a totality of circumstances. Volkert, supra note 68, at 207. In granting approval, the FDA “will look to what the manufacturer claims in making the product, how the product is advertised and whether the product has a specific medical purpose. For telemedicine practice, the FDA’s position of whether or not a device is ‘intended’ for use in the diagnosis, treatment or prevention of disease may not be subject, at present, to a legal litmus test.” CTR. FOR DEVICES & RADIOLOGICAL HEALTH, supra note 84.
medical devices’ safe usage, it also regulates personnel, equipment, practices, and the procedures in use in telemedical facilities. While the CDRH currently concentrates its efforts on the safety of Internet drug sales, it could be a powerful regulatory force in the telemedical field if it chose to exercise the full extent of its oversight authority.

In short, the FDA’s regulation of telemedical devices is more *de facto* than *de jure*, creating a number of problems for the FDA: (1) it has no authority over a device unless the device is intended to be used for a medical purpose; (2) it must approve every medical device software update; and (3) it has no formal authority to regulate the market.

But regardless of whether the FDA’s authority over telemedicine is *de facto* or *de jure*, the fact that the FDA has entered the field of telemedicine facilitates the offshoring of medical positions by imposing safety standards and guidelines on the rapidly expanding telemedicine market. Without some form of safety standards, medical device manufacturers would be reluctant to enter the market. But because the FDA’s oversight would encourage more manufacturers to enter the telemedicine market, competition likely will increase and costs of telemedical hardware and software will fall, making it easier for more providers to offer telemedical services. Moreover, as the FDA gains expertise with medical devices and articulates clear standards, telemedical device manufacturers in other countries will likely adopt the FDA’s standards rather than “reinvent the

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88. Volkert, *supra* note 68, at 206. The “FDA does not regulate the ‘delivery of healthcare services’ or even the transmission of information between physicians and patients, but it does address those issues that relate to technology and concerns about safety and effectiveness.” Volkert, *supra* note 68, at 243.


92. Author’s Note: This is analogous to the situation in the videotape market of the 1970s. Only after it became clear that the VHS format would be the industry standard (and not Sony’s BetaMax format) did large numbers of manufacturers enter the market and drive down the price of video recorders.

93. *See infra* Part III.
Of course, the Health Insurance Portability and Accountability Act of 1996 (HIPAA) also impacts telemedicine and the offshoring of medical jobs. This paper will not address the regulatory network that has arisen in the wake of HIPAA’s enactment. But because the electronic storage and transmission of medical data inherent in telemedicine implicates privacy issues, HIPAA’s impact on telemedicine must be considered.

First, HIPAA has been moderately successful in meeting its goal of keeping patients’ medical information confidential. Generally, HIPAA imposes civil and criminal penalties on any health care provider who stores or transmits any identifiable, patient-specific medical information. Presumably, HIPAA’s privacy and security rules apply to all telemedical transactions.

As HIPAA is applied to telemedicine, it is both a blessing and a curse. Like the FDA standards, HIPAA standards and regulations provide a uniform playing field that will entice manufacturers to develop new and better telemedical hardware and software. On the other hand, HIPAA imposes substantial civil and criminal penalties for failing to comply with the Act’s complex standards to protect patient information, and will undoubtedly deter some providers who would otherwise consider offering...
telemedical services. In fact, as discussed below, a major university has already contemplated HIPPA liability because it sent its medical billing operations offshore.

b. A New Medical Paradigm

The second factor facilitating the exportation of medical jobs is the devaluation of medical knowledge. The medical community traditionally had a virtual monopoly on medical knowledge. If the average person wanted medical information, he would speak to a medical professional, or try to extract the information from arcane medical text books. But the technological changes of the past thirty years have all but destroyed the industry's monopoly on medical knowledge.

The changing paradigm for the management of pregnancy illustrates this shift. In the 1970s, pregnancy was treated as a disease. If a woman wanted to know if she was pregnant, she went to her physician's office for a physical exam and medical testing. Today, if that same woman wants to know if she is pregnant, she purchases a home pregnancy test kit. If the test is positive, the woman can search the Internet to determine not only whether her physician has been sued or disciplined, but also to discover medical issues that arise during pregnancy and her physician's philosophies on how to handle such issues. When the woman visits her obstetrician's office, she dictates the terms of her treatment, like whether she will accept an epidural for pain management. In the modern era of pregnancy management, the only decision left for the doctor to make is the decision to agree. Furthermore, while the doctor's decision to agree with his patient's demands solidifies the contractual relationship between them, it is not necessarily a decision that requires a medical degree.

99. Some would argue that HIPAA is not enough protection for patients. Pierre, supra note 93, at 551. Professor Pierre posits that: (1) HIPAA's discretionary reasonableness standard is insufficient; (2) certain exceptions to the application of HIPAA should be eliminated; and (3) based on European notions of patient privacy we should be doing more. If HIPAA is expanded along these lines as outlined by Professor Pierre, the barrier to entering the telemedical field would be increased.

100. See infra Part III.B.

101. Author's Note: These observations are based on my personal experience.

102. Patients' demands are not limited to what invasive procedures they will receive. For example, some patients attempt to limit those members of the hospital staff with whom they will have contact. Sanjeev Dutta et al., "And Doctor, No Residents Please!", 197(6) J. AM. COLL. of SURGEONS 1012, 1012 (2003).

103. Not all patients engage in such behavior, but the percentage of patients empowered with medical knowledge seems to be increasing yearly. Moreover, knowledge-empowered patients are not limited to the private sector. For example, even in the VA system, some of the more sophisticated patients with lung and esophageal cancer visit a doctor armed with knowledge of their disease and are ready to debate the merits of surgery versus
From the medical community's perspective, surrendering its medical expertise could not have come at worse time. By the mid-1980s, managed care had supplanted fee-for-service reimbursement as the primary means for compensating physician services, causing physicians to engage in questionable behavior to supplant their plummeting income. For example, in an effort to secure managed care contracts, physicians agreed to contracts containing the "gag rule" clause. The "gag rule" formally stated the following:

Physician shall agree not to take any action or make any communication which undermines or could undermine the confidence of enrollees, their employers, their unions, or the public in U.S. Health care or the quality of U.S. Health care coverage. Physician shall keep the Proprietary Information payment rates, utilization-review procedures, etc. and this Agreement strictly confidential.

Such clauses had the effect of alerting physicians that it was in their best interests to withhold medically significant information from patients, or fail to disclose to patients that their medical plans may not have been treating them fairly. Therefore, as a condition of obtaining these contracts, physicians agreed not to disclose any information regarding their incentives. Eventually, the gag rule, like most secrets, became public knowledge. As a result, the public learned that the medical community would subordinate its interests for cash contracts. From then on, the public decided that physicians could no longer be trusted as the exclusive holders of medical knowledge. With its faith in the beneficence of the medical community shattered, the public's view of providers had to evolve because once trust exits a relationship, the parties to the relationship no longer look at each other the same way.

Thus, in hindsight, it appears inevitable that the public, empowered with chemotherapy. Ten years ago such a knowledge-empowered patient in the VA system was almost unimaginable.

105. Richards & McLean, supra note 21, at 455.
106. Id. at 455 (citing Woodhandler & Himmelstein, Extreme Risk—The New Corporate Proposition for Physicians, 333 NEW ENGLAND J. MED. 1706, 1706 (1995)).
107. Id. at 455.
108. Physicians' value to the public will probably remain low until the medical community takes affirmative steps to demonstrate to the public that physicians can be trusted and sufficient numbers of the public-at-large are harmed by their own attempts to manage their medical conditions; for example, by attempting to navigate the direct-to-customer advertisement now commonly used by the pharmaceutical industry.
medical knowledge and a natural skepticism of medical providers, would embrace the patient safety revolution. The Institute of Medicine's (IOM) publication of To Err is Human: Building a Safer Health System, which reported that physician-errors may kill as many 98,000 hospitalized patients per year,\textsuperscript{109} launched the patient safety revolution in late 1999. Having sounded the alarm that providers made an excessive number of errors in treating patients, the IOM announced in three successive publications its recommendations for remedial action to improve health care quality.\textsuperscript{110} While a detailed discussion of the IOM's remedial action plan is not appropriate in this article, a few comments are in order.\textsuperscript{111} For the IOM, the key to improving health care is the development and implementation of medical-indication and clinical-practice guidelines.\textsuperscript{112} Guidelines not only create bright-line tests to gauge the quality of care rendered by physicians and hospitals; but such guidelines also allow medical care to be delegated to "physician extenders," that is, physicians' assistants or advanced practice nurses. In fact, a premise of the patient safety movement is that providers who follow the guidelines are fungible, which is all the more reason for those who actually pay for health insurance to want to have medical jobs sent offshore to low-cost providers.

While a shift to having health care provided by physician extenders is driven by multiple economic forces, perhaps the two most important of these forces are: the devaluation of medical knowledge and the greater likelihood that physician extenders will be more compliant clinical practice

\textsuperscript{109.} INST. OF MED., TO ERR IS HUMAN: BUILDING A SAFER HEALTH SYSTEM 1 (2000) [hereinafter To ERR IS HUMAN]. Five years after the IOM published To ERR IS HUMAN, the majority of Americans believe that the quality of health care has not improved, or worse yet, it has declined. See KAISER FAMILY FOUNDATION, NATIONAL SURVEY ON CONSUMERS' EXPERIENCES WITH PATIENT SAFETY AND QUALITY INFORMATION 8 (2004), available at www.kff.org/kaiserpolls/pomr111704pkg.cfm; Robert M. Wachter, The End of the Beginning: Patient Safety Five Years After 'To Err is Human,' HEALTH AFF., Web Exclusive, Nov. 30, 2004, at http://content.healthaffairs.org/cgi/content/abstract/ hlthaff.w4.534 (last visited Apr. 16, 2005).


\textsuperscript{111.} See Thomas R. McLean, Patient Safety: Something for Everybody, 13 LEG. MED. PERSP. 19 (2004) (discussing the IOM publication, PATIENT SAFETY); Thomas R. McLean, Medical Rationing: The Implicit Results of Leadership by Example, 36 J. HEALTH L. 325 (2003) (discussing the IOM publication, LEADERSHIP BY EXAMPLE); Quality Chasm, supra note 7, at 239 (discussing the IOM publication, CROSSING THE QUALITY CHASM).

\textsuperscript{112.} See Thomas R. McLean, Application of Administrative Law to Healthcare Reform: The Real Politik of Crossing the Quality Chasm 16 J.L. & HEALTH 65, 71-74 (2002) (discussing how such guidelines will be developed and implemented).
guidelines. Shifting our health care delivery paradigm from physician-decision makers to physician extender / guideline-driven decision-making will facilitate telemedicine implementation; hence the offshoring of medical jobs. Although telemedicine may have started out as merely teleconsultation between physicians, telemedicine as it exists today allows for a centrally located physician to supervise a number of remotely located physician extenders. In so doing, fewer physicians and ancillary medical personnel are required to deliver the same level of care, thereby reducing the cost to deliver health care.

To illustrate, consider how the Texas Correctional System (TCS) makes use of telemedicine and physician extenders. The TCS, which operates a number of prisons throughout Texas, contracts exclusively with University of Texas at Galveston for medical services. In the past this meant that when a prisoner in El Paso claimed to need medical attention, the prisoner would have to be transported approximately 1,000 miles to see a physician. Accordingly, prior to telemedicine, it was very inefficient to emergently transport a single prisoner from El Paso to Galveston, especially if the prisoner was not acutely ill. However, by providing the Galveston physicians with a telemedical link to the various prisons, many of logistical and security concerns with prisoner transport for medical consultation could be eliminated. More specifically, the TCS’s telemedical system allowed a Galveston-based physician who was supervising a physician extender to monitor the physician extender-prisoner encounter. Based on what the supervising physician observes during the interview and physical examination conducted by the physician extender, the physician could then make a medical decision on whether the patient was sufficiently acutely ill to justify urgent transport.

But it must be realized that TCS does not have to hire a physician from Galveston, or even Texas, to supervise physician extender-prisoner encounters. Rather, there is nothing that prevents the TCS from hiring a

113. Neither the Leapfrog Group nor the National Association of Nurse Practitioners is aware of any evidence that demonstrates that physician extenders are more compliant with clinical practice guidelines than physicians. (Personal communication with these organizations, Nov. 22, 2004). Nor have I been able to confirm this as a fact from a review of the literature. Still, it is probable that physician extenders will follow guidelines better than physicians for two reasons: first, compliance with guidelines will provide physician extenders with more prestigious and possibly better paying positions; second, physicians will view compliance with clinical guidelines as an affront because guideline compliance means a loss of professional autonomy.

114. See generally Quality Chasm, supra note 7, at 246-64 (discussing state licensure and scope of practice acts for physician extenders as well as show the method of supervision that a physician must use in supervising physician extenders is determined by the states).

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physician anywhere in the world to supervise the medical needs of its prisoners. More generally, because telemedical signals can be sent across international boarders, nothing prevents a patient located in America from being treated by a physician located in Beijing. ¹¹⁶ And as was the case with the exportation of other white-collar jobs, exportation of medical jobs to Beijing or Calcutta could substantially reduce total health care costs because foreign physicians are willing to accept much less in wages and benefits.¹¹⁷

To be sure, the political and financial concerns with the offshoring of medical jobs will be substantial; yet, the greatest impediment to medical jobs exportation is most likely to be a lack of physician extenders in this country who are capable of facilitating the remote doctor’s examination.¹¹⁸ Still, the size of the physician extender labor pool is a relative, and not an absolute, concern in assessing the feasibility of offshoring medical jobs because the IOM is recommending that the U.S not only train more nurses, but also that America should do whatever is possible to keep nurses working in the medical field.¹¹⁹

c. New Business Models

The final factor that favors medical jobs exportation is the evolution of our health care delivery system. During the past two decades, providers have seen their income progressively whittled away such that providers today must cope with razor-thin profit margins. Consequently, physicians no longer practice solo or in small groups.¹²⁰ Rather, physicians are practicing as employees of corporations or in Independent Practice Associations (IPAs). With this shift in practice patterns to new business organization, physicians have recently adopted a number of sophisticated marketing and business strategies to control costs.¹²¹ In particular,

¹¹⁶. McLean, supra note 32, at 514.
¹¹⁷. I was unable to find reliable data for physicians’ income in China or India. Thus, the actual magnitude of physician wage-benefit differential between the U.S. and China is speculative. Moreover, there is no reason to believe that an offshore physician would charge American patients the same rate they would charge the indigenous population.
¹¹⁸. 80-Hour Work Week, supra note 7.
¹²¹. See Thomas R. McLean, Antitrust Law and a Tale of Two Industries, 32 AM. HEART Hosp. J. 24, 24 (2004). Because marketing strategies and delivery systems change with the times, it should come as no surprise that the offshoring of medical jobs is not a new idea; albeit, in early times the term “offshoring” was not used. For example, in the 1960s,
providers increasingly are looking at the Internet as a marketing tool and the franchising of a brand-name as strategies to gain economies of scale.

1. Marketing Medicine on the Internet

Since 1995, when the introduction of the Netscape browser revolutionized the Internet, physicians have increasingly viewed the Internet as a means to market their services. Physicians view the Internet as a cheap way to lure patients who are directing their own medical care into their cyberspace office. What these patients are looking for in cyberspace is a physician with a good outcome reputation and someone who can be trusted. The actual location of the physician is only a secondary concern to many of these patients. After all, patients have been willing to travel to places such as the Mayo Clinic and Texas Heart Institute for years. Given such a mindset, in the near future, patients will likely not be bothered if the physician of their choice is located in a foreign country. Physical location is secondary to the physician’s clinical track record, trustworthiness, and an ability to provide the desired medical treatment telemedically.

From an economic perspective, as the number of Internet-mediated transactions with international providers increases, there will be a corresponding decrease in the need for American providers. In addition, if international providers continue to follow American providers by marketing themselves on the Internet, and are willing to undercut American providers on price, basic economic principles dictate that American medical jobs will

several European nations, particularly the Netherlands, offshored their cardiac surgical jobs to the U.S. From across the ocean, the Europeans sent raw material (defective hearts) and money to Drs. M.A. DeBakey and D.A. Cooley who would then operate and send back the finished product (a repaired heart). See generally THOMAS THOMPSON, HEARTS OF SURGEONS AND TRANSPLANTS, MIRACLES AND DISASTERS ALONG THE CARDIAC FRONTIER (1971).


123. P. Greg Gulick, E-Health And The Future of Medicine: The Economic, Legal, Regulatory, Cultural, and Organizational Obstacles Facing Telemedicine and Cybermedicine Programs, 12 ALB. L.J. SCI. & TECH. 351, 354-62 (2002). See also id. (discussing how Jim Clark launched Hyperion in an unsuccessful attempt to control the e-Health market); cf. J.D. Kleinde, Vaporware.com: The Failed Promise Of The Healthcare Internet 19 HEALTH AFF. 57, 57-58 2000 (observing that Internet is already littered with empty provider.com companies that failed because the company was poorly designed).

124. Physicians in other countries also use the Internet to market their services. There is no reason to believe that when an American searches for a physician, that the search will be limited to the United States, especially if the American patient can get what is desired from the foreign physician. See Carolyn Edmonds, British Columbia Reports Big Increase in Demand For Flu Shots, SEATTLE POST INTELLIGENCER, at B9 (Nov. 4, 2004) (demonstrating that when Americans in Washington State discovered that Canadian providers had an ample supply of flu shots, Americans were willing go to Canada and pay for the shot).
move offshore.\textsuperscript{125}

2. The Franchise Model and Name Recognition

The increase in use of the business franchise model will also stimulate the exportation of medical jobs. Perhaps the best known example of the franchise model phenomenon in clinical medicine is the Mayo Clinic. The Mayo Clinic has established franchise operations in Scottsdale, Arizona and Jacksonville, Florida\textsuperscript{126} by franchising its Minnesota operation. These franchise operations allowed the Mayo Clinic to gain competitive advantages in the national market place through the creation of economies of scale that eliminated operational redundancy. In addition, a marquee health care provider like the Mayo Clinic benefits from instant name recognition when it moves into a new market.\textsuperscript{127} Although the Mayo Clinic has limited its expansion to domestic cities, other providers have already franchised their operations internationally.\textsuperscript{128} Once a foreign-based operation is up and running, it is likely that the American parent company will transfer some of its operation to overseas locations to take advantage of a cheaper labor market.\textsuperscript{129} In fact, the franchise model is already being

\begin{itemize}
\item \textsuperscript{125} At present the chief mechanism to battle offshore businesses is the erection of trade barriers to increase the offshore company’s transaction cost. However, history teaches that trade barriers, like tariffs and licensing requirements, become increasingly ineffective as time passes. McLean, supra note 32, at 521-23.
\item \textsuperscript{126} See McLean, supra note 32, at 524 (describing how the Mayo Clinic also has created several satellite operations in several smaller markets).
\item \textsuperscript{127} An implicit assumption behind a health care provider cloning its operation is that the provider wishes to gain a greater market share. This raises the specter of antitrust; a detailed discussion of which is beyond the scope of this article. See generally \textsc{Fed. Trade Commn. \& the Dep’t of Justice, Improving Healthcare: A Dose of Competition (2004), available at} \url{http://www.healthlawyers.org/docs/ask2004/FTC_report.pdf} (last visited Apr. 16, 2005) (competition to improve cost and quality could be favorably induced by: (1) elimination of trade barriers including CON programs and state-specific provider licensure requirements; (2) liberalizing the use of “allied health professionals,” or physician extenders; (3) increasing the utilization of telemedical technology; and (4) single-specialty hospitals). See also \textsc{Deep Pockets, supra} note 120, at 126-27.
\item \textsuperscript{128} Edmund Newton, A Kansas Cardiologist With His Eye on the World, \textsc{N.Y. Times}, Oct. 30, 2002, at C2 (discussing how a U.S. cardiologist franchised his clinic operation to China); Andrew Pollack, Who’s Reading Your X-Ray? \textsc{N.Y. Times}, Nov. 16, 2003, at 31 (the “University of Pittsburgh Medical Center essentially manages a transplant hospital in Italy”).
\item \textsuperscript{129} There is no reason to believe the American medical service providers will behave differently than American manufacturers when they gain access to a cheap labor pool. See supra Part II.A. See also Saritha Rai, Low Costs Lure Foreigners to India for Medical Care; \textsc{N.Y. Times}, Apr. 07, 2005, at C6. If Americans are willing to travel to India today to purchase medical care cheaper than they can in the U.S., \textsc{id.}, it is not unreasonable to believe that telemedicine, which obviates the need to physically travel to India, would not flourish because lower-wage Indian providers decrease the costs to individual Americans.
\end{itemize}
exploited by some American telemedical health care providers.  

III. OFFSHORING MEDICINE

The above discussion makes it clear that virtually nothing prevents American medical jobs from being exported. Thus, the next question is just how far down the road to exporting medical jobs has the U.S. already traveled? That is, if providers were given the right economic incentives, political support and cost-effective technology, how much longer will it be before a significant number of medical jobs are exported? The short answer to this question is that the U.S. has already begun offshoring some medical jobs in significant numbers.

Presently America is offshoring a significant number of medical jobs that involve “back room” operations and radiology services. Common to both of these jobs is that they require a low level of technological sophistication and they have minimal exposure to tort liability. However, since telemedicine and cybersurgery are already sufficiently advanced, it is only a matter of time before all fields in medicine can be exported. Therefore, if medical inflation is not checked and the telecommunication technology train continues to roll, face-to-face encounters will become less important to patients and surgical jobs are likely to be exported before the decade is out.


131. WORLD HEALTH ORG., REP. TO INDIA, COUNTRY REPORT FOR MODE 1: CROSS BORDER TRADE FOR HEALTH SERVICES 63-65 (2004), available at http://www.whoindia.org/EIP/GATS/10-63.pdf (observing that India providers have already captured 2% of the U.S. health care market.

132. See infra Part III.A.

133. The low level of technology is reflected in the minimal amount of capital that must be raised to become a telemedicine provider. Letter from Jafar Amini, MD, Chief, Section of Leavenworth Veteran’s Administration Dep’t of Radiology, to author (Mar. 21, 2005) (on file with author); Telephone interview with Lynda A. Cleveland, Telecommunications Attorney, Overland Park, Kan. (Mar. 23, 2005).


135. Discussion here will focus primarily on state-of-the-art telemedicine in the U.S. However, it should be kept in mind that even third-world countries are rapidly embracing telemedicine as means to improve access to medical care. See Gulick, supra note 91, at 193-200.

136. For evidence that the doctor-patient paradigm requires less face-to-face interaction, consider the explosion in cyberprescription, see generally John D. Blum, Internet Medicine and the Evolving Legal Status of the Physician-Patient Relationship, 24 J. LEG. MED. 413.
Offshoring medicine not only promises to be less costly as it exploits an economically more favorable foreign labor market, but the offshoring of medical jobs also has the potential to improve health care quality. Offshoring will improve access to health care because patients will be examined immediately by trained physicians on a round-the-clock basis. Additionally, quality will be improved because providers will be monitored for medical errors on a continuous basis.

A. Medical Paperwork is Already Being Offshored

Telecommunication technology is revolutionizing all aspects of the practice of medicine as providers look to find more cost-efficient techniques to provide patient care. In recent years, providers' income has progressively fallen while their expenses have continued to increase. Accordingly, providers have been forced to operate on razor-thin profit margins. Like other industries that had to cope with razor-thin profit margins in the last thirty years, health care providers are increasingly looking to offshore some of their backroom operations just as American Express did a decade ago. In fact, for many providers today there is "no choice but to use offshore services if they can get the same quality service for less than it would cost in America."

1. Transcription

Accordingly, many American providers are exporting their backroom operations like transcription and billing. Offshoring medical transcription is a straightforward, somewhat simplistic telecommunications application.
From the providers’ point of view, nothing has changed: the providers dial a telephone number, dictate the medical information, and the typed report is presented to them twenty-four to seventy-two hours later for their signatures. Historically, the providers’ dictations were recorded on magnetic tape and transcribed at the convenience of a local vendor. Even today, for the most part, medical transcription is operated as a cottage-industry by transcriptionists who work out of their homes. However in the aggregate, medical transcription is big business in America as it generates $15 billion to $20 billion in revenue per year.\(^{142}\)

Medical transcription became a multibillion-dollar industry for two reasons. First, billions of medical transactions occur each year. Some of these transactions are trivial; for example, when a patient returns to a provider to have their sutures removed. Other medical transactions, such as an organ transplant operation are complex. Regardless of the complexity of any medical transaction, the doctor needs to provide medical documentation, to be properly paid and handwritten notes are increasingly unacceptable.\(^{143}\) Second, the transcriptionists must not only be good typists, but they must also be fluent in the language of medicine. These requirements place medical transcription outside of the general secretarial skill set. Consequently, American transcriptionists command salaries of $27,000 to $30,000, plus benefits.\(^{144}\) Such relatively high wages and benefits, which are similar to the wages and benefits received by many unionized blue-collar workers, serve as a stimulus to offshore medical transcription.\(^{145}\)

With the advent of the Internet and the falling cost of telecommunications,\(^{146}\) when a provider now dials a local number, the dictation is frequently sent to India where it is transcribed and then returned either as an e-mail attachment or sent Federal Express the next day. Regardless of the exact procedure used, offshoring of medical transcriptions

\(^{142}\). Id.

\(^{143}\). CROSSING THE QUALITY CHASM, supra note 110, at 166 (advocating the universal usage of electronic medical records).

\(^{144}\). Chin, supra note 140. Assuming a 40-hour work week, with two weeks of vacation, this means that transcriptions earn about $14-15/hour.

\(^{145}\). Chin, supra note 140; see also HALBERSTAM, supra note 1, at 694.

\(^{146}\). In 2004, fifty-one percent of Internet users access the Internet via Wi-fi broadband technology. Om Malik, Home Entertainment to Go, BUSINESS 2.0, Dec. 2004, at 29. Accordingly, telecommunication cost will continue to fall as cities wire their streets with Wi-fi antennas. See Jessie Drucker, Telcom Giants Oppose Cities on Web Access, WALL ST. J., Nov. 23, 2004, at B1. By paying for such infrastructure improvements with taxes, Wi-Fi technology holds the promise that Internet access charges may become a thing of the past. Id.; cf. Mark Glassman, Most Wanted: Drilling Down/Wireless Internet, Why Not Wi-Fi?, N.Y TIMES, Nov. 15, 2004, at C11 (because Wi-Fi is a low energy signal, Wi-Fi does not penetrate buildings well).
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jobs not only frequently results in less turnaround time, but also is associated with significant cost savings. In India, a medical transcriptionist can be hired for a little as $125 to $150 a month. When compared to the wages received by transcriptionists in the U.S., the differential in wages and benefits is so significant that perhaps the only reason any transcription is still performed in the U.S. is that the money saved on labor savings is often offset by heavier investments in technology, management, editing and quality assurance. Still, by offshoring their medical transcriptions, providers can generally save fifteen to twenty-five percent off the cost of local transcription services.

2. Billing

In the age of information, money moves with a click of a computer key. Thus, like medical transcription, American providers are already exporting an impressive amount of their billing. The reason is, once again, a favorable wage-benefit differential in the labor force and the only technology that is required is access to the Internet and an Excel™ spreadsheet. Interestingly, although upfront costs for the technology to offshore medical billing are minimal and English fluency requirements for billing operations are much less, the costs to export medical billing operations are still fairly high. Currently, for a medical practice to offshore its billing operation, it will cost upwards of $20,000 to $22,000 per year. However, this is still cheaper than the $30,000 per year it costs to bring a similar operation in-house.

Given favorable economics, it is hard to argue with providers who wish to offshore their transcription and/or billing operations. Exportation of these jobs is associated with few negative risks and improves a provider’s profit margin. However, the need to protect patient confidentiality is the

147. Chin, supra note 140.
148. Id. As the cost of technology and management fall, the economics of hiring Indian transcriptionists will become increasingly more desirable. Perhaps only high-quality voice-recognition software will be able to keep some transcription jobs from being offshored. However, voice recognition software will not save the jobs of American transcriptionists. Id.
150. Id. It is unclear why exportation of medical billing costs proportionately more than exportation of transcription. Perhaps it is a reflection of the fact the offshore accountants are in higher demand because non-medical companies, like American Express, compete for the same talent. On the other hand, perhaps foreign accountants have learned that Americans are willing to pay more to foreign vendors because it is still cheaper than purchasing accounting services from U.S. vendors.
151. Id. An important liability that is outside the scope of this article is liability of a provider for the submission of a false claim. See False Claims Act, 31 U.S.C. § 3729 (2003).
one liability that should not be overlooked.\textsuperscript{152} The Health Insurance Portability and Accountability Act of 1996 (HIPAA) requires that covered entities (e.g., providers) must ensure that protected patient information (PPI) (e.g., a medical transcription) is not disclosed without proper authorization.\textsuperscript{153} Providers who have exploited foreign labor markets for their backroom operations have already had to contemplate HIPAA liability.\textsuperscript{154} For example, consider the HIPAA liability issues that the University California at San Francisco (UCSF) had to resolve after offshoring some of its billing and transcriptions operations.\textsuperscript{155} UCSF, much to its chagrin, became involved in a contract dispute with a foreign vendor who threatened to post UCSF's patients' PPI on the Internet unless the vendor was fully compensated.\textsuperscript{156} Aware that such an action by the vendor could expose the university to significant HIPAA liability, UCSF settled with the vendor.\textsuperscript{157} Regrettably, UCSF's experience is not an isolated event. As a result, six states\textsuperscript{158} are contemplating a ban on outsourcing all provider billing and transcription operations.\textsuperscript{159}

B. Disease Management: The Model For Primary Care Physicians

At this point, it could be argued that medical transcription and billing are not really medical jobs. Because an advanced medical degree is not
required to perform these backroom operations, these jobs are little more than garden-variety white-collar labor. Such an argument is fair, but the inclusion of transcription and billing in this discussion is required for two reasons: (1) for completeness; and (2) to emphasize that there are virtually no positions connected with the practice of medicine that are not exportable. Therefore, with the goal of demonstrating that virtually all medical care is exportable, we begin a survey of the formal practice of medicine with the field of primary care, which is the process of adopting the innovative techniques disease management.

At present, although disease management (DM) is the most rapidly growing sector of the health care industry, it remains an amorphous concept without an agreed-upon definition. According to the Congressional Budget Office (CBO), DM “covers a range of activities that attempt[ ] to address several perceived shortcomings of current medical practice.” The CBO then goes on to state that DM is most easily recognized by its characteristic components: (1) active education of patients especially with respect to the proper use of medication; (2) active and regular monitoring of patient’s progress; and (3) coordination of patient care among providers. While patient education and coordination of patient care are clearly facilitated by the use of telemedicine, which brings a remote provider into contact with a patient, the discussion here will focus on demonstrating how DM will facilitate remote monitoring of outpatients.

Seventy-five percent of all health care dollars are spent treating chronic  

160. I will concede that it is unlikely in the near future that all medical jobs will be exportable. These jobs are characterized by the need for close physical proximity to a patient; and include such jobs as direct care givers who actually position patients, assist in transferring patients, and changing a patient’s bed. However, as will be discussed later in the article, nursing and physician assistant jobs that involve monitoring and modulation of medical care are exportable.

161. A primary care physician (PCP) refers to a practitioner of internal medicine and family practice. However, as used here, the term is given a broader meaning. PCPs in this paper also include pediatricians, obstetricians, and gynecologists in their non-surgical capacities. The reason a broader view of PCPs is used is because what distinguishes these medical disciplines is their patient population, and not the specific area of medicine practiced.


163. CONG. BUDGET OFF., AN ANALYSIS OF THE LITERATURE ON DISEASE MANAGEMENT PROGRAMS, available at www.cbo.gov/showdoc.cfm?index=5909&sequence=0 (last visited Apr. 16, 2005). These shortcomings are: (1) that chronic conditions either go untreated or are inappropriately managed; (2) there is a disparity between evidence-based recommended treatment guidelines and current practice; and (3) care is often given without physicians’ coordination. Id.

164. Id.
disease. Hospitals, for the most part, treat acute disease-states, while chronic diseases are treated in the outpatient setting. Medical monitoring of a chronic disease is the key to a successful outpatient management program. Traditionally, the medical monitoring of outpatients was performed by having the patients come to a physicians’ office on regular, sometimes weekly, basis. Once in the doctor’s office, patients were made to wait for long periods to see the doctor, which from a societal point of view is a tremendously inefficient way to manage the labor force. The waiting room experience, however, was not a total loss because the nursing staff could use the waiting period to gather the key data for monitoring the patient’s disease; for example, the patient’s vital signs, weight, and occasionally draw blood for testing. Once this information was gathered the doctor might supplement this data with a limited examination prior to making a diagnosis and initiating treatment.

Unfortunately, this Norman Rockwellian image of American health care is rapidly being relegated to the history books because of innovations in DM and telemedical technology. Using the DM paradigm, the patient’s key data no longer has to be gathered in the doctor’s office. Rather, DM makes uses of patient monitoring devices that telemetrically link patients to providers. At the low end of the DM technology spectrum are scales that measure the daily weight of congestive heart failure patients and devices that measure the blood sugar of diabetic patients and then telephone these parameters into a provider’s office. In contrast, at the high end of the DM technology spectrum is the LifeWatch Corporation. Using the latest in telemetric monitoring and cellular technology, LifeWatch monitors patients’ heart rhythm in real-time. In addition, DM technology will soon include Machine-to-Machine (M2M) devices. Sophisticated M2M devices will facilitate outpatient

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166. See Jon Van, Telemedicine at Heart of Diagnostics Change, CHI. TRIB., Oct. 6, 2004, at C1.

167. Anne Eisenberg, When the Athlete’s Heart Falters, a Monitor Dials for Help, N.Y. TIMES, Jan. 9, 2003, at G7.

168. Jon Van, Machine-to-Machine Talk Not Stuff of Fiction, CHI. TRIB., Sept. 2, 2003, at C1 (“widespread availability of cheap computer chips combined with easily accessible wireless phone networks means that no machine, no matter how lowly, need ever be lonely again. The advent of machine networking, which is sometimes called 'pervasive computing,' eventually will change nearly every line of business”). In the extreme situation, the M2M technology will facilitate offshoring of jobs because automation will eliminate many providers’ jobs around the world as the M2M device’s telephone data can be accessed
management by automation; one device will telephone in patients' parameters and another device will send the patient a set of specific care instructions, which may prescribe that they go to the emergency room or take less insulin. 169

Advocates of DM note that using medical devices to monitor outpatient care has distinct clinical advantages, because many chronic disease-states, like congestive heart failure, diabetes, and hypertension, are inefficiently managed absent telemetry. 170 Whether DM is cost effective is another story. 171 In part, cost-effectiveness is controversial because at present, providers still need to be involved in a patient's care to perform an appropriate examination. This means that DM as we know it today must be administered by a local physician. Where the physician can make a medical decision about a patient absent a detailed physical examination, based on the symptoms and daily weight of a patient with congestive heart failure, for example, the patient may be able to avoid some visits to the doctor's office.

However, we have already noted that telemedical techniques, coupled with the use of physician extenders, allows the supervising physician to operate from anywhere in the world. Similarly, data collected via DM monitoring can be forwarded anywhere in the world. Accordingly, DM not only facilitates outpatient management, 172 it also facilitates the offshoring of medical jobs. To the extent that data collected by a DM device needs to be supplemented with a physical examination, the examination could be performed by a local physician extender who is being supervised by a remote physician. 173 Thus in the near future, U.S. patients may be spending less time in the waiting room of a doctor's office.

The quality of a physical examination performed in cyberspace is not a trivial issue. Professor John Blum points out that the physical separation, and to a lesser degree the temporal separation, of the physician and patient during a telemedical encounter creates problems with traditional notions of

169. See id.; Eisenberg, supra note 167, at G7.
171. Compare CONG. BUDGET OFF., supra note 163 (DM industry as it currently exists is not cost-effective) with HF Disease Management Teams: Varied Approaches Find Success, 33 CARDIOLOGY 1, 4 (2004) (for patients admitted to the hospital with heart failure, DM caused an 87% drop in readmission during the next year).
172. See supra Part II.B.2.
whether a doctor-patient relationship is established and whether physician is appropriately licensed. Generally, a physician may be subject to disciplinary action for the unlicensed practice of medicine if he prescribes medicine or administers online medical treatment without first having performed a physical examination on the patient. Still, determining when a doctor-patient relationship is created and when a license is required to perform cybermedicine is unsettled in both the real world and in cyberspace, where a physical examination does not occur. Accordingly, Professor Blum concludes his review by noting that work remains to be done to harmonize the various judicial solutions and law review concepts of the doctor-patient relationship and licensure in cyberspace.

However, as a practitioner, I would favor a more practical definition for the establishment of a doctor-patient relationship in cyberspace. The relationship should be established when a remote physician actually performs a review of a patient’s PPI. In addition to being a bright line standard, using this standard to determine the existence of a doctor-patient relationship would expand governmental oversight to a number of situations where oversight could potentially improve patient safety.

Blum, supra note 136, at 455. Professor Blum argues that, based on existing principles of law, the key to determining whether medicine is being practiced in cyberspace turns on whether a physical exam was, or should have been, performed.

Gulick, supra note 123, at 364. In addition to fifty states, twelve federal agencies have some regulatory oversight of the practice of medicine. Id. at 378. A question closely related to licensure is whether the offshore physician who telemedically examines an American patient needs a visa to enter this country. Personal communication Amy J. Sokol, Vice President and General Counsel, Carondelet Health, Oct. 20, 2004. If a foreign physician needs a visa and a license to practice medicine, then it would seem reasonable to require an offshore foreign physician to have a visa to enter this country telemedically in order to practice. Id. A detailed discussion of visas in telemedicine is beyond the scope of this article. See Amy Hagopian et al., Health Departments’ Use of International Medical Graduates in Physician Shortage Areas, HEALTH AFF., Sept.-Oct. 2003; Myrle Croasdale, Visa Complications Snare Physicians; Hospitals Scramble, AMNEWS, Sept. 15, 2003, available at www.ama-assn.org/amednews/2003/09/15/prl20915.htm (last visited Mar. 29, 2005).


Blum, supra note 136, at 455.

Using an analogous line of logic, doctor-patient relationships have been deemed to exist when a medical director makes a decision without performing a physical examination. See State Bd. of Registration for the Healing Arts v. Fallon, 41 S.W.3d 474, 477 (Mo. 2001); Murphy v. Bd. of Med. Exam’rs, 949 P.2d 530, 536 (Ariz. Ct. App. 1997).
when a remote radiologist reviews an x-ray now, a physical examination is not really performed because the radiologist simply reviews the patient's radiographic image. In this situation, a traditional doctor-patient relationship arguably is not established. On the other hand, if reviewing a patient's PPI, including an x-ray, triggers the creation of a doctor-patient relationship, there would be no question that radiologist’s interpretation of a radiographic image would establish the basis of a doctor-patient relationship such that the doctor was engaging in the practice of medicine.179 Additionally, basing the doctor-patient relationship on the review of PPI is consistent with the recommendations of other commentators180 and the Federation of State Medical Boards.181

C. Moving Intensive Care Units (ICUs) Offshore

Notwithstanding the concern over whether telemedicine-facilitated DM constitutes the practice of medicine, what is critical to recall at this juncture is that telemedicine allows for the offshoring of virtually all medical jobs. The use of telecommunications means that the provider who monitors a patient in a DM program can be anywhere in the world because the patient’s data, and not the patient, is presented to the provider for a medical decision. Moreover, remote patient monitoring is not limited to the ambulatory setting for the management of chronic disease. While a telephone connection constituted “telecommunication” thus far in this article, going forward, telecommunications should be viewed broadly to include cable and broadband182 and newer technologies based on the vertical integration of video image suppliers.183 Today’s telemedical technology is being increasingly applied to acute care settings in hospitals, making medical jobs within the hospital at risk for exportation. To illustrate, consider perhaps the most risky in-hospital situation for offshoring: patient care in an intensive care unit (ICU).

179. It would also help to distinguish cocktail-party advice from the practice of medicine.
180. See Nicholas P. Terry, Cyber-Malpractice: Legal Exposure for Cybermedicine, 25 AM. J.L. & MED. 327, 328 (1999) (e.g. giving advice that physician reasonably expects a patient to follow or accepting payment constitutes the practice of medicine); Julie Reed, Cybermedicine: Defying and Redefining Patient Standards of Care, 37 IND. L. REV. 845, 856 (2004) (noting that the practice of medicine by use of “online questionnaire consultation doesn’t constitute an acceptable standard of care”).
181. FED'N OF STATE MED. BOARDS, A GUIDE TO THE ESSENTIALS OF THE MODERN MEDICAL PRACTICE ACT (10th ed. 2003), at § II(A)(5) (the practice of medicine includes “rendering a determination of medical necessity or decision affecting concerning the diagnosis or treatment of a patient”).
182. See Cybersurgery, supra note 6, at 172-73.
Today, the most acutely ill patients are managed in ICUs. In the best of situations, which are typically found in the tertiary care centers, ICUs are staffed during daylight hours by fully-trained specialists in intensive care medicine. These "intensivists" are not capable of working around the clock. While some ICUs are staffed by fully-trained physicians each night, most ICUs are either staffed by residents or are staffed by physicians who take calls from home. But staffing ICUs at night with residents and on-call physicians is less than ideal as death and disease never sleep; many patients decompensate between midnight and dawn. For this reason and others, Leapfrog, a round-table employer discussion group, has long asserted that remote twenty-four hour-a-day monitoring of ICU patients could save as many as 53,000 lives per year. Recently published data demonstrates that eICUs, which use remote specialists to monitor and provide patient care in multiple ICUs, show superior outcomes both in terms of patient events and dollars saved when compared with ICUs that were traditionally staffed. Like DM providers, eICU providers may be located anywhere in the world. This is an important point if we are to provide quality ICU care to patients on a round-the-clock basis. Dr. Michael Breslow recently conducted a two-year study examining the care given to 2,140 patients located in two ICUs whose care was remotely monitored by trained professionals. Dr. Breslow’s study was premised on the assumption that

184. A resident is a physician who has completed medical school and an internship and is now receiving training in a specialized area, which is required for board certification in any medical or surgical specialty. See MedicaNet.com, at http://www.medterms.com/script/main/art.asp?articlekey=9957.

185. See, e.g., Advocate Healthcare website, at http://www.advocatehealth.com/system/info/tvspsots/eicu.html/q2 ("intensivists[,] critical care nurses and healthcare assistants . . . will be available both at the bedside and remotely to monitor all 212 adult ICU beds across Advocate’s eight Chicago area hospitals.").


188. Id.; Carolyn Bekes, Pro: Multiplier, 32 CRITICAL CARE MED. 287 (2004); Steve G. Peters & Christopher J. Farmer, Con: Is the Tele-intensive Care Unit Ready for Prime Time?, 32 CRITICAL CARE MED. 288 (2004). However, any study or commentary of ICU efficiency must be tempered by recognition that there is no objective "gold standard" to use as a comparison to judge the quality of care given. Jean-Louis Vincent, Evidence-Based Medicine in the ICU, 120 CHEST 592 (2004).

189. In the studies done by Breslow, ICU patients were monitored by remote American physicians. Breslow, supra note 187, at 32. However, if the remote monitoring physician had been stationed in China or India, an even greater cost savings may have been possible.

190. Id. at 34.
better ICU outcomes are achieved if remote intensivists telemetrically monitor ICU patients compared to ICU care provided solely by residents or on-call physicians. However, Dr. Breslow’s actual study design did not provide for round-the-clock monitoring. Therefore, Dr. Breslow’s study stops short of measuring the true benefits of eICU care. If there is really a benefit having ICU patient care remotely monitored by specialists, such supervision should be on a round-the-clock basis.

Dr. Breslow’s study design undoubtedly reflects the economic realities of providing continuous round-the-clock coverage. Such comprehensive monitoring of patients rarely occurs in America because so few physicians are able and physically willing to provide coverage on the third shift. One solution to this physician-labor dilemma would be to hire intensive care specialists living in a time zone eight hours ahead of or behind America.\footnote{See infra III.D.} In this way, the local fully-trained intensivists would provide patient care on the first and second shifts while an offshore physician would provide oversight coverage on the third shift.

Admittedly, if we were to move to such a health care delivery model for eICUs, the telecommunication systems employed would have to be capable of handling the large volume of continuous digital data generated by ICU patients. High volumes of continuous digital data, in turn, are associated with some logistic and technical problems, including the need for dedicated telecommunications links, which are not always readily available,\footnote{Military Using Telemedicine, CHI. TRIB., May 10, 2004, at C17.} and dealing with providers who frequently are not set up to handle electronic medical records, let alone major telemedicine data interfaces.\footnote{Melanie Warner, Under the Knife, BUSINESS 2.0 Jan./Feb. 2004, at 84-88 (only 20% of hospitals have electronic medical record systems); Milt Freudenheim, Many Hospitals Resist Computerized Patient Care, N.Y. TIMES, April 6, 2004, at C1 (only a few of non-governmental hospitals used on-line ordering of hospital pharmaceuticals); INST. OF MED., HEALTH PROFESSIONAL EDUCATION: A BRIDGE TO QUALITY (2003) (health care professionals have not kept up-to-date with technology and management innovations).} Accordingly, we will need more than a favorable wage-benefit differential and a large contingent of English speaking physicians in Beijing and Calcutta before American eICUs are routinely staffed on the third shift by offshored physicians.

Yet the current logistical and technical problems faced by telemedicine are likely to disappear as health care providers around the world embrace technology for electronic storage and transmission of patient-specific data. That is, the logistical and technical problems associated with telemedicine are solvable. Moreover, these problems are likely to be solved sooner rather than later because providers are already being given incentives, in the
form of a competitive advantage in the market place, to adopt telemedical technology.\footnote{194} For example, given that the cost of electronic data storage is falling rapidly,\footnote{195} it is estimated that all-digital hospitals will be able to reduce their operating expenses by twenty percent when compared with a traditional hospital that does not employ telemedical technology.\footnote{196} Given such projected cost savings, it is not surprising that in 2001, HealthSouth broke ground to build the first all-digital hospital.\footnote{197}

D. Teleradiology: The Model for Imaging Physicians\footnote{198}

An important aspect of the all-digital hospitals will be their teleradiology capabilities. Because all-digital hospitals will be able to store and transmit electronic images, they will be in a position to hire physicians willing to work for lower wages and benefits in exchange for the freedom to interpret radiographic images from anywhere in the world.\footnote{199} That is, in five to ten years, hospitals will likely be in a position to choose whether they receive their radiology support staff locally or from overseas. Although all-digital

\footnote{194} Once data is stored and transmitted electronically, telemedicine and the ability to offshore medical jobs are only a half-step away.

\footnote{195} Matthew Maier, A New Dimension in Storage, BUSINESS 2.0, Nov. 2003, at 34 (discussing how three dimensional holographic storage techniques will vastly expand the storage capacity of two dimensional DVD technology, thereby lowering the costs for storing data).


\footnote{197} HealthSouth, Oracle to Build Groundbreaking Digital Hospital, PR NEWSWIRE, Mar. 26, 2001 (given HealthSouth’s current legal problems, it is unclear if this all-digital hospital will come to fruition).

\footnote{198} Herein only teleradiology is discussed. However, with minor modifications to this discussion, the points raised concerning the practice of radiology in cyberspace apply equally to any branch of medicine that is primarily concerned with the evaluation of images or the evaluation of clinical data that can be reduced to an image format. These branches of medicine are all ripe for exportation via telemedicine, including dermatology, see R. Wooton et al., Multicenter Randomize Control Trial Comparing Real Time Teledermatology with Conventional Outpatient Dermatologic Care, 320 BRIT. MED. J. 1244 (2000); ophthalmology, see Laurie Barclay, Telemedicine May Improve Screening for Diabetic Retinopathy, Diabetes Care, 25 MEDSCAPE 1384 (2002); and pathology, see B.H. Williams, The AFIP center for telemedicine application—pathology for the twenty-first century, 3 TELEMED. VIRTUAL REAL. 64 (1998). Herein this discussion also contemplates that some endoscopy procedures are going to be supplanted by innovative radiology techniques thereby rendering those endoscopy procedures obsolete. J. Perry et al., Computed Tomographic Virtual Colonoscopy to Screen for Colorectal Neoplasia in Asymptomatic Adults, 349 NEW ENG. J. MED. 2191 (2003) (discussing how some radiologic imaging techniques are equivalent to endoscopic examinations).

\footnote{199} In addition to reading films, radiologists also supervise radiology technicians. Herein, the focus is on the radiologists as film interpreters. But as radiology services are increasingly provided by physician extenders there is no question that supervisory positions in radiology can be exported. See 80-Hour Work Week, supra note 7.
hospitals are not yet commonplace, three economic forces are driving traditional hospitals to purchase their radiology services from overseas providers. The first factor is the magnitude of the wage-benefit differential that exists between American and foreign radiologists. After all, why would anyone pay an American radiologist $350,000 per year "if they [could] get a cheap Indian radiologist for $25,000 [per year]."  

The second factor concerns the perception that a shortage of radiologists exists in this country. This perceived shortage allows radiologists to demand high fees for work done on the first and second shifts, and even higher fees if they work the third shift. Thus, providing in-house radiologist coverage on the third shift is cost-prohibitive for most hospitals in this country. Hospitals could solve this problem by purchasing radiology services from foreign vendors.  

The effect of physicians' inability to access offshore medical employees is unclear; any shortage of radiologists may be more apparent than real because the American medical community tends to over-utilize radiology services. If radiographic images were ordered as a result of evidence-based indications, as recommended by clinical guidelines, fewer imaging studies would need to be performed and thus, fewer radiologists would be needed. Radiologists benefit from the perception that they are in short supply. A shortage of radiologists, whether real or perceived, allows radiologists to receive premium remuneration.  

The third factor driving the exploration of teleradiology services is the patient safety revolution. Because few radiologists are available between 11 p.m. and 7 a.m. to interpret the radiology films of patients with medical emergencies, some quality-minded radiology groups have come up with unique solution for providing continuous coverage that is tantamount to offshoring. Yet this protocol avoids many of the licensing and visa concerns that are typically raised in legal discussions of telemedicine. The groups rotate a fully licensed, board certified radiologist to Europe in order to exploit the time difference. For example, a group of radiologists in Sacramento that wishes to provide round-the-clock service by a well-rested physician may send a different radiologist to Spain every few months. Because Spain is eight time zones ahead of Sacramento, the radiologist can


202. See Sara Schaefer Munoz, Additional Reader for Mammograms Is Urged by Study, N.Y. TIMES, June 11, 2004, at B4 (noting that if physician assistants were trained to interpret mammograms as some recommendations suggest, it would "help offset a shortage of radiologists and keep up with demand for breast imaging").
read the x-rays created by the third-shift technicians in Sacramento in real
time.\(^{203}\) In essence, the Sacramento radiology group has opened a Spanish
radiology suite to provide radiology coverage services to Sacramento
patients at night.

This is a clever, progressive solution to a difficult health care delivery
dilemma. Yet, it begs the question: when will the Sacramento radiology
group completely relocate its third shift operation offshore and hire a
Spanish radiologist to take the place of the rotating American radiologist?
The short answer is that no one knows for sure because of the multiple
factors that must be contemplated. However, it seems reasonable that the
Sacramento group will hire Spanish radiologists for their Spanish radiology
suite when the transaction costs of rotating American radiologists to Spain
exceed the cost to license and credential new Spanish radiologists.\(^{204}\)

For many high-volume hospital systems in America, opening a Spanish
radiology suite may be an ideal solution for providing cost-effective
radiology services on the third shift. Unfortunately, this solution is not
available for low-volume hospitals because it would not be cost-effective to
relocate American radiologists to Europe on a regular basis. For these low-
volume hospitals, an offshore radiology industry has already come into
existence to meet their radiological needs. The apparent leader in this
industry is Teleradiology Solutions, an Indian corporation that provides
overnight radiology coverage for “30 hospitals in the U.S. including
California, Georgia, Indiana, Massachusetts, Minnesota, Texas, [and]
Washington.”\(^{205}\) Teleradiology Solutions boasts that its board-certified
radiologists will provide reports for “Computed Tomography, MRI,
ultrasound, X-Ray, nuclear medicine studies and conventional plain films
(digital format) with a turn around time of under 30 minutes for a
transcribed faxed report.”\(^{206}\)

This suggests that because an Indian vendor can provide board-certified,
third-shift radiologists so cheaply, American hospitals may hire

\(^{203}\) Chin, supra note 141; see also Pollack, supra note 128, at 31.

\(^{204}\) Another wrinkle in such calculations is just how much money should be paid to the
radiologists in Spain. The cost-of-living in Barcelona, Spain is less than it is in major
American cities, including New York, Chicago, San Francisco, and Miami. See Mercer
popup.html (last visited Mar. 28, 2005). Thus, an employer who deploys a radiologist in
Spain could argue that remuneration for the radiologist in Spain does not need to be set
according to an American cost-of-living.

\(^{205}\) Vijaya, supra note 130.

\(^{206}\) Id. Still, as critics of Teleradiology Solution have pointed out, how do you insure
quality when your vendor is “8,000 miles away?” Lindsey Tanner, Global Telemedicine on
Call for U.S. Hospitals, CHI. TRIB., Dec. 6, 2004, at 14. While a fuller discussion of quality
insurance for offshoring medical services is important, it is beyond the scope of this article.
Teleradiology Solutions for all of its radiological needs. Certainly if Teleradiology Solutions could provide board-certified physicians in other time zones, it may become a formidable economic force in the American health delivery system. In short, while America is presently only flirting with offshoring primary care medicine, it is offshoring significant numbers of radiology positions.

E. Cybersurgery: The Model for Interventional Physicians

Thus far, this article has focused on diagnostic telemedicine, including primary care, intensive care, and radiology. Once a diagnosis is made, a treatment decision logically follows, which generally includes a combination of drug therapy, diet manipulation, and perhaps exercise modifications. Conceptually, in order for an offshore physician to treat those patients who have chronic diseases, who are relegated to the ICU, or who have recently undergone an imaging study, he must simply telephone the patient or his caregiver with a prescription for medicine, diet or exercise. To the extent that there will be any barriers to the remote management of medical patients over the next five to ten years, it is reasonable to assume that these barriers will largely be regulatory, relating to licensure and scope of practice compliance, for example. 207

Existing technology is sufficient to export primary care workers, intensivists, and radiological staff. But exportation of surgical jobs would seem to be an unlikely prospect for exportation overseas because of the physical proximity required between surgeon and patient. However, robotic surgical technology has advanced to a point where even surgical jobs are likely be offshored in the next five to ten years. 208

207. In general, states require full licensure for a physician to provide telemedical services. Waters, supra note 176 (nineteen states specifically require full licensure to practice telemedicine, and three others require full licensure by policy). A total of twenty-seven states require, by enactment, regulation, or policy, a physical examination of the patient before prescribing medication. Id. See also Wendi Johnson, Telemedicine: Diagnosing the Legal Issues, in HEALTH LAW HANDBOOK 3:4 (Alice G. Grosfield ed., 2001) (listing the requirements for telemedicine as “full licensure”). However, only FSMB’s model act for medical licensure and six states require telemedical providers to have special purpose licenses, which are limited licenses that allow a physician to practice in a state if certain conditions are met. See Waters, supra note 176; Ala. (ALA. CODE § 34-24-500 to 508 (2002)); Del. (140th Leg., Gen. Assembly (2000)); Mont. (S.B. 241, H.B. 399, Reg. Sess. (1999)); Or. (S.B. 600, 70th Leg., Reg. Sess. (1999)); Tenn. (TENN. COMP. R. & REGS. 0880-2.16 (2002)); and Texas (22 TEX. ADMIN. CODE § 174.3 (2002)).

208. This discussion contemplates that cybersurgery includes general and thoracic surgery. However, given that simulator training is being developed for many cardiologic and invasive percutaneous radiologic procedures, it is only a matter of time before these procedures are preformed remotely by telemedicine. Simulator Making Major Inroads into Medical Training, 31 CARDIOLOGY 1-4 (2002) (discussing the use of to simulator to teach management strategies during cardiac catheterization).
In 2000, the Food and Drug Administration (FDA) gave Intuitive Surgical approval to place its *da Vinci* Surgical System™ (*da Vinci*) on the market. The instrument "allows the surgeon to sit at a console and control, in real time, via InSite™ Vision, two articulating robotic arms that respond in a fashion similar to a surgeon’s hands." It "substantially advances the technology of minimally invasive surgery far beyond current instruments on the market" and "allows the surgeon . . . to be positioned remote from the patient undergoing the operation."

One year after the *da Vinci* entered the market, Dr. Jacques Marescaux, Chairman of the Department of Digestive and Endocrine Surgery at the University of Strasbourg, used a similar robotic machine and a dedicated telecommunication link to perform "Operation Lindberg," the world’s first transoceanic surgical operation. During the procedure, Dr. Marescaux, who was in New York City, successfully remove the gallbladder of a patient in France, four thousand miles away. Although Dr. Marescaux was the first to perform the Lindberg procedure, German and Japanese investigators soon repeated his results by also conducting successful surgeries.

Interestingly, Canada has become the country that has most wholeheartedly embraced and developed cybersurgery. In 2004, the Canadian government opened the “Centre for Minimal Access Surgery” (CMAS) in Hamilton, Ontario in order to extend the “availability of minimal invasion surgery to Canadians living in remote areas.” A preliminary report on the success of CMAS reported that the cybersurgery center performed twenty-two intra-abdominal procedures on patients located in North Bay, Ontario. Thus, cybersurgery is no longer an...
intellectual novelty, but rather it has become a legitimate technique for treating patients.

By moving cybersurgery from the backburner of prototypical demonstrations to actual clinical usage, the Canadians have stepped to the forefront of cybersurgery. This advancement was a missed opportunity for American surgeons because our country lacked interest in entering the cybersurgical field. While the Canadians have not shown any interest in using the CMAS to move into the U.S. surgical market, offshoring U.S. surgical business to Canada could become a reality if the economics become favorable.

F. Bottom Line: The Practice of Medicine is Already Being Exported

In the late twentieth century, well-paid blue-collar workers learned a harsh economic reality: corporate America was willing to export high paying jobs to improve its bottom line. White-collar workers, who initially believed that the greater educational requirements for their positions meant that their jobs were not exportable, discovered that powerful economic forces could drive their jobs overseas. Now, as this overview of telemedicine has demonstrated, the medical community stands on the threshold of learning that their jobs have no immunity to the economic forces that move jobs across oceans to exploit cheaper labor markets.

The offshoring of American jobs, including medical jobs, occurs when the expenses associated with exportation are offset by profits recovered by operating in a foreign country over time. That is, before a job is exported, a company must determine when the break-even point occurs. The break-even point can occur after only a few months where, for example, the start-up costs are minimal and the wage-benefit deferential is large. Or, a company may break even after many years if the start-up costs are excessive and the wage-benefit deferential is minimal. In the blue- and white-collar worlds, that figure can be calculated fairly easily because start-up costs, on-going operational costs, the wage-benefit deferential, and

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217. “America is falling behind the rest of the world in telemedical expertise.” McLean, supra note 32, at 522 n.155.

218. The outcome of this calculation varies over time. For example, exportation of jobs to China is currently favorable because neither Chinese businesses nor the Chinese government provides medical benefits. See Michael A. Lev, In China, No Money Means No Treatment, CHI. TRIB., Nov. 12, 2004, at 4 (describing how people are literally dying in the street because they have no money to purchase health care). This means that as third-world lifestyles resemble those found in the U.S., some form of insurance or health benefits program will need to be established. Id. Accordingly, such a paradigm shift in the third world will change the calculus for determining whether offshoring remains economically reasonable.
liabilities are all known or can be reasonably estimated.

However, calculating the break-even point for the offshoring of medical jobs is tricky. While the start-up costs, on-going operational costs, and the wage-benefit deferential associated with telemedically-performed medical services are known, the liability associated with providing telemedical services is largely unknown, complicating the computation. In fact, the volume of American health care jobs that are being exported is inversely related to the perceived liability risks. Currently, the most frequently exported medical jobs involve backroom operations and radiology. Offshoring these types of jobs has relatively low risk: they primarily attract liability for loss of data and breach of patient confidentiality. While HIPAA penalties can be severe for breach of patient confidentiality, these risks can be minimized if proper safeguards are taken.

On the other hand, medical monitoring of patients, via DM in the outpatient setting or via eICUs for in-patients, is associated with moderate risk. These types of telemedical services not only carry the risk of breach of confidentiality, but also the risk of telecommunication interruption and negligent telecommunication signal transmission, which can be significant risks for some telemedical providers. However, exposure to such liability tends to be minimized by the fact that multiple providers are required to be involved in an offshore medical monitoring transaction. Thus, demonstrating causation in a malpractice action would be difficult. The exposure to malpractice liability is greater for practitioners who use technology like DM or work in eICUs, as opposed to practicing radiology. Thus, it is not surprising that DM and eICUs are only now exploring telemedicine.

Additionally, cybersurgery carries a considerable threat of tort liability due to the immediate risk of significant bodily injury. Moreover, it is easier to prove causation against the individual providers in cybersurgery malpractice cases because the injury is more clearly caused by the physician's error. The risk of tort liability is likely the reason that only one country, Canada, has entered the cybersurgical field.219 Clarifying the liability issues concerning cybersurgery will stimulate the offshoring of surgeries.

219. An interesting question would be whether the Canadian government has granted CMAS immunity from medical malpractice. When CMAS was contacted for this article, they declined to comment in writing on their immunity status. A search of Lexis's Consolidated Statutes of Canada and Consolidated Statutes of Ontario returned no hits for a search of “CMAS or Centre for Minimal Access Surgery.”
IV. CIVIL PROCEDURE AND LIABILITY ISSUES

A discussion of tort liability for offshoring medical jobs at this juncture is premature because a court must first have jurisdiction to find tort liability. A traditional civil procedure analysis of cyberspace jurisdiction should begin with a determination of whether the defendant engaged in purposeful "minimum contacts," and whether a long-arm statute exists such that traditional notions of fair play would not be upset by bringing a defendant into the court to answer for the alleged wrong-doing.\(^{220}\) In contrast to the physical world, however, cyberspace relationships raise several novel nuances in the minimum contacts analysis, such as whether the "inconvenient forum" doctrine is applicable.\(^{221}\) In prior analyses of minimum contacts with respect to cyberspace, it was generally assumed that liability was being assessed against a domestic defendant. That is, prior cyberspace minimum contacts analyses have, for the most part, assumed that the court was in the U.S. and the defendant was a U.S. citizen. But when contemplating the tort liability of an offshore medical provider, such an assumption is not appropriate.\(^{222}\)

A. International Jurisdiction

Before a foreign medical provider can be held liable in the U.S., an American court must determine whether international law grants that court jurisdiction over the foreign provider.\(^{223}\) Although a detailed discussion of international law is beyond the scope of this article, the short answer to this question is that international law is unsettled as to whether a U.S. court has jurisdiction over an offshore provider.\(^{224}\) In part, this is because international law as applied to telemedicine "is complex and disjointed, as it is composed of pockets of law that are only linked together by these

\(^{220}\) Int'l Shoe v. Wash., 326 U.S. 310, 316-17 (1945); see also Gulick, supra note 91, at 205-06, for a detailed discussion of minimum contacts with respect to cyberspace.

\(^{221}\) Volker, supra note 68, at 186-87.

\(^{222}\) In the discussion that follows, it will be assumed that the court is located in the U.S. and the health care provider is located offshore.


technologies and applications.\textsuperscript{225} In part, international law concerning telemedicine is unsettled because the nascent telemetrical industry is too small to have attracted much international attention, especially as compared to trade in steel or semiconductors. Hence, the law is lagging behind technology.\textsuperscript{226}

In a recent review of how international law impacts telemedicine, Professor Blum observed that there are no international agreements concerning telemedicine.\textsuperscript{227} This observation undoubtedly reflects the fact that the fundamental purpose of international trade agreements is to facilitate the movement of goods and non-medical services across international boarders.\textsuperscript{228} Consequently, telemedical commerce has generally fallen outside of the scope of international agreements. To the extent that telemedicine is covered in international agreements, it is covered only collaterally as it falls within discussions of confidentiality, intellectual property, and telecommunication standards.\textsuperscript{229} Unfortunately, the result is that the key tort liability laws, i.e., malpractice and insurance law, have been neglected in most international agreements.\textsuperscript{230}

Still, progress is being made on the application of international civil procedure to offshore medical malpractice. Malaysia recently became the first and only country to have "enacted a generic telemedicine law, covering licensure, informed consent and telemedicine standard development."\textsuperscript{231} Additionally, the General Agreement on Trade in Services (GATS) is the first multinational agreement to establish legally enforceable rights to trade in all services.\textsuperscript{232} In particular, GATS covers: "all services except those provided in the exercise of government power."\textsuperscript{233}

Regional trade agreements allow more opportunity to specifically address telemedicine. For example, the North American Free Trade

\textsuperscript{225} Id. at 110.
\textsuperscript{226} See Rustad & Koenig, supra note 9, at 77-78.
\textsuperscript{228} Id. at 85.
\textsuperscript{229} Id.
\textsuperscript{231} Id. at 97.
\textsuperscript{233} Id. at 91.
The Offshoring of American Medicine

Agreement (NAFTA)\textsuperscript{234} has a chapter that covers professional services, which appears to contemplate telemedicine. However, NAFTA's professional services chapter contains an opt-out provision,\textsuperscript{235} which, interestingly enough, was exercised by the Canadian government.\textsuperscript{236} Professor Blum speculated that the Canadians may have opted out of the professional services chapter because of fears that "for-profit American health care entrepreneurs" would move into Canada and siphon health care reimbursement away from Canadian providers.\textsuperscript{237} Subsequent to the publication of Professor Blum's article, Canada successfully launched its Centre for Minimal Access Surgery (CMAS) suggesting that perhaps the real reason Canada opted out of NAFTA's professional service chapter was to protect its inchoate cybersurgical industry.

Another important regional trade agreement that impacts the offshoring of medical jobs is the European Commission's Directive to Establish a Legal Framework for the Development of Electronic Commerce.\textsuperscript{238} Under this agreement,

the place of business for an Internet company is where the physical premises are located, as well as the possibility of concluding contracts on-line or the removal of rules requiring that contracts be drawn on paper. Also, the directive adopts the "mere conduit" rule for information intermediaries, which minimizes liability for passing on or storing information unless actual knowledge can be shown.\textsuperscript{239}

Thus the Commission's directive has important implications for further tort liability.

In short, while a number of regional international trade agreements give some indication as to whether a U.S. court may have jurisdiction over a foreign telemedical provider, we are far from a consensus opinion. Thus, jurisdictional issues alone will leave telemedical providers with significant uncertainty on their cyber-malpractice exposure. But even if these jurisdictional issues are resolved substantial uncertainty would still remain as to the applicability of negligence law to foreign telemedical providers.

\textsuperscript{236} Blum, supra note 224, at 92.
\textsuperscript{237} Id.
\textsuperscript{238} Id. at 95-96.
\textsuperscript{239} Id.
B. Negligence by Offshore Physicians

The Institute of Medicine (IOM) is undoubtedly correct that the addition of telecommunication technology to the practice of medicine in the form of electronic medical records and electronic outreach programs to rural America will improve health care quality overall. Yet, the introduction of new technology into the marketplace creates its own set of problems, which can remain dormant for long periods of time before a technological bug triggers a disaster. Perhaps one of the most significant differences between the "real" world, with its purely mechanical machines, and cyberspace, with its intangible electronics, is the unexpected ways harm to third parties arises in cyberspace. Unlike in the "real" world, machines in cyberspace can cause harm to third parties because of the effects of electromagnetic interference, hacking, and computer viruses, even if the machines are otherwise non-defective and properly maintained. In short, while telemedicine will bring a lot of good, it will also virtually guarantee that cyber-malpractice litigation will be more complex due to the substantial differences between the real and cyber worlds.

So if America is already exporting medical jobs, why have we not yet heard about a salacious case of cyber-malpractice committed by a foreign physician? There appears to be at least three answers to this question.

240. See Patient Safety, supra note 110, at 45-47.
241. See To Err Is Human, supra note 109, at 13.
243. Jube Shiver, Jr., Traffic getting jammed in wireless world, Chi. Trib., Nov. 8, 2003, at 3. However, electromagnetic interference with medical devices has diminished since 2000, when the government reserved a specific broadband frequency for medical use. See the FDA Center for Devices and Radiological Health’s website at http://www.fda.gov/cdrh/safety/emimts.html (last modified July 11, 2000).
244. Mitnick, supra note 157, at 4 (noting that some hacking is facilitated by the computer’s owner-operator); Dawn Fallik, Security Doesn’t Have To Be Such A Problem on Wireless, Chi. Trib., May 8, 2004, at C4 (discussing the use of virus protection and firewalls as a means of substantially decreasing hacking).
246. Cybersurgery, supra note 6, at 179-80.
First, at present, we are offshoring only low risk medical jobs. When a third-world vendor makes an error in transcription or billing, patients are not physically harmed, so there is less support for a malpractice claim. Similarly, because treating physicians generally review radiographic images themselves, diagnostic radiologists rarely harm patients. And even when a radiologist does cause harm to a patient, his liability is often cut off by the actions of a treating physician.\textsuperscript{247}

Second, if medical jobs are exported, the delivery of health care becomes more complex. In the traditional practice of medicine, adverse outcomes generally arise through one of two phenomena: the natural course of disease or physician error. As there are only two possibilities, the causal analysis of an adverse event is fairly straightforward. On the other hand, when a patient is injured by an offshore provider, there are several additional causes of adverse outcomes, such as robotic machine defects, telecommunication link failures, and unrelated third-party hackers and saboteurs.\textsuperscript{248} As a corollary, multiple causes suggests that cyber-malpractice will likely involve many defendants. Multiple defendants, in turn, means that medical malpractice litigation concerning medical care delivered by an offshore provider is likely to degenerate into "finger pointing" cases, which tend to settle out of court.\textsuperscript{249} Because no opinion is generated and the settlement agreements almost always contain confidentiality clauses, finger pointing cyber-malpractice cases remain off-limits to the public.

The third reason cyber-malpractice is not yet a matter of public discussion on the radar screen has to do with legal lag time.\textsuperscript{250} This phenomenon appears to have been first described by former President Nixon early in his career.\textsuperscript{251} In 1936, Nixon observed that over the course of a generation, automobile liability law had exploded. Immediately after the automobile was introduced, a comprehensive review of automobile liability could have been compiled in a four page document; by the 1930s, that review would require an encyclopedia.\textsuperscript{252} The point of Nixon's argument was that it takes the legal community a measurable length of time to comprehend and digest new technology before it begins to regulate that

\textsuperscript{247} This is not to say that radiologists cannot be successfully sued. \textit{See} McLean, supra note 134, at 1672-79.

\textsuperscript{248} \textit{Cybersurgery,} supra note 6, at 179-97. Herein no attempt is made to clarify the nature of the actions against the defendants, which may include simple negligence, malpractice, or products liability.

\textsuperscript{249} \textit{Id.}

\textsuperscript{250} Rustad & Koenig, supra note 9, at 77-78.


\textsuperscript{252} Rustad & Koenig, supra note 9, at 77-78.
technology under tort law.  

Legal lag time appears to occur in the field of telemedicine and more generally in computer technology. In a recent review of computer technology, Professors Michael Rustad and Thomas Koenig failed to identify any cases of computer malpractice. Rustad and Koenig also expressed surprise that no court has yet found medical malpractice liability arising out of an online consultation, given the “widespread adoption” of telemedicine in this country. Traditionally, “[c]ourts have been wary of extending professional standards of care to medical web sites, medical software licensors, or other purveyors of information-age health products.” Thus, it seems reasonable to conclude that tort liability associated with the exportation of medical positions via telemedicine is still in the “lag” phase.

Philosophically, whether tort law should be applied in cyberspace is another issue. Tort law as we know it was largely developed to deal with accidents in the Industrial Age. Thus, applying tort law in the Age of Information should be questioned as it may have unintended consequences. As noted elsewhere, telemedicine is fundamentally changing the nature of the physician-patient relationship. Professor Nicholas Terry observed that if the traditional physician-patient relationship has been altered, it may no longer be fair to apply traditional medical duties to offshore physicians.

To illustrate, consider the standard of care issue as it is applied to offshore physicians. Even within America, the standard of medical care varies from state to state. Concern over the proper standard of care will

255. Rustad & Koenig, supra note 9, at 136.
256. Id.
257. LAWRENCE M. FRIEDMAN, A HISTORY OF AMERICAN LAW 467 (2d ed. 1985) (positing that in the Age of Information, the law of torts “must be laid at the door of the industrial revolution, whose machines had a marvelous capacity for smashing the human body”).
258. See supra Part III.B.
259. See Terry, supra note 180, at 341. However, even without telemedicine, the Age of Information is altering the nature of the doctor-patient relationship. A good illustration of this is direct-to-customer advertising by which drug companies attempt to bypass the physician and market their products directly to the patient. Under these conditions, some courts have questioned whether drug companies are entitled to the learned intermediate defense in products liability actions. See Perez v. Wyeth Laboratories, 734 A.2d 1245, 1246 (N.J. 1999).
be magnified in cases where medical care is provided by an overseas provider because state-of-the-art medical care in some sections of India or China may be substandard care in the U.S. Further, it has been argued that telemedical providers owe their patients a higher standard of care than face-to-face providers because telemedical providers must understand the limitations of telecommunication technology in addition to the limitations of medical care. It is important to note that a deviation from the standard of care may be due to a software glitch, which may be very difficult to prove. Thus, we are a long way from having a consensus opinion on the standard of telemedical care in cyberspace.

Still, it is unlikely that we will totally jettison our centuries’ old system for providing compensation to victims of negligence in cyberspace. Even if we were to eliminate tort law from the health care arena, many principles of tort law would still be identifiable and operative. Thus, while the degree of duty, standard of care, and causation owed by an offshore physician to patients in this country are likely to be debated for sometime, how we actually analyze a particular legal situation and identify the dispositive factors is not likely to change. While there are few rules to guide the liability analysis for adverse events at present, in ten to twenty years an encyclopedia will probably be needed to store the rules of cyber-malpractice.

In the mean time, American jurisprudence on telemedical liability will remain in limbo. Yet, because the offshoring of medicine is both technology dependent and operationally complex, medical job exportation will not occur in isolation, but will likely require the development of new sophisticated international business organizations. Because business

4, 2002, available at http://www.ama-assn.org/amednews/2002/11/04/bise1104.htm; see also Ill. Dep’t of Prof R Regulation, supra note 176, at 10 (finding that an Indiana-based physician consulting and pharmacy service website cannot sell its services telemedically in Illinois because the company’s practice for controlling its drug supply, based on Indiana regulations, did not comport with Illinois’s more stringent standards).

261. Cybersurgery, supra note 6, at 184-85.

262. Not only can it be difficult to find a bug in a software program, the software program may not have been created by a human. Sudha Nagaraj, Software Reuse: Why Reinvent the Wheel?, COMPUTERS TODAY, May 15, 1999, at 94 (discussing how computer-assisted software engineering tools have automated computer programming so that a computer program writes a computer program).

organizations prefer not to operate in a legal limbo, the first international telemedical providers will want to define the legal boundaries of liability. Because of the potential profit, these forthcoming telemedical providers will be pushing to minimize the legal lag time associated with telemedicine. In this regard, Professor Terry has already articulated a set of factors that must be addressed by international telemedical providers to minimize the legal lag phase of telemedicine:

First, the history of e-health illustrates the way that health care in the United States has devalued patient expectations and access to care while over-investing in processes and technologies that serve the few. Second, e-health provides a rich source of examples revealing the transformation of health law away from an increasingly marginalized doctrine rooted in professional and personal paradigms. Third, e-health provides a disruptive model, particularly in its most recent iterations, that can be used to shake out otherwise dormant issues of law and policy. 264

Lurking in the background of all of Professor Terry’s factors is the concept that patient alienation is fodder for cyber-malpractice suits. Consequently, it is likely that institutional international telemedical providers, who presently would not be protected by medical malpractices caps, 265 would want to define cyber-malpractice so as to minimize their exposure to liability. This suggests that compensation for patient alienation will need to be minimized in cyber-malpractice actions. Also, business organizations that want to enter the telemedical market will want to enter the market early to secure market share and lobby the government to minimize their own liability. 266 All of these actions will tend to limit the legal lag time associated with telemedicine.

There is one more factor that will work to minimize the legal lag phase of telemedicine. When the American telemedical providers approach the government to enact laws defining their liability, they may soon find that the government is willing to listen. To protect American health care jobs and preserve American hegemony in health care, as will be discussed in the next section, the government will want to nurture and develop telemedicine. To accomplish this goal, the government will have to grant telemedical

266. Except for the fear of financial loss, nothing prevents American telemedical companies from getting into the offshoring business. In fact, a market already exists for any American telemedical provider who wants to enter the field because European hospitals that are concerned with patient safety and avoiding medical errors caused by sleepy physicians would logically want to hire Americans who would voluntarily provide medical coverage for Europe’s third shift. See 80-Hour Work Week, supra note 7.
providers a stable regulatory lattice that minimizes their exposure to tort liability.

V. THE FUTURE: THE BEST DEFENSE IS A GOOD OFFENSE

There is more to business life than issues of liability; so far, this discussion of offshoring medical jobs via telemedicine can be criticized because it atomizes the subject matter. Analyzing the offshoring of medical jobs by dissection of its components (e.g., regulations, costs, state-of-the-art technology, and liability) was done to facilitate the discussion of the current place and future of telemedicine. Yet, in life it is not the parts that matter, it the whole. Thus the most appropriate view for society to analysis the offshoring of medical jobs via telemedical technology is in toto. To measure the impact of telemedicine on society in toto, an appropriated standard is needed. Fortunately, when it comes to our health care delivery system, the “Iron Triangle;” i.e., access to care, quality, and cost, has become the recognized standard to determine health care quality.267

When telemedicine is assessed against the back drop of the Iron Triangle not only does it appear that telemedicine will improve the quality of health care, but such an analysis also suggests that if America wants to preserve its medical jobs, it must embrace telemedicine and minimize the associated legal lag period. In particular, if America is to regain its hegemonic position in telemedicine from the Canadians, America should aggressively invest in and build the best quality telemedical systems for remote non-urban areas so that these systems can be franchised throughout the world.268

A. The Iron Triangle and Telemedicine

The Iron Triangle, originally a term used to describe an unholy alliance between the military, government, and corporate America during the Cold War,269 refers to the concept that excellence in health care is not determined by access to care, quality, and cost individually. Rather, excellence in health care is a function of all three variables.270 The Iron Triangle framework for evaluating health care technology means that we should not look at telemedicine merely as an innovation that will lead to the loss of

268. While many health care providers may have aesthetic objections to following the McDonald’s corporate model, that is the basic strategy being proposed here.
269. DAN BROIDY, THE IRON TRIANGLE, at xxvii (2003). On leaving office, President Eisenhower warned America of the “grave implications” of business transactions between corporate America, the military, and the federal government. Id.
America jobs. Rather, the proper analysis for the value of telemedicine is to examine costs and impact on quality and access to care for the country. Although telemedical up-front costs are of concern, in the long run, telemedicine will improve access to care and quality of medical care in this country.

1. Access to Care

Of the three corners of the health care Iron Triangle, telemedicine scores highest in improving access to care. Millions of Americans live in rural regions far away from high quality, full-service health care providers, let alone from state-of-the-art tertiary care medical centers. In fact, improving access to high quality, full-service health care providers by eliminating travel logistics is the raison d'être for developing telemedicine. The notion that telemedicine improves access to medical care is so strong that most studies on the impact of telemedicine have simply assumed this to be true. Furthermore, it seems telemedicine’s ability to improve access to care is accepted worldwide, as even some of the poorest third-world countries are investing their scarce resources in improving access to medical care for their citizens by building telemedical systems.

2. Quality of Care

Quality of medical care, like beauty, is in the eye of the beholder. In this regard, it is useful to consider some of the more frequently used methods to assess quality of medical care. Presently, the preferred method to determine quality of care is to measure patient satisfaction because it is cheap and easy to measure. However, use of patient satisfaction surveys may not be the most appropriate means of measuring telemedicine quality administered by offshore providers because of the changing nature of the doctor-patient interaction and decreasing patient expectations.

In reality, quality of medical care is increasingly determined by the guideline method. According to the Institute of Medicine (IOM), a provider’s compliance with existing clinical guidelines is the best indicator of quality medical care. By this method, one measures quality patient care by determining how often the provider deviates from the clinical guidelines.

271. Smolensky, supra note 76, at 398.


273. Smolensky, supra note 76, at 393; supra section II.B.2.

274. Ellison, supra note 130; supra section II.B.2.

275. PATIENT SAFETY, supra note 110, at 5-6.
practice guidelines. Under this system of analysis, the best providers are those who follow the guidelines; accordingly, these providers neither over nor under prescribe medical care. On the plus side, using guideline compliance as an index to quality medical care is desirable because it is an objective standard that is publicized so that providers, patients, and payors all know what factors are being scrutinized. On the other hand, this method is undesirable because the parameters tested for quality are controversial, and sometime providers are merely changing their behavior to game the system.

Thus, we come to a fundamental problem in determining the quality of medical care: should quality of care rendered by a provider turn on the provider organization’s structure, function, or outcome? Because an organization’s structure has little to do with patients’ satisfaction of their clinical outcome, most commentators would not index quality of care to a provider’s business structure. Providers ideally would like to see quality based on outcome, but measuring outcome is expensive and controversial at both the design and analysis stages. Thus, while the functional approach to quality of care, i.e. compliance with guidelines, has its detractors, quality of care is most likely going to be determined by clinical guidelines. Guideline analysis is cheaper to perform, and although it is controversial with respect to the parameters chosen, it is less controversial when the data is analyzed. Moreover, the parameters used in guideline compliance analysis are likely to become less controversial as the government assists in developing methodologies to determine the most appropriate parameters of compliance for a particular clinical situation.

Regardless of the ultimate definition of what constitutes quality medical care, telemedicine will improve quality because of its audit trails. The IOM has long been a proponent of moving the country to electronic medical records, in part because the audit trails of electronic medical records will

276. Not only do definitions vary, but there is no agreement upon what should be identified and measured. Smolensky, supra note 76, at 390.
277. This is known as the Hawthorne Effect. See Stephen W. Draper, *The Hawthorne effect and other expectancy effects: a note*, Department of Psychology, University of Glasgow, at http://www.psy.gla.ac.uk/~steve/hawth.html#Hawthorne%20overall (last modified Mar. 28, 2005).
278. Because outcomes are what matter to patients, most patients would probably want quality indexed to outcome. Using outcomes analysis suffers because such studies are the most difficult to undertake, and the most expensive. As to cost matters, it should not be surprising that the IOM has come out strongly in favor of using the functional approach, i.e., compliance with guidelines, as the measure for quality. See *Patient Safety*, supra note 110, at 5-6.
facilitate the identification of medical errors. One of the reasons the IOM advocated strengthening medical examiner offices was to identify medical errors because so few hospitals have electronic medical records. Given that many cybersurgical operations, the most complex of all telemedical interactions, can be recorded in their entirety on a single CD-ROM disc, telemedicine offers a quantum step forward in medical record keeping.

In short, because telemedical audit trails will improve error analysis, it is reasonable to conclude that telemedicine will stimulate improvements in quality of medical care no matter how quality is ultimately determined.

3. Cost

Cost is an elusive concept in health care, perhaps even more than quality. Telemedical costs are nebulous because of the fuzzy initial costs and assessment of liability exposure. To illustrate, consider how a telecommunications provider is likely to view the telemedicine industry. Thus far, telecommunications companies have had only a passing interest in entering the telemedicine market. That is, while U.S. telecommunications will allow medical digital data to pass through their systems, no American telecommunication companies have shown any interest in partnering with providers to develop more sophisticated telemedical technology like cybersurgery. In contrast German, French, and Japanese telephone companies have demonstrated their willingness to work with providers to set up prototypical cybersurgery demonstrations. Because telecommunication companies face liability for telecommunication interruption if they become telemedical providers it is likely that they are

280. PATIENT SAFETY, supra note 110, at 6. Unfortunately, only 20% of hospitals use electronic medical records. See Warner, supra note 193, at 85; see also Freudenheim, supra note 193, at C1. Medical error analysis is needed for both guideline analysis and outcome studies of quality of care. Thus, regardless of how we ultimately define quality of care, error analysis will play a role.


282. See Warner, supra note 193, at 85; Freudenheim, supra note 193, at C1.

283. McLean, supra note 32, at 508.

284. I will concede the point that conceptually, America can move toward all-digital hospitals without having to develop telemedicine first. This, however, seems an unlikely scenario.

285. See McLean, supra note 32, at 524 n.155.

286. Under a traditional tort analysis, telecommunication companies probably face no liability for service interruptions in low-risk telemedicine services like teleradiology. McLean, supra note 32, at 501. However, I would argue that if a telecommunication company enters into partnership agreements with providers to deliver high-risk telemedical services like cybersurgery, imposing liability on telecommunication companies could be justified based on a change of circumstances and receipt of remuneration in excess of what is
waiting for the legal lag phase of telemedical liability analysis to pass before entering the market. By waiting, the telecommunication companies will better be able to calculate their exposure in cyber medical malpractice actions. As sophisticated telemedicine encounters are impossible without the telecommunications companies functioning as the links between patients and providers, \(^{287}\) it is unclear what they would ultimately charge for their services in this health care arena. \(^{288}\)

An additional figure that complicates the cost analysis of telemedicine is over what period of time the expenses should be amortized. \(^{289}\) As Professor Henry Hazlitt notes, most economic analyses provide misleading results because they are not carried out over sufficiently long time horizons. \(^{290}\) Thus, telemedicine may appear to be cost prohibitive if one considers only the first few years of operation. Also, the cost-prohibitive nature of telemedicine is related to the perception that telemedicine is more of a novelty than a clinical tool. But as the above survey of telemedicine indicates, it is probably only a matter of time before many medical services are purchased from quality cost-efficient overseas vendors. However, it is also true that the long-run analysis of telemedicine is complicated by the nature of the assumptions that need to be made. For example, some assumptions need to be made concerning reimbursement, which varies with geographic location. \(^{291}\) But whether reimbursement rates in geographic areas remain stable regardless of the relatively long period of time it takes to get a telemedical system up and running is an open question.

Even if the initial costs are high and the long-run analysis of telemedicine uncertain, it is nonetheless likely that the U.S. government will soon be interested in investing in a telemedical infrastructure in order received for providing voice and data transmission. \(\textit{Id.}\) at 502.

\(^{287}\) One reason that the offshoring of formal medical jobs has been limited to services like radiology is because these services can be administered over a standard telephone line. More sophisticated telemedicine services, like cybersurgery, will require health care providers to collaborate with the telecommunication companies that will provide dedicated and secure connections between providers and patients. \(\textit{See supra}\) parts III.D., E.

\(^{288}\) The telecommunication costs associated with telemedicine would depend on several factors, including whether the link was by hardwire or broadband, where the patient was located vis-à-vis the provider, and the nature of the telemetrically-given care. A consultation may only require a standard telephone line or the Internet (email or voice over internet protocol). In contrast, cybersurgery will demand a secure, dedicated, hardwired link, for the foreseeable future.


\(^{290}\) \textit{HENRY HAZLITT, ECONOMICS IN ONE LESSON}, 15-19 Blackstone (1979). \textit{But cf. JOHN MAYNARD KEYNES, THE GENERAL THEORY OF EMPLOYMENT, INTEREST AND MONEY} (1936) (the preference for short-term economic analysis in modern times can be traced to Keynes who opined that in the long run, we are all dead).

\(^{291}\) \textit{Supra} Part II.B.2.
to reap the collateral benefits. After all, investing in infrastructure often yields unanticipated dividends. Consider the interstate highway system. The Eisenhower administration invested a significant cost in erecting the interstate highway system to transport missiles and facilitate mass evacuations, if necessary. But almost immediately, the government’s investment yielded unanticipated benefits as new industries sprang up along the road side, like fast food outlets and roadside motels.

Similarly, the investment in a telemedical superhighway is likely to produce benefits we can hardly anticipate. At the very least, a telemedical infrastructure will facilitate the development of competition and economies of scale that have the potential to lower overall health care costs. Competition will be stimulated as rural providers begin to compete with urban providers for patients. However, urban providers have the advantage in that competition because every rural patient captured will make the urban provider’s economies of scale just that much larger, thereby allowing the urban provider to lower its prices without reducing the quality of services provided. Of course, because it is likely that the prices of telemedical services will fall, a long term economic analysis will be that much more uncertain.

Two additional points must be made before leaving this discussion of the cost-effectiveness of telemedicine. First, comparing the installation of a telemedical infrastructure to the building of the interstate highway system is not entirely analogous. When the interstate highway system was built, there was no concern that an offshore construction vendor would exploit and capitalize on the system. But it is possible that a foreign vendor could commandeer a fiber-optic cable system to deliver telemedical services on its own. Thus, American companies will not want to build and pay for telemedical infrastructure if large benefits are reaped by foreign providers. So how should the government protect our nascent telemedical industry? Should we set up a protective tariff, or should we seek to opt out of the

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292. The IOM is firmly behind the use of telemedicine to improve the quality of medical care to rural America. See generally INST. OF MED., supra note 72.


295. Smolensky, supra note 76, at 384-85.

296. Reed Abelson, An M.R.I. Machine for Every Doctor? Someone Has to Pay, N.Y. TIMES, Mar. 13, 2004, at A1 (“diagnostic imaging, which also includes CT and PET scans, is approaching a $100-billion-a-year business, according to a recent report by the Blue Cross and Blue Shield Association.”). See also McLean, supra note 32, at 517-19.

297. Such analysis is further complicated by the fact that a global provider of health care services would use differential pricing, such that the price to purchase an offshore medical service would not be uniform across the globe. See Blum, supra note 224, at 105-07.
professional services chapter of NAFTA? These are questions to be decided.

Second, in addition to those political questions, there is the practical question of just how America will actually finance telemedical infrastructure. As we move further into the twenty-first century, venture capitalists are playing an increasingly larger role in the development of medical technology. As many hospital systems are already operating on razor-thin profit margins, it is reasonable to expect that venture capitalists may be involved with the formation of many telemedical operations. This involvement will likely mean that greater financial discipline will be expected of providers. Moreover, doing business with foreign providers over the long run will mean that medical providers will have to become more proficient in handling international financing and foreign exchange. In particular, many of the international telemedical providers will no doubt want to establish hedge funds to deal with foreign exchange rate risks. But hedge funds, and sophisticated financial transactions in general, will create their own risks for providers.

4. Epilogue: Telemedicine and the Iron Triangle

In short, when telemedicine is considered against the Iron Triangle, investment in a telemedical infrastructure receives high marks in the access to care corner, high marks in the quality corner, depending on how quality is measured, and no mark in the cost corner because at present, up-front and long-term economic considerations are too speculative. So, should there be a telemedical superhighway when two of the three corners of the Iron Triangle are pointing up? That’s a difficult question to answer, especially considering the potential loses. Alternatively, perhaps we are contemplating the wrong question. Rather than calculating a precise quantitative cost of telemedicine, perhaps the better question to ask is: can we afford not to invest in telemedicine?

In 2004, when Canada opened its remote robotic surgical operation in Hamilton, Ontario, the U.S. quietly fell to the number two position in the hierarchical world of medical technology. For Canada, this was no small

298. Steve Lohr, Venture Medicine, Healthcare Costs Are a Killer, but Maybe That’s a Plus, N.Y. TIMES, Sept. 26, 2004, at 45.


300. PARTNOY, supra note 36, at 136.

301. Alison Leigh Cowan, Investment Losses Hurt Major Cleveland Hospital, N.Y. TIMES, Mar. 10, 2003, at A15. The sophisticated Cleveland Clinic lost one-third of its foundation fund in long-term investments. One has to wonders if such large losses were due to the clinic taking a large position in the derivative market. See id.
feat, especially considering that Canadian health care dollars are scarce and that Canada's health care delivery system has been under stress for sometime. It is true that by offering high-tech, state-of-the-art surgery, Canada will be better able to retain its surgeons and provide health care to its more rural areas. But with more providers at home, the Canadians should be contemplating whether to provide offshore medical services for other countries, like the U.S., the U.K., and perhaps even some third-world countries. After all, American health care providers have captured a share of a foreign medical market. Thus, given the significant improvements in telemedical technology, the growing expertise of Canada as a remote surgical provider, and the growing expertise of India as a remote radiology provider, absent a change, America will soon likely be purchasing health care services from overseas providers who administer medical care with the same level of quality at a lower cost than the U.S. providers.

B. A Coasian View of Offshoring Medical Jobs

While the legal lag and cost-effectiveness of telemedicine will not be resolved in the next two or three years, it seems clear that telemedicine will ultimately become as commonplace as automobiles on the interstate highway system. The certainty of this statement lies in the recognition that the business community is abandoning a premise of the Industrial Age: locally produced goods and services are cheaper than those produced remotely. Rather, the history of business in the twentieth century teaches that frequently it is more cost-effective to purchase goods and services on

303. Clifford Krauss, Canada Looks for Ways to Fix Its Healthcare System, N.Y. TIMES, Sept. 12 2004, at 13 (the "doctor shortage is hurting the economies of small towns seeking to attract businesses. But it is also taxing the energies of the doctors who do live in those towns, as well as the resources of local hospitals - and patients often complain that their treatment is rushed"); Clifford Krauss, Canada's Healthcare System Needs More Money, Panel Says, N.Y. TIMES, Nov. 29, 2002, at A27.
304. See Krauss, supra note 303, at 13; Krauss, supra note 303, at A27.
305. Providing surgical services for third-world countries would not only generate cash, it would also generate experience for the Canadian surgeons, and foster goodwill. See Mendelsohn, supra note 227, at 153.
306. McLean, supra note 32, at 515. Dr. Eric Tangalos of the Mayo Clinic has suggested that "the export of U.S. medical expertise," particularly with telemedicine, could provide enough money to "fund our domestic healthcare system." Id. Furthermore, an estimated forty to sixty billion dollars per year could be saved with the implementation of an interactive telemedicine system. Gulick, supra note 91, at 186.
307. If Canada moves to amend NAFTA, that may indicate that Canadian telemedical providers are contemplating invading the U.S. health market.
the open market than to make them locally.

Some time ago, Ronald H. Coase, a Nobel laureate in economics, examined the relationship of the firm to the marketplace.\textsuperscript{308} The firm "in modern economic theory is an organization that transforms inputs into outputs."\textsuperscript{309} That is, a firm produces a good or a service. On the other hand, markets are "intuitions that exist to facilitate exchange."\textsuperscript{310} In a Coasian view of the world, how large a firm becomes is determined by the overall transaction costs. When the cost of raw materials coupled with administrative costs to produce a good or service exceeds the cost of purchasing the same item on the open market, the firm will no longer expand.\textsuperscript{311} At that point, a reasonable manufacturer will no longer make the goods or generate the services in the firm; rather, the manufacturer will become a distributor and purchase the goods or services on the open market for their resale value.\textsuperscript{312} Given that many other industries obey Coasian principles, there is no reason to think that medicine is any exception.

As the above survey of the telemedical industry reveals, many fields of medicine, like radiology, are already at a point where offshoring medical services is cheaper than providing those services locally due to excessive local production and transaction costs. These local costs are excessive because of the relatively high wages and benefits commanded by radiologists. On the other hand, administrative costs associated with offshoring radiology jobs have been minimized by improvements in telemedical technology and cheap telecommunication connections.\textsuperscript{313} These changes in global economic forces have created a favorable climate for the offshoring of radiology jobs. Moreover, the offshoring of other medical jobs, like surgery, will follow suit as the resolution of the legal lag phase associated with telemedical technology causes transaction costs to fall. In the long run, the medical community will no more be able to resist the forces that compel the offshoring of medical jobs than the blue- and other white-collar professions were.

To the extent that America wants to keep medical jobs at home, the real question is: how does America prevent the various economic forces from sweeping American medical jobs overseas? Protective trade barriers, such

\begin{itemize}
  \item \textsuperscript{309} \textit{Id.} at 5.
  \item \textsuperscript{310} \textit{Id.} at 7.
  \item \textsuperscript{311} \textit{Id.} at 6-8.
  \item \textsuperscript{312} In part, Enron attempted to follow Coase's theory. \textit{PARTNOY, supra} note 36, at 180. The firm started off drilling for oil and natural gas, but as drilling costs increased and transaction costs associated with moving energy transmission across boarders fell due to deregulation, Enron transformed itself from an energy producer to an energy trader. \textit{Id.}
  \item \textsuperscript{313} See generally \textit{OM MALIK, BROADBANDITS} (2003).
\end{itemize}
as licensure and visa requirements, certainly may be utilized to keep American medical jobs at home because trade barriers can be erected fairly inexpensively. However, trade barriers are only a quick-fix solution; history teaches that protective trade barriers, in the long run, are ineffective at preserving domestic markets.\textsuperscript{314} Thus, if we as a nation wish to prevent medical jobs from being exported, something more than trade barriers will be needed.

Considering the dynamic nature of the practice of medicine, perhaps the solution to saving medical jobs from exportation can be found in a new practice paradigm. Concerns for the safety of patients are changing the way medicine is practiced. In particular, the patient safety revolution is questioning the wisdom of allowing sleep-deprived providers to attend to patients.\textsuperscript{315} A worldwide trend already exists to limit the professional practice time of physicians to as few as a forty hours per week.\textsuperscript{316} The greatest impediment to the implementation of such a policy is that we presently have insufficient numbers of providers to deliver health care on a round-the-clock basis if physicians are work restricted to forty-hour workweeks.\textsuperscript{317} This is a solvable problem, however, and ultimately, absent a change in the direction of the patient safety revolution both here and abroad, health care in this country should continue to evolve towards a shift-work system. This evolution is important because physicians working in shifts is likely to decrease medical errors and offer a partial solution to keeping some medical jobs in America.

Nevertheless, moving to a shift-work model for health care delivery will not save all medical jobs from exportation. Some jobs will be rendered obsolete by technology. Moreover, offshoring blue- and white-collar jobs has taught us that the exportation of some medical jobs may be desirable. For example, shipping jobs to India has given that country $420 billion more in discretionary income.\textsuperscript{318} This income in turn allows Indians to purchase American products, especially brand name apparel and fiber optic cable.\textsuperscript{319}

Adopting a shift-work system of health care delivery may help to keep medical jobs in the U.S. if it is coupled with a heavy investment in telemedical technology. This recommendation many seem somewhat paradoxical because technology is an important driver of medical

\textsuperscript{314.} McLean, \textit{supra} note 32, at 511.
\textsuperscript{315.} \textit{80-Hour Work Week, supra} note 7.
\textsuperscript{316.} \textit{Id.}
\textsuperscript{317.} \textit{Id.}
\textsuperscript{319.} \textit{Id.}
inflation. But, if the goal is to keep medical jobs in the country, then the U.S. must be prepared to fund the endeavor. The history of economics teaches us that the best way to protect a labor market is not by protective tariffs, but rather by adding capital to stimulate technologic innovation, which, in turn, preserves jobs. Society benefits from more technology. Consequently, the best solution to keeping medical jobs in America appears to require America to regain its hegemonic position in telemedical technology.

Under this system, American day-shift physicians could use telemedicine between 11:00 p.m. and 7:00 a.m. to treat remote rural patients and overseas patients. By having providers work second and third shifts, our domestic market would be better protected against foreign competition. But if America is to preserve its medical jobs and become the “doctor-to-the-world” by expanding its medical services overseas, we must master telemedicine technology. Given the existing labor differential, for America to successfully compete in foreign markets as a provider of medical services, we must develop the world’s most efficient telemedical system. Finally, by aggressively entering the telemedical market, America will benefit as other countries look to America for guidance on which telemedical standards to adopt and how to resolve their own legal lag periods.

VI. CONCLUSION

Because regulatory changes in the mid-1990s made telemedicine profitable, the U.S. is now exporting many of its medical jobs, especially medical backroom operations and radiology. Other medical jobs, such as primary care and surgery, are likely to follow as the legal liability associated with telemedicine is clarified and the financial markets realize that telemedical transactional costs have fallen. In short, to minimize the exportation of medical jobs, the U.S. needs to regain it hegemonic position in telemedical technology from Canada by gaining a stronger position in the field of telemedicine. By asserting its presence in international telemedicine, the U.S. may have an effective long-term strategy for keeping medical jobs from being exported.

320. PRICEWATERHOUSECOOPERS, COST OF CARING: KEY DRIVERS OF GROWTH IN SPENDING ON HOSPITAL CARE 10, 17 (2003) (the most important driver of the $84 billion dollar increase in hospital spending over the past five years was technology).
322. Id. at 60-61.