CYBERSURGERY: WHY THE UNITED STATES SHOULD EMBRACE THIS EMERGING TECHNOLOGY

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Introduction

John Jones and his wife Maggie are in the mountains of Montana on their 50th wedding anniversary.[1] John has always dreamed of seeing the towering mountains and lush valleys where his parents grew up before moving to the East Coast with their young family, and the couple thought the occasion was a perfect time to get away before advancing age and declining health restricted their mobility. Unfortunately, on the last night of their stay, John started feeling intense pain radiating from his chest down his left arm. The couple rushes to their vehicle and drive fifty miles to the nearest emergency room, with John gasping and getting grayer by every mile marker sign. Upon reaching the tiny local hospital, nurses confirm the couple's worst nightmare – John is in cardiac arrest. The only possible way to save John is through emergency open-heart surgery, and the closest surgeon capable of such a surgery is 300 miles away at the next hospital.

However, the Jones' are fortunate because this local hospital recently opened a new cybersurgery wing which would allow John access to a surgeon in New York via remotely operated surgical device. As soon as John is anesthetized and the physician assistant has prepared the device, the surgeon in New York connects via broadband technology and performs the critically needed surgery. With the accuracy of both the skilled surgeon and the robotic machine, only a small sized incision is made. Within days, John is

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1. The following is a hypothetical situation and is not meant to portray any real events.

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healing and back on the East Coast surrounded by his grandchildren. Without the remote surgery, John would have died within the hour.

Although this sounds like science fiction, the scenario described above has already played out in reality several times.[2] The particular circumstances may have been different – perhaps someone suffered a gallbladder attack, or a mother gave birth to an infant with a heart malformation – but remote surgeries are no longer a technology of the future.[3] Cybersurgery is the term that describes a surgical procedure where a surgeon with access to a control panel in one location utilizes a telecommunication connection to control a medical device in another location.[4] The technology was first used when the Food and Drug Administration (FDA) approved the first medical device intended for robotic surgery in July 2000.[5]

The practical implications of this technology are far-reaching. Medically under-served areas could offer their patients access to the most qualified specialists; third world countries could offer their citizens United States quality healthcare; dying members of the armed forces could be moments away from salvation via a mobile cybersurgery vehicle. The list goes on. However, despite the potential for overwhelming benefits, substantial legal obstacles hinder this technology's future.[6] This Note will focus on the possible implications of cybersurgery for Americans, and the need for the United States government to facilitate the entrance of this technology into our healthcare industry.

Part I will discuss the origins and current state of cybersurgery. Part II will discuss the obstacles facing the cybersurgery field and the current state of healthcare and the healthcare industry in the United States. Part III will discuss the possibilities this technology could hold for the United States, including savings for the healthcare industry, strides in the global economy, and improvements of the quality of healthcare. The current steps the United States has taken toward embracing this technology and how the United States can

2. *See* Thomas R. McLean, *The Offshoring of American Medicine: Scope, Economic Issues and Legal Liabilities*, 14 ANNALS HEALTH L. 205, 244-45 (2005) [hereinafter McLean I] (stating that twenty-two such abdominal procedures have been performed while the surgeon is in Hamilton, Ontario, Canada, and the patients are in North Bay, Ontario, Canada – a distance of almost 250 miles).

3. *Id.*

4. Thomas R. McLean, *Cybersurgery: Innovation or a Means to Close Community Hospitals and Displace Physicians?* 20 J. MARSHALL J. COMPUTER & INFO. L. 495, 495 (2006) [hereinafter McLean II] (defining cybersurgery).

5. C.R. Ewell, *Telemedicine: Overcoming Obstacles on the Road to Global Healthcare*, 12 CURRENTS: INT'L TRADE L.J. 68, 69 (2003) (discussing Intuitive Surgical's da Vinci ™ Surgical System). *See also infra* Part I.

6. *See generally* Ewell, *supra* note 5.

further support the cybersurgery field will also be discussed in Part III.

Part I – History

Cybersurgery is part of the broader field of medicine called telemedicine.[7] The definition of telemedicine, or telehealth, varies across jurisdictions within the United States.[8] The federal definition

7. *Id.* at 69.

8. *See e.g,.* MONT. CODE ANN. § 37-3-342 (2005) (defining "telemedicine" as "the practice of medicine, as defined in 37-3-102, by a physician located outside the state who performs an evaluative or therapeutic act relating to the treatment or correction of a patient's physical or mental condition, ailment, disease, injury, or infirmity and who transmits that evaluative or therapeutic act into Montana through any means, method, device, or instrumentality under the following conditions: (a) The information or opinion is provided for compensation or with the expectation of compensation, (b) The physician does not limit the physician's services to an occasional case, (c) The physician has an established or regularly used connection with the state, including but not limited to: (i) an office or another place for the reception of a transmission from the physician; (ii) a contractual relationship with a person or entity in Montana related to the physician's practice of medicine; or (iii) privileges in a Montana hospital or another Montana health care facility, as defined in 50-5-101, (2) used in 37-3-301, 37-3-341 through 37-3-345, and 37-3-347 through 37-3-349, telemedicine does not mean: (a) an act or practice that is exempt from licensure under 37-3-103; (b) an informal consultation, made without compensation or expectation of compensation, between an out-of-state physician and a physician or other health care provider located in Montana; (c) the transfer of patient records, independent of any other medical service and without compensation; (d) communication about a Montana patient with the patient's physician or other health care provider who practices in Montana, in lieu of direct communication with the Montana patient or the patient's legal representative; (e) diagnosis of a medical condition by a physician located outside the state, based upon an x-ray, cardiogram, pap smear, or other specimen sent for evaluation to the physician outside the state by a health care provider in Montana; or (f) a communication from a physician located outside Montana to a patient in Montana in collaboration with a physician or other health care provider licensed to practice medicine in Montana."); NEB. REV. STAT. § 71-8503 (2005) (defining "telehealth" as "the use of telecommunications technology by a health care practitioner to deliver health care services within his or her scope of practice at a site other than where the patient is located"); N.M. STAT. ANN. § 24-25-3 (LexisNexis 2005) (defining "telehealth" as "the use of electronic information, imaging and communication technologies, including interactive audio, video, data communications as well as store-and-forward technologies, to provide and support health care delivery, diagnosis, consultation, treatment, transfer of medical data and education when distance separates the patient and the health care provider."); OR. REV. STAT. ANN. § 677.135 (West 2003) (defining "the practice of medicine across state lines" as "(1) The rendering directly to a person of a written or otherwise documented medical opinion concerning the diagnosis or treatment of that person located within this state for the purpose of patient care by a physician located outside this state as a result of the transmission of individual patient data by electronic or other means from within this state to that physician or the physician's agent; or (2) The rendering of medical treatment directly to a person located within

of "telehealth services" for Medicare reimbursement purposes changes frequently and is defined based on coverage of specific services rather than a broad idea of what telehealth means.[9] Generally, the main themes in all of the formal definitions of telehealth are the movement of health information via electronic or telecommunicative means and the provision of medical services via electronic or telecommunicative means without direct face-to-face interaction between the healthcare professional and the patient.[10]

While experiencing growth in the medical field, telehealth poses many challenges for the legal field. Regulators must strike a balance between making treatment safe and keeping medical information secure and confidential, while not stymieing the progress of the medical field in this new direction.[11] While cybersurgery shares some of these challenges, it poses its own separate obstacles and rewards as well.[12] For example, from a legal standpoint, one can just imagine the multitude of issues that arise from the surgery performed on John Jones in the previous hypothetical situation. If something went wrong who would be liable: the surgeon, the device

this state by a physician located outside this state as a result of the outward transmission of individual patient data by electronic or other means from within this state to that physician or the physician's agent."). Many states do not specifically define telehealth or telemedicine in their statutes or regulations. *See, e.g.*, TEX. GOV'T CODE ANN. § 531.02171 (Vernon 2005) (defining "telehealth service" as "a health service, other than a telemedicine medical service, delivered by a licensed or certified health professional acting within the scope of the health professional's license or certification who does not perform a telemedicine medical service that requires the use of advanced telecommunications technology, other than by telephone or facsimile, including: (A) compressed digital interactive video, audio, or data transmission; (B) clinical data transmission using computer imaging by way of still-image capture and store and forward; and (C) other technology that facilitates access to health care services or medical specialty expertise," and defining "telemedicine medical service" as "a health care service initiated by a physician or provided by a health professional acting under physician delegation and supervision, for purposes of patient assessment by a health professional, diagnosis or consultation by a physician, treatment, or the transfer of medical data, that requires the use of advanced telecommunications technology, other than by telephone or facsimile, including: (A) compressed digital interactive video, audio, or data transmission; (B) clinical data transmission using computer imaging by way of still-image capture and store and forward; and (C) other technology that facilitates access to health care services or medical specialty expertise.").

9. *See* 42 C.F.R. § 410.78 (2007).

10. *See supra* text accompanying note 8; Ewell, *supra* note 5, at 69.

11. *See generally* 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, 352-353 (2002). Telehealth and telemedicine are not the focus of this paper. However, Gulick provides an excellent discussion of the challenges facing this field.

12. Ewell, *supra* note 5, at 69-70.

manufacturer, the local hospital, or the telecommunication connection provider? Does the New York surgeon need to be licensed in Montana? Will the Montana hospital be reimbursed by John Jones' insurance? If so, how does the New York surgeon get paid? The answers to many of these questions are unclear, or worse, the answers merely create more questions.[13]

As noted above, cybersurgery was born with FDA approval of the first robotic surgery device, Intuitive Surgical's da Vinci® Surgical System.[14] Intuitive Surgical's main competitor, Computer Motion, received approval for its robotic machine Zeus® shortly thereafter.[15] On September 20, 2001, the first cybersurgery was performed via fiber optic cable where a French surgeon named Dr. Marescaux, operating from New York, used da Vinci® to successfully remove the gall bladder from a patient in Strasburg, France.[16] Not long thereafter, German and Japanese surgeons conducted their own successful surgeries.[17]

The cybersurgery field is starting to grow, even though many of the approximately 400 da Vinci® devices in the marketplace are utilized with the control panel, robot, and patient all in one location.[18] In 2004, the Canadian government opened the Centre for Minimal Access Surgery, where surgeons have performed many surgeries from Hamilton, Ontario while their patients were in North Bay, Ontario.[19] In March 2005, SRI International announced that the company is collaborating with the United States Defense Department's Advanced Research Projects Agency to develop a mobile trauma unit for use in the United States military.[20] SRI is receiving $12 million in grant money in 2006 and 2007 to develop a

13. *See generally* Thomas R. McLean, *Cybersurgery – An Argument for Enterprise Liability*, 23 J. LEGAL MED. 167, 167-210 (2002) [hereinafter McLean III]; McLean I, *supra* note 2; McLean II, *supra* note 4; Ewell, *supra* note 5. The present state of such regulations is discussed *infra* Part II.

14. Ewell, *supra* note 5, at 69.

15. McLean II, *supra* note 4, at 498. Intuitive Surgical bought Computer Motion in 2003, and Zeus® is no longer being actively marketed. Michelle Meadows, *Computer-Assisted Surgery: An Update*, FDA CONSUMER MAG., July-Aug. 2005, at 39.

16. McLean I, *supra* note 2, at 244.

17. *Id*.

18. Meadows, *supra* note 15; Intuitive Surgical, Investor FAQ, http://www.intuitivesurgical.com/corporate/ (follow "Investor Relations" hyperlink; then follow "Investor FAQ" hyperlink) (last visited Apr. 24, 2007) (over 400 da Vinci® systems have been installed).

19. McLean I, *supra* note 2, at 244-45.

20. David R. Baker, *SRI Envisions Remote-Controlled Battlefield Surgery Units: Emergency Rooms That Travel With Soldiers Under Development*, S.F. CHRON., Mar. 28, 2005, at E-3.

mobile unit to hold surgical robots which can connect via a wireless connection to a distant surgeon who can stabilize wounded soldiers in preparation for movement to a military hospital.[21] Such advances show progress in the fledgling cybersurgery field.

Although the cybersurgical field seems to be progressing, the legal obstacles surrounding this technology have created resistance to its widespread acceptance.[22] For example, the World Medical Association previously promulgated guidelines which stated that telemedicine should only be used in emergency situations to provide care to patients that have no other access to physicians.[23] Also, Intuitive Surgical does not include a distance-surgery capability on their current da Vinci® systems because cybersurgery is not the focus of the company.[24] Such obstacles will be the focus of the next section.

Part II – Facts

As noted above, cybersurgery holds promise for the advancement of modern medicine in the United States, but the current state of the law and general resistance to the new technology are inhibiting the expansion of this area of telemedicine.[25] Some of the obstacles include the following: physician resistance for fear of being displaced by technology; practitioner fear of exposure to liability; the general quagmire of licensure laws within the many jurisdictions of the United States; the lack of international agreements to handle cross-border medical service transactions; and the absence of a reimbursement schedule. Additionally, there are still a few practical problems posed by technological limitations. Privacy concerns must also be solved.

21. *Id.*

22. *See, e.g.*, Leah B. Mendelsohn, *A Piece Of The Puzzle: Telemedicine As An Instrument To Facilitate The Improvement Of Healthcare In Developing Countries?*, 18 EMORY INT'L L. Rev. 151, 164-65 (2004) (stating cybersurgery is the most controversial provision of telemedicine); Intuitive Surgical, Frequently Asked Questions, http://www.intuitivesurgical.com/products/faq/ (last visited Apr. 24, 2007) (stating remote capabilities not available with current da Vinci™ because focus of company is not remote surgery).

23. World Med. Ass'n, Inc., WMA Policy, World Medical Association Statement on Accountability, Responsibilities and Ethical Guidelines in the Practice of Telemedicine, (Oct. 1999), *available at* http://www.wma.net/e/policy/a7.htm (last visited Apr. 24, 2007). Perhaps as a sign that cybersurgery is becoming more widely accepted, the World Medical Association rescinded these guidelines at their annual meeting in 2006. *Id.*

24. Intuitive Surgical, Frequently Asked Questions, *supra* note 22.

25. *Supra* at Introduction.

A. Fear of Displacement

Many of the benefits from cybersurgery come from the ability of surgeons to practice without regard to location.[26] For example, a surgeon sitting at a control panel connected to several locations worldwide could perform many more surgeries than if the surgeon himself had to travel from operating room to operating room, thereby increasing efficiency and decreasing waste.[27] However, increases in efficiency and the practice of medicine regardless of physical location means that every physician is a potential competitor within their specialty regardless of geographic location. Fewer surgeons would be needed to do the same number of surgeries.[28] Surgeons in rural or community hospitals who do not have the same level of experience as those in urban areas may be displaced from their field.[29]

Consider the hypothetical above. John Jones is in Montana in need of an emergency surgery. Rather than being transported to the nearest surgeon who could perform the needed surgery, Mr. Jones is operated on by a New York surgeon. If this happens on a regular basis, the Montana surgeon may experience a decrease in the number of procedures she performs. If the other hospital is more convenient for many potential patients, the Montana surgeon may lose so many patients that her hospital employer decides to cut the cardiac surgery department.[30] Or, perhaps the hospital sees the success of the

26. *See* McLean II, *supra* note 4, at 510 (stating cybersurgery leverages physician's expertise, thereby reducing number of physicians needed, lowering costs and ensuring quality care).

27. Efficiency is increased by the practical time savings of not having to physically walk between operating rooms, not having to scrub ones arms between each surgery, etc. The physician would simply have to disconnect from one remote surgical device and connect to another.

28. *See* McLean II, *supra* note 4, at 510.

29. McLean II, *supra* note 4, at 510.

30. *See, e.g.*, Liz Kowalczyk, *Guideline Is Skirted On Obesity Surgeries*, BOSTON GLOBE, Dec. 22, 2005, at A1 (stating area hospitals were skirting voluntary patient safety guidelines that surgeons perform a certain number of obesity surgeries a year); Charles Ornstein, Alan Zarembo & Tracy Weber, *Many Kidneys Turned Down at UCI: The program's difficulties are similar to those that led to the shutdown of the liver transplant unit at the hospital in November*, L.A. TIMES, Jan. 24, 2006, at B1 (stating UCI Medical Center refused to do kidney transplants because their volume was low, so they didn't have good patient outcomes); Ulysses Torassa, *Choice of Hospital May Affect Outcome*, CNN (Mar. 1, 2000), *available at* http://archives.cnn.com/2000/HEALTH/03/01/hospitals.mortality.wmd/ (last visited Feb. 2. 2005) (citing Journal of the American Medical Association study supporting that patients fare better after surgery when done by physician who has high volume of such surgeries per year).

cybersurgical program where John Jones received surgical attention and buys its own robotic cybersurgical device and hires remote surgeons. The Montana physician indirectly has been displaced by the new technology.

Once physicians realize their peril, surgeons may come out as a profession united against cybersurgery.[31] Physicians and physicians' associations will likely lobby to strengthen laws that bar competition and seek to erect barriers between national jurisdictions.[32] Rather than accept the new technology, physicians fearing displacement have incentive to fight the encroachment of their profession hand and foot.[33]

B. Liability Issues

One of the largest obstacles to the advancement of the technology is the difficulty in identifying where liability lies for accidents or mishaps that may occur during cybersurgery.[34] If a patient is seriously injured during a cybersurgery and subsequently sues, there are four possible defendants: the surgeon, the local hospital or physician's assistant, the product manufacturer, and the telecommunication provider. Clearly any analysis into such a situation would be fact specific, but the following general principles apply.

1. The Surgeon

The surgeon's liability for a cybersurgical error would probably be based on a basic negligence analysis including: (1) whether the physician had a duty to the patient; (2) whether the duty was breached based on the applicable standard of care; (3) whether the patient was injured; and (4) whether such breach of duty was what caused the injury.[35] But what is the applicable standard of care? Some states define the surgical standard of care as measured against

31. *See* McLean II, *supra* note 4, at 510 (using 17th century mint workers as an example of a profession resisting displacement).

32. McLean II, *supra* note 4, at 510. The focus of this paper is not on this or any other specific obstacle. *See generally* McLean II, *supra* note 4 (providing an excellent analysis of cybersurgery's effect on community hospitals).

33. *See* McLean II, *supra* note 4, at 510-12.

34. *See* Ewell, *supra* note 5, at 73. *See generally* McLean III, *supra* note 13. Both articles summarize the liability issues that abound in cybersurgery.

35. *See* Ewell, *supra* note 5, at 73 (summarizing the standard analysis for a medical malpractice claim).

other reasonable surgeons within the community.[36] A physician could conceivably be measured either against the community from which the surgery was performed or the community where the patient was located.[37] Also, whether a surgeon fell below the applicable standard of care will sometimes depend upon if he or she acted with the same care that another comparably trained surgeon would have in the same or similar circumstances.[38] A true standard of care for cybersurgery cannot be defined until many cybersurgical procedures have been performed and the courts have a basis for comparison.

2. The Local Hospital

Depending on the factual situation leading up to the cybersurgical mishap, the hospital where the patient and the physician assistant are could be liable for patient injuries. Some examples of such situations are if the hospital failed to properly clean and service the robotic device, or if the physician assistant failed to properly prepare the patient for surgery. Whether the hospital is liable could be addressed under a basic negligence analysis depending on the facts.[39] The relevance of their potential liability is that both the remote hospital and the physician assistant could be implicated in a patient lawsuit if a cybersurgical procedure were to fail.

3. The Product Manufacturer

If the robotic device were to fail during a cybersurgery, the manufacturer would certainly be a defendant in any potential suit.[40]

36. *See* McLean III, *supra* note 13, at 176 n.45 (citing Texas as requiring evidence of the applicable standard of care be pulled from the community).

37. *See generally* James O. Pearson, Jr., Annotation, *Modern Status of "Locality Rule" in Malpractice Action Against Physician who is not a Specialist*, 99 A.L.R. 3d 1133 (2007) (referring to cases which considered defendant physician's locality, those which looked at a similar locality, those in which locality of physician was not referenced, and jurisdictions in which rule is unclear).

38. *See* McLean III, *supra* note 13, at 176 (stating that no matter what type of surgery – laparoscopic, traditional, or otherwise – physicians are held to the same level as others with similar training in similar circumstances).

39. *See generally* John D. Hodson, Ph.D., Annotation, *Liability of Hospital or Sanitarium for Negligence of Physician or Surgeon*, 51 A.L.R. 4th 235 (2007) (summarizing law related to hospitals' vicarious liability for physicians' malpractice).

40. For discussions of product liability for medical devices and potential product liability in cybersurygery, see generally McLean III, *supra* note 13, at 179-97; Symposium, *When the "Machine that Goes 'Ping'" Causes Harm: Default Torts Rules and Technologically-Mediated Health Care Injuries*, 46 ST. LOUIS U. L.J. 37

To avoid product liability, the manufacturer must meet its duty to properly warn the physician of potential dangers.[41] Clearly, the manufacturer must also be sure the device holds no design flaws.[42] However, once the physician is duly warned, it becomes the physician's duty as a learned intermediary to properly warn the patient of any dangers.[43] To ensure that the manufacturer is insulated from product liability, the company will want to be sure that the physicians using its machines are highly trained and fully warned of any dangers.[44] If a medical device is too complex to consider a physician competently trained, then the physician will not be considered a "learned" intermediary and the manufacturer may be held liable.[45] Due to the complexity of the medical robots in use for cybersurgery, the manufacturers will need to be cognizant of such cases and be sure that physicians using their device are highly trained.[46]

Computer Motion, the makers of the Zeus® robotic surgery device, took an intuitive approach to making sure physicians have sufficient training to be considered "learned intermediaries" for a product liability analysis.[47] Computer Motion developed a second control panel dubbed Socrates that could be attached to any Zeus® device.[48] Socrates was able to freeze the robotic arms under the control of the original control panel and take over a surgery if the circumstances demanded intervention.[49] Computer Motion intended Socrates to be used as a training device, where a rookie surgeon using Zeus® to perform a surgery could be stopped from making a mistake by Socrates, which ideally was controlled by a more senior surgeon.[50] Before Intuitive Surgical acquired Computer Motion, the makers of Zeus® were considering connecting Socrates to many Zeus® machines at once and hiring better trained physicians to

(2002).

41. *See* Ewell, *supra* note 5, at 73.

42. *See* Ewell, *supra* note 5, at 73.

43. *See* McLean III, *supra* note 13, at 183-86; Symposium, *supra* note 40, at 52-53 (1999) (describing the learned intermediary doctrine).

44. Ewell, *supra* note 5, at 73.

45. Ewell, *supra* note 5, at 73 (citing McLean III at 184).

46. Ewell, *supra* note 5, at 73.

47. *See* McLean II, *supra* note 4, at 503 (describing Socrates, Computer Motion's training device). Neither Zeus® nor Socrates are being marketed since Intuitive Surgical's purchase of Computer Motion. Meadows, *supra* note 15.

48. *See* McLean II, *supra* note 4, at 503.

49. *See* McLean II, *supra* note 4, at 503-04.

50. *See* McLean II, *supra* note 4, at 504.

control Socrates.[51] Devices like Socrates can be effective training tools for a manufacturer to utilize and thereby avoid product liability.

4. The Telecommunication Provider

Common law generally holds telecommunication providers immune from liability from interruption in service.[52] While an interruption in service during a cybersurgery could be deadly, it is highly unlikely absent some agreement between telecommunication providers and the medical field sharing liability that the telecommunication provider would be held liable for any interruption in service.[53] A patient-plaintiff who was severely injured during a cybersurgery due to an interruption in telecommunication service may be entirely unable to recover damages if all other players in the medical service transaction performed their duties perfectly.[54]

Not only is the potential for liability for each contributor to the cybersurgical procedure an obstacle to entering the growing field of cybersurgery, but also the uncertainty of how such liability will disseminate in any situation will be enough to create a barrier to entering the field.[55] Such questions and uncertainties will need to be answered before the United States will see any significant growth in cybersurgery as an industry.

51. *See* McLean II, *supra* note 4, at 506-07.

52. State law and common law may be preempted by federal telecommunications law, such as the Telecommunications Act of 1996, if (a) the matter to be regulated has both interstate and intrastate aspects; (b) preemption is necessary to protect valid federal regulatory objectives; and (c) state regulation would negate the exercise by the FCC of its own lawful authority because regulation of the interstate aspects of the matter cannot be unbundled from regulation of the intrastate aspects. *See* Jaqualin Friend Peterson, Annotation, *Regulation of Telegraph and Telephone Companies: Federal Preemption*, 74 Am. Jur. 2d Telecommunications § 18 (2007). Due to the complexity of that analysis, especially as it relates to the unbundling of interstate and intrastate aspects, federal preemption is not addressed in this Note. For a thorough discussion of the potential liability of telecommunication providers for cybersurgical misadventures, *see* McLean III, *supra* note 13, at 197-203.

53. McLean III, *supra* note 13, at 200-03 (concluding that both case law and statutes support telecommunication provider immunity from liability for service interruption).

54. *See* McLean II, *supra* note 4, at 501 (arguing that since telecommunication providers will be held immune, any award under a malpractice theory would be irrational).

55. Ewell, *supra* note 5, at 71 (stating attribution of legal responsibility as an obstacle to growth in the field of cybersurgery).

C. Licensure Regulations

The practice of cybersurgery becoming commonplace in the United States is quite unlikely if licensing regulations remain unchanged. As noted above, cybersurgery is part of the larger field of telemedicine and it fits into the general theme of many of the telemedicine definitions.[56] However, a majority of states do not allow the practice of telemedicine within their jurisdiction unless the physician has full licensure in that state.[57] Also, many laws defining

56. *Infra* at Part I.

57. *See, e.g.*, ALASKA STAT. § 08.64.170 (2006) (stating that "(a) A person may not practice medicine, podiatry, or osteopathy in the state unless the person is licensed under this chapter, except that (1) a physician assistant may examine, diagnose, or treat persons under the supervision, control, and responsibility of either a physician licensed under this chapter or a physician exempted from licensing under AS 08.64.370"); ARK. CODE ANN. § 17-95-206 (2006) (stating that "a physician who is physically located outside this state but who through the use of any medium, including an electronic medium, performs an act that is part of a patient care service initiated in this state, including the performance or interpretation of an X-ray examination or the preparation or interpretation of pathological material that would affect the diagnosis or treatment of the patient, is engaged in the practice of medicine in this state for the purposes of this chapter and is subject to this chapter and to appropriate regulation by the Arkansas State Medical Board. This section does not apply to: (1) The acts of a medical specialist located in another jurisdiction who provides only episodic consultation services; (2) The acts of a physician located in another jurisdiction who is providing consultation services to a medical school; (3) Decisions regarding the denial or approval of coverage under any insurance or health maintenance organization plan; (4) A service to be performed which is not available in the state; (5) A physician physically seeing a patient in person in another jurisdiction; or (6) Other acts exempted by the board by regulation"); CONN. GEN. STAT. § 20-9 (2004) (stating "no person shall, for compensation, gain or reward, received or expected, diagnose, treat, operate for or prescribe for any injury, deformity, ailment or disease, actual or imaginary, of another person, nor practice surgery, until he has obtained such a license as provided in *section 20-10*, and then only in the kind or branch of practice stated in such license"); GA. CODE ANN. § 43-34-31.1 (2005) (stating "a person who is physically located in another state or foreign country and who, through the use of any means, including electronic, radiographic, or other means of telecommunication, through which medical information or data is transmitted, performs an act that is part of a patient care service located in this state, including but not limited to the initiation of imaging procedures or the preparation of pathological material for examination, and that would affect the diagnosis or treatment of the patient is engaged in the practice of medicine in this state. Any person who performs such acts through such means shall be required to have a license to practice medicine in this state and shall be subject to regulation by the board. Any such out-of-state or foreign practitioner shall not have ultimate authority over the care or primary diagnosis of a patient who is located in this state"); 225 ILL. COMP. STAT. 60/49-5 (2005) (stating "a person who engages in the practice of telemedicine without a license issued under this Act shall be subject to penalties provided in Section 59"); IOWA CODE § 147.2 (2004) (stating "a person shall not engage in the practice of medicine and surgery, podiatry, osteopathy,

and regulating the practice of medicine require face-to-face contact between the patient and physician.[58] Clearly, these laws will need to be changed or cybersurgeons will face an administrative licensure nightmare whenever trying to penetrate a new market.[59]

If cybersurgery becomes commonplace, international players almost certainly would become involved in the marketplace.[60] One could see American physicians operating on patients worldwide, creating an international market for American services.[61] However, there are no international medical agreements covering telehealth or creating a uniform system of licensing physicians, and conflicting interests between countries make such agreements seem a thing of the far distant future.[62]

D. Reimbursement

Another looming obstacle to the expansion of a cybersurgery market is the question of how the practitioners will be compensated.

osteopathic medicine and surgery, psychology, chiropractic, physical therapy, nursing, dentistry, dental hygiene, optometry, speech pathology, audiology, occupational therapy, respiratory care, pharmacy, cosmetology, barbering, social work, dietetics, marital and family therapy or mental health counseling, massage therapy, mortuary science, athletic training, acupuncture … or shall not practice as a physician assistant as defined in the following chapters of this subtitle, unless the person has obtained from the department a license for that purpose"); MICH. COMP. LAWS § 333.16294 (2005) (stating "an individual who practices or holds himself or herself out as practicing a health profession regulated by this article without a license or registration or under a suspended, revoked, lapsed, void, or fraudulently obtained license or registration, or outside the provisions of a limited license or registration, or who uses as his or her own the license or registration of another person, is guilty of a felony"). Similar statutes exist in Maine, Maryland, Massachusetts, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Utah, Vermont, Virginia, West Virginia, Wisconsin and Wyoming. *See* CENTER FOR TELEMEDICINE LAW, DEP'T OF HEALTH & HUMAN SERVICES, TELEMEDICINE LICENSURE REPORT (2003), *available at* http://ftp.hrsa.gov/telehealth/licensure.pdf.

58. *See* McLean I, *supra* note 2, at 236 n.176 (describing how in twenty-seven states, a physician must give a physical exam before she may prescribe medication to a patient).

59. *See generally* P. Greg Gulick, *The Development of a Global Hospital is Closer Than We Think: An Examination of the International Implications of Telemedicine and the Developments, Uses and Problems Facing International Telemedicine Programs*, 11 IND. INT'L & COMP. L. REV. 183, 204 (2000) (arguing for a national licensure system).

60. *See generally* Ewell, *supra* note 5 (discussing international issues). This paper offers a more national focus.

61. Ewell, *supra* note 5, at 70 (describing the impact of cybersurgery on healthcare and the economy worldwide).

62. Ewell, *supra* note 5, at 70-71.

In 1998, the federal Department of Health and Human Services ("HHS") revised Medicare reimbursement statutes to include certain telehealth services. Subsequently in 2002, HHS provided for a system of adding telehealth services to those reimbursed by Medicare.[63] Cybersurgery is not on the list of services that Medicare covers.[64] Since the federal Medicare program is one of the leading payors in the healthcare industry, adding cybersurgery as a reimbursement item would be a substantial development to ensure that the medical professionals and institutions involved get paid for their services.[65] The federal Medicaid program also pays for a considerable amount of healthcare services through state created Medicaid plans.[66] Those federal guidelines could also be amended to include reimbursement for cybersurgery procedures.

Private insurance is another significant payor of healthcare services. Private insurance policies vary widely, not only from state to state based on each state's regulations, but from company to company as well.[67] The services reimbursed by private insurance companies vary greatly from plan to plan. However, private insurance companies may be compelled to pay for cybersurgical services if the Medicare and Medicaid Program lead by example.

E. Other Obstacles

Above is a brief summary of some of the major obstacles that stand in the way of cybersurgical advancement. However, there are other obstacles to struggle with as well.[68] For example, the technology behind cybersurgery needs to be advanced to provide for a better connection between surgeon and patient.[69] The current method of

63. *See* Medicare Program; Revisions to Payment Policies and Adjustments to the Relative Value Units Under the Physician Fee Schedule for Calendar Year 1999, 63 Fed. Reg. 58,814, 58,909 (Nov. 2, 1998) (codified at 42 C.F.R. § 410.1 *et seq*) (creating reimbursement for certain consultations via telecommunications systems); Medicare Program; Revisions to Payment Policies Under the Physician Fee Schedule for Calendar Year 2003, 67 Fed. Reg. 79,966, 79,988 (Dec. 31, 2002) (codified at 42 C.F.R. § 410.1 *et seq*) (creating a system of adding services to the reimbursement schedules under Medicare).

64. *Supra* note 9.

65. *See* BARRY R. FURROW ET AL., THE LAW OF HEALTH CARE ORGANIZATION AND FINANCE 360 (5th ed. 2004) (stating federal Medicare program spent $271 billion in 2003).

66. *Id.* at 360, 400-01 (stating that Medicaid paid for $258 billion in 2003, and describing the Medicaid program generally).

67. Ewell, *supra* note 5, at 72.

68. *See generally* Ewell, *supra* note 5.

69. *See* McLean II, *supra* note 4, at 499 (discussing the delay in transmission of signal based on distance between sender and receiver).

connection between the control panel of a robotic device and the robotic arms is a fiber optic cable.[70] The length of the fiber optic cable has a direct relationship to the speed of transmission of signals – the longer the fiber optic cable, the longer between the time the surgeon manipulates the control panel and the robotic arms respond.[71] A distance of a few thousand miles could create a delay of a few seconds or more, which would greatly effect the ability of the surgeon to respond to any emergency situation in the operating room.[72] This problem could be addressed by the use of broadband technology but that technology has not yet been integrated into the existing robotic surgery products.

An additional obstacle is presented with the electronic transfer of patient health information that must occur before the cybersurgery.[73] While the Health Information Portability and Accountability Act of 1996 presents some solutions for the problem of patient confidentiality, some specific concerns arise in the cybersurgery arena.[74] For example, the telecommunication connection between the surgeon and the patient would need to be virtually immune from computer hackers. The threat of hacking poses risks for compromised patient confidentiality. Additionally, more dire concerns exist if a hacker had the ability to freeze or take over the connection.[75]

Regardless of the obstacles to the cybersurgery field, the United States needs to embrace this technology. The United States healthcare system needs to change in a very basic and fundamental way.[76] Healthcare spending in the United States is astronomically high - $1.7 trillion in 2003[77] – and yet the quality of healthcare needs improvement in many areas.[78] Healthcare spending figures have

70. *See* McLean II, *supra* note 4, at 499.
71. *See* McLean II, *supra* note 4, at 499.
72. *See* McLean II, *supra* note 4, at 499.
73. *See* Ewell, *supra* note 5, at 73 (discussing patient confidentiality issues).
74. *See* Ewell, *supra* note 5, at 73 (discussing patient confidentiality issues). *See generally* Pub. L. No. 104-191, 110 Stat. 1936 (1996).
75. *See* Ewell, *supra* note 5, at 73.
76. McLean III, *supra* note 13, at 167 (quoting COMMITTEE ON QUALITY HEALTH CARE IN AMERICA, INSTITUTE OF MEDICINE, CROSSING THE QUALITY CHASM: A NEW HEALTH CARE SYSTEM FOR THE 21ST CENTURY (2001)).
77. *See* DEP'T OF HEALTH AND HUMAN SERVICES, EFFECTS OF HEALTH CARE SPENDING ON THE U.S. ECONOMY (2005), *available at* http://aspe.hhs.gov/health/costgrowth/ (last visited Apr. 1, 2007).
78. *See generally* BUREAU OF LABOR EDUCATION, UNIVERSITY OF MAINE, THE U.S. HEALTH CARE SYSTEM: THE BEST IN THE WORLD, OR JUST THE MOST EXPENSIVE? (2001), *available at* http://dll.umaine.edu/ble/pubs.htm (follow "U.S. Healthcare System" hyperlink) (giving many examples of the quality of Unites States healthcare as compared to other countries). According to a World Health

been increasing at a rate that outpaces inflation and population growth since the early 1990s and have only recently shown signs of decreasing momentum.[79] Up to 98,000 people die in the United States every year due to errors in the medical field.[80] Indeed, in 2001 the Institute of Medicine issued a call to action for the healthcare industry and regulators alike to improve the quality of the health care system in its totality.[81] The combination of high spending with reduced quality and the lack of solutions to this problem are leading to a crisis situation.[82]

Part III – Analysis

A. Advantages of Cybersurgery for the United States

Cybersurgery may be the start of just the sort of change for which the Institute of Medicine has called.[83] In fact, the Institute has suggested that the United States use technology and physician assistants to control costs.[84] Hospital care and physician and clinical services combined make up more than fifty percent of national healthcare spending.[85] While surgery does not make up all of that spending, it is safe to assume surgery is a major expenditure for all hospitals.[86] As noted above, cybersurgery creates an economy of

Organization report released in 2000, the United States is by far the most expensive healthcare system in the world, is one of two countries in the developed world that does not provide health insurance for all of its citizens, has the highest infant mortality rate of the countries studied, is 24th in terms of disability adjusted life expectancy, and is tied for last place in terms of the fairness of financial contributions. *Id.*

79. *See* DEP'T OF HEALTH AND HUMAN SERVICES, *supra* note 77.

80. McLean III, *supra* note 13, at 1 (citing COMMITTEE ON QUALITY HEALTH CARE IN AMERICA, INSTITUTE OF MEDICINE, CROSSING THE QUALITY CHASM: A NEW HEALTH CARE SYSTEM FOR THE 21ST CENTURY (2001)).

81. McLean III, *supra* note 13, at 1.

82. BUREAU OF LABOR EDUCATION, *supra* note 78, at 1.

83. *See* COMMITTEE ON QUALITY HEALTH CARE IN AMERICA, *supra* note 76.

84. McLean II, *supra* note 4, at 509, (citing COMMITTEE ON QUALITY HEALTH CARE IN AMERICA, *supra* note 76) (noting that the use of physician's assistants and technology may reduce adverse events and thus cut down on the cost of remedial health care).

85. DEP'T OF HEALTH AND HUMAN SERVICES, *supra* note 77, at 3 (summarizing United States health care spending with pie charts).

86. The precise percentage of hospital expenditures related to surgical procedures is difficult to quantify since many hospital services are related to surgical procedures but are also utilized for other healthcare needs, such as imaging equipment, health professionals' services, and pharmaceutical costs. It is difficult

scale in the medical profession wherein physicians can perform more surgeries in a smaller amount of time, thereby increasing efficiency and decreasing waste.[87] Fewer physicians would be needed and physicians would be replaced by physician's assistants, whose salaries are less costly to hospitals.

The widespread use of cybersurgery would increase the quality of healthcare. Strong evidence suggests that surgeons performing more of the same sort of surgery have better outcomes than those who do fewer surgeries.[88] The most efficient cybersurgery system would have physicians become specialists in certain types of surgeries by performing the same kind of surgery regularly. Presumably, cybersurgeon specialists would reduce the 98,000 deaths per year caused by medical error.[89] Also, the robotic devices currently on the market make quite small incisions during many of the procedures performed, and such minimally invasive surgery could also contribute to an increase in positive surgical outcomes.[90]

The international market for cybersurgeries performed by United States surgeons may be an incentive for the United States to encourage the growth of cybersurgery. In fact, Dr. Eric Tangalos of the Mayo Clinic has suggested that exporting American telemedical services could generate enough income to fund the United States healthcare system in its entirety.[91] Aside from the fantastic financial potential of exporting cybersurgery overseas, the United States must recognize that if it does not enter the market for cybersurgical services and establish a presence in the global economy, another country will.[92] If the United States continues to allow significant obstacles to the growth of cybersurgery to exist, innovation in the

to know how much of the cost related to those ancillary services is related to surgical procedures.

87. *Supra* Section II, Part A.

88. McLean II, *supra* note 4, at 517 (citing several studies and stating that there is "mounting clinical evidence to support the conclusion that high volume medical institutional providers are safer than low volume medical institutional providers").

89. McLean III, *supra* note 13, at 1 (citing COMMITTEE ON QUALITY HEALTH CARE IN AMERICA, INSTITUTE OF MEDICINE, CROSSING THE QUALITY CHASM: A NEW HEALTH CARE SYSTEM FOR THE 21ST CENTURY (2001)).

90. *See, e.g.*, Intuitive Surgical, Frequently Asked Questions, *supra* note 22. (summarizing the abilities of the robotic technology and the benefits of minimally invasive surgery, including fast recovery).

91. *Telemedicine: An Information Highway to Save Lives, Hearing before the Subcomm. on Investigations and Oversight of the House Comm. on Science, Space and Technology*, 103d Cong. 2 (1994) (written testimony of Eric G. Tangalos, M.D., Associate Professor of Medicine, Mayo Clinic).

92. McLean II, *supra* note 4, at 510 (remarking that it would be naïve to think that the Chinese are not contemplating this type of venture).

United States will be stymied and another country will step into the market and develop new and better ways of meeting global cybersurgery needs.[93] The United States will be left with a set of obstacles to a promising technology and an insatiably increasing healthcare bill. With the strides that Canada has taken in the cybersurgical field, this threat is very real.[94] Little restrains Canada from reaching across the border and finding ways to market its services here.[95]

B. Steps in the Right Direction

The United States has been moving toward embracing telemedicine, albeit slowly. In several State of the Union Addresses, the Bush Administration has proclaimed a devotion to the goal of every American having fully electronic health records within ten years.[96] In furtherance of this goal, President George W. Bush created a new position called the National Health Information Technology Coordinator and appointed Dr. David Brailer to the post.[97] Dr. Brailer is charged with making the goal of electronic health records a reality, and has been making strides in that direction.[98]

Another step that the United States has taken toward embracing telemedicine is the inclusion of certain telemedicine services in the Medicare reimbursement schedule.[99] The Medicare program often sets an example for what services private insurance plans will reimburse.[100] A system is in place for telehealth services to be added

93. McLean I, *supra* note 4, at 262 (discussing the threat of the growing expertise of Canada and India in the telemedical field).

94. *Supra* Part I.

95. McLean II, *supra* note 4, at 515 (detailing the incentives and lack of limitations for foreign doctors to practice cybersurgery in the United States).

96. *See, e.g.*, George W. Bush, U.S. President, State of the Union Address (Jan. 31, 2006), *available at* http://www.whitehouse.gov/stateoftheunion/2006 (last visited Apr. 1, 2007).

97. *See* Office of the National Coordinator for Health Information Technology Biography of David J. Brailer, M.D., Ph.D., http://www.hhs.gov/healthit/bios.html (last visited Apr. 24, 2007).

98. *See, e.g.*, *The Koko Nnamdi Show: TT: National IT Health Coordinator* (WAMU American University Radio broadcast Jan. 31, 2006), *available at* http://www.wamu.org/programs/kn/06/01/31.php (last visited Apr. 1, 2007) (discussion with Dr. David Brailer about progress towards all Americans having electronic health records in ten years).

99. *See supra* Part II.E.

100. *See* Eleanor D. Kinney, *Medicare Coverage Decision-Making & Appeal Procedures: Can Process Meet the Challenge of New Medical Technology?*, 60

to the Medicare reimbursement schedule, making the addition of cybersurgery as a reimbursable service easier.[101]

The government-commissioned study regarding a mobile trauma unit for the military also shows that the administration is open to telemedicine generally and perhaps the idea of cybersurgery specifically.[102] If SRI International is successful in creating a mobile trauma unit for use in the armed forces, the step toward marketing the mobile trauma units for use in the United States seems obvious. Such a mobile trauma unit would be ideal for responding to accidents, natural disasters, and even reaching rural areas where people need medical attention and are unable to travel to get it.

C. Clearing the Obstacles

By understanding the benefits of cybersurgery and by recognizing the risks of entering the market too late, the United States needs to clear the obstacles for this technology to bloom. As can be seen from the long list of hurdles above, drastic changes need to be made before cybersurgery can be commonplace in the United States healthcare system. With other countries eying the cybersurgical market hungrily, such changes must be swift.

In the opinion of the Institute of Medicine, state licensure laws are the largest barrier to high quality, cost efficient health care.[103] The few telemedicine licensure statutes currently in use, such as the one in Texas, create barriers that protect in-state physicians from any additional competition from out-of-state physicians.[104] Many have proposed how to change the current licensing system from a system of minimizing competition to a system of ensuring quality.[105] For

WASH. & LEE L. REV. 1461, 1497 (2003) (stating that Medicare coverage decision-making exerts great influence over other federally sponsored and private insurance programs).

101. *See* Medicare Program; Revisions to Payment Policies Under the Physician Fee Schedule for Calendar Year 2003, 67 Fed. Reg. 79,966, 79,988 (Dec. 31, 2002) (codified at 42 C.F.R. § 410.1 *et seq*) (creating a system of adding telehealth services to the reimbursement schedules under Medicare).

102. *See supra* Part I (discussing the United States Department of Defense Advanced Research Projects Agency effort in coordination with SRI International to develop a mobile trauma unit).

103. COMMITTEE ON QUALITY HEALTH CARE IN AMERICA, INSTITUTE OF MEDICINE, CROSSING THE QUALITY CHASM: A NEW HEALTH CARE SYSTEM FOR THE 21ST CENTURY 207-220 (2001).

104. *See* Tex. Occ. Code Ann. §151.056(a) (West 2007). S*ee also* Gulick, *supra* note 11, at 366 (stating that current telemedical licensure provisions do not go far enough in promoting telemedicine).

105. *See* Ewell, *supra* note 5, at 72 (summarizing international licensure

example, federal regulators could create a license to practice telemedicine specifically and make that license preempt state licenses.[106] Even the Federation of State Medical Boards, which has traditionally opposed any sort of national licensure, has developed model legislation encouraging a special interstate license for telemedicine.[107] Such a license would allow physicians to practice telemedicine specifically in any state provided the physician is practicing across state lines and practices telemedicine frequently.[108] Federal regulators could also abolish state licensure all together and create a national license to practice medicine in its place.[109] While either proposal may be allowable as a federal field under the commerce clause, the second proposal would most certainly offend proponents of federalism and states' rights.[110] Proposals for changing the licensure system are numerous, and several of these ideas have support in the medical community.[111] The problem is that licensure simply has not received enough attention for either the federal government or the several state governments to seriously consider how to change the system to ease the practice of telemedicine. However, state licensure regulations must give way in order for telemedicine in general, and cybersurgery specifically, to grow.

Liability is another major obstacle to the growth of cybersurgery.[112] Even if all other obstacles were eliminated, many physicians would be hesitant to enter the cybersurgery field without a clear understanding of how far their liability extends. Additionally, their malpractice insurance may refuse to cover such a new service due to the uncertainty of liability. One proposal to ease this uncertainty is to use an enterprise liability approach to liability in

proposals); *see also*, Susan E. Volkert, *Telemedicine: RX for the Future of Health Care*, 6 MICH. TELECOMM. TECH. L. REV. 147, 173 (2000) (illustrating efforts of commissions and professional associations to change licensure statutes).

106. *See* Volkert, *supra* note 105, at 173 (discussing proposals for national licensure programs and the likelihood of such proposals' success).

107. *See* Volkert, *supra* note 1055, at 174. The Federation has proposed that state medical boards issue telemedicine licenses rather than the federal government. *Id*.

108. *See* Volkert, *supra* note 1055, at 174.

109. *See* Volkert, *supra* note 1055, at 177 (discussing the idea of a national licensure system and arguing that there is not enough support for the concept at this time).

110. *See* Volkert, *supra* note 1055, at 177.

111. *See generally* Volkert, *supra* note 1055, at 165-80 (discussing several licensure models).

112. *Supra* Part II.B.

cybersurgical contexts.[113] Enterprise liability as applied to cybersurgery places all liability for a cybersurgical mishap on one entity, i.e., a hospital, thereby ensuring that plaintiffs would be compensated for any injury without the finger pointing that would come from having several entities as defendants.[114] Enterprise liability seems to be the best solution for the uncertainty of where liability lies.[115] Such liability can be included in the cost of the procedure by the entity that is billing for the service.[116] Additionally, any subsequent litigation would be simplified, and the plaintiff could rest assured that any injury resulting from the cybersurgery would be compensated.[117] In the absence of such a liability system, the government could potentially mandate that malpractice insurance companies cover cybersurgery in order to allow the field to grow, although this could have the adverse effect of raising malpractice premiums even higher.[118] Without any response to the liability question, a few brave surgeons will probably enter the field and face the consequences.[119] Unfortunately, where liability lies for cybersurgical mishaps will likely only be known when a few cases have been litigated and judges have case law to refer to when such situations enter their court rooms.

Physicians and hospitals will be much more likely to embrace the cybersurgical field if they knew that their efforts would be reimbursed. Few potential patients could privately afford the cost of a cybersurgical procedure, especially since one of the applications of cybersurgery would be to reach into rural, traditionally lower-income areas where patients may have otherwise gone without surgery to their detriment.[120] The system exists for cybersurgery to be added to

113. *See generally* McLean III, *supra* note 13 (arguing for enterprise liability).

114. McLean III, *supra* note 13, at 205.

115. *See generally* FOWLER V. HARPER ET AL., HARPER, JAMES AND GRAY ON TORTS §14.3 n.19 (1986) ("That such loss distribution, based in effect on enterprise liability, would usually be preferable to the determination of compensation by reference to fault, has been widely recognized for years.").

116. *See generally id.* §11.5 n. 10 ("In one type of enterprise liability, accident costs are imposed on those most likely to insure or self-insure; in the other, such costs are imposed on those in a position to achieve spreading by passing some or all of the costs on to the purchasers of the enterprise's products.").

117. McLean III, *supra* note 13, at 205-206 (describing the many benefits of an enterprise liability approach).

118. This assumption is based on the basic economic principle that if demand is virtually unlimited, suppliers will increase the price.

119. McLean III, *supra* note 13, at 209 (stating that if society stimulated development of cybersurgery, physicians will perform the service).

120. *See* Ewell, *supra* note 5, at 72.

the Medicare reimbursement schedule. The government needs to take the next step and add cybersurgery to the list of telehealth services it reimburses.[121] Perhaps then private insurers will begin to cover cybersurgery as well.

While improvements do need to be made to cybersurgical technology, as the saying goes, "where there is a will there is a way."[122] Once a market exists for cybersurgical technology, it will only be a matter of time until the technology is improved.[123] Access to, and the transmission of, electronic health records would also increase if there was need stemming from a blooming cybersurgical market.[124] With the strides that have already been made toward the goal of having electronic health records for every American, it seems likely that we will have electronic health records before we have a cybersurgical market. Indeed, many of the benefits of cybersurgery would be realized with the technology as it is now. While there is a delay in signal transmission over many miles, the Canadian Centre for Minimal Access Surgery has shown the world that cybersurgery can be performed at a distance of at least 250 miles.[125]

Another large obstacle that needs to be overcome in order for cybersurgical technology to blossom is physicians' fear of displacement. There is no easy way to alleviate the fear that physicians will feel with this new technology entering the marketplace. Those that do not grow with the technology will fall by the wayside.[126] Such is true with the introduction of any new technology.[127] However, to create a more cost-efficient health care system, the United States will need to embrace new technologies, and those new technologies will displace physicians.[128] In their stead will

121. *See* Ewell, *supra* note 5, at 72 (discussing how Medicare and Medicaid are behind the times in their reimbursement practices).

122. *See* Ewell, supra note 5, at 70 (discussing how improvements in the technology will overcome shortcomings).

123. *See* Ewell, *supra* note 5, at 7.

124. *See* Melissa Harris, *Bill Backs Digitizing Medical Records*, BALTIMORE SUN, Mar. 17, 2006 (reporting on a new electronic medical records bill, and discussing the usefulness of electronic medical records during Hurricane Katrina).

125. *See* Centre for Minimal Access Surgery, http://www.cmas.ca/default.htm (follow "Profile" hyperlink, then "telehealth" hyperlink) (last visited Apr. 24, 2007).

126. *See* McLean II, *supra* note 4, at 510-11 (illustrating resistance to new technology through the example of mint workers in 1661, and stating that surgeons and physicians would be replaced by technology and physician extenders if the practice of cybersurgery became widespread).

127. *See* McLean II, *supra* note 4, at 510-11.

128. *See* McLean II, *supra* note 4, at 509 (stating that the Institute of Medicine advocates for the increased use of technology and physician extenders to control health care costs).

be a greater demand for physician assistants. Displacement is already happening with the trend of moving from community hospitals to "Centers of Excellence," or large hospital systems that handle a larger volume of patients and have access to diverse specialties.[129] Rather than fearing displacement, physicians should embrace the technology as a way to improve quality and try to establish themselves as cybersurgeons early in the race to avoid displacement.

One way that the United States government could spur the growth of this technology would be to fund studies into its efficacy.[130] Much of the uncertainty about the technology would dissipate if the Medicare program established pilot studies to see how the technology functioned and how liability applied to each party. The pilot programs could, through trial and error, establish a more efficient cybersurgical system and help establish the emerging market.[131] Most significantly, the United States government would demonstrate its endorsement for this technology and physicians and hospital systems alike would begin to embrace cybersurgery themselves.

Part IV – Conclusion

The benefits of cybersurgery are profound. They include increased efficiency, cost-savings, improved quality in the surgical arena, and a potentially large and profitable export in the global cybersurgical market. The United States health care system is in an unsustainable state of growth without any companion increase in quality, and cybersurgery could begin to combat that trend. Some of the numerous obstacles facing the widespread application of cybersurgery are daunting. However, if the United States does not take expeditious steps to embrace cybersurgery and reap its overwhelming benefits, the state of the health care system in the United States will continue to deteriorate. Additionally, global competition for market share in the cybersurgical services industry will intensify leaving the American healthcare system in a perilous situation. The benefits of cybersurgery are easy to grasp and many of

129. *See* McLean II, *supra* note 4, at 519 (discussing the move to Centers of Excellence).

130. *Cf.* Dep't of Health & Human Services, Centers for Medicare & Medicaid Services, *available at* http://www.cms.hhs.gov/DemoProjectsEvalRpts/ (follow "Medicare Demonstrations" hyperlink) (last visited Apr. 1, 2007) (listing 46 current demonstration projects).

131. *See* Dep't of Health & Human Services, Centers for Medicare & Medicaid Services, Overview, http://www.cms.hhs.gov/DemoProjectsEvalRpts/ (discussing affects of prior demonstration projects).

the obstacles are easy to clear – the United States simply needs to take action.