The Treatment for Malpractice – Physician, Enhance Thyself: The Impact of Neuroenhancements for Medical Malpractice

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THE TREATMENT FOR MALPRACTICE – PHYSICIAN, ENHANCE THYSELF
THE IMPACT OF NEUROENHANCEMENTS FOR MEDICAL MALPRACTICE

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Key Search Terms: medical malpractice; neuroenhancements; neurointerventions; neuroscience; cognitive enhancement; standard of care

I. Intro

Twenty four hours into his shift, Dr. Burns was walking his rounds like a zombie. Going through the motions, dispensing orders for meds and making calls on patients he could barely think about, he was covering rounds for another doctor who called in sick. These days were routine, much like his internship and residency, in which 30 hour shifts were common. And he had seen it all before - pain after surgery, a pulled suture or two, resetting a problem port in the chest, and the occasional abdominal pain, likely due to constipation caused by pain meds. Give them the normal course of action, a laxative, chart that for the next doctor, and give it time to work. Only this time, the stomach pain happened not to be constipation. The pain was caused by an infection made possible by a nick in the colon gone unnoticed during surgery. And Dr. Burns’ fatigue made him choose the easier course of action and the most likely and intuitive response to these symptoms. It was also the decision that took less time and mental energy to dispense.²

¹ Harvey L. Fiser, J.D., Associate Professor Business Law, Else School of Management, Millsaps College, Jackson, Mississippi.
² See Sallie J. Weaver, PhD, David E. Newman-Toker, MD, PhD & Michael A. Rosen, PhD, Reducing Cognitive Skill Decay and Diagnostic Error: Theory-Based Practices for Continuing Education in Health Care, 32(4) J. CONT. EDUC. HEALTH PROF. 269, 270 (2012) (explaining the dual-process theories related to diagnostic reasoning and decision making where experienced clinicians engage efficient Type 1 processes when a pattern of symptoms are recognized); see also, e.g., Shai Danziger, Jonathan Levav, & Liora Avnaim-Pesso, Extraneous Factors in Judicial
The problem here is likely manifold - too few doctors making the rounds, too many work hours, too many patients, and increasing pressure at the intersection of insurance and medicine to move quicker and lower costs. But one certain issue is that Dr. Burns simply doesn’t work well fatigued. In fact, he is not alone. Studies indicate that fatigue, stress, and anxiety are significant causes of medical errors.3

So clearly a simple solution is just to limit the number of hours Dr. Burns can work, say to 16. That should fix it. Unfortunately, studies also show that another potential place for error is the “passing off,” or transfer, from one doctor to another during shift changes, this problem is increased when limiting the number of hours a doctor may work in a shift.4 As more shift changes are needed, there are more changes in medical providers for each patient, increasing the chances of error.

So what is a doctor or hospital to do? Should they make a supply of Red Bull or more coffee available? Or what if there were another, simpler, and more effective way. What if we

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Decisions, 108 (17) PROC. NAT’L ACADEMY SCI. 6889 (April, 2011) (“research suggests that making repeated judgments or decisions depletes individuals’ executive function and mental resources, which can, in turn, influence their subsequent decisions. . . . Sequential choices and the apparent mental depletion that they evoke also increase people’s tendency to simplify decisions by accepting the status quo.”).

3 Weaver, supra n.2; Working Hours, Fatigue, and Medical Malpractice, 14(4) MEDSURG NURSING 218 (August 2005). See also, Barron H. Lerner, A Case that Shook Medicine, WASH. POST, (Nov. 28, 2006), available at http://www.washingtonpost.com/wp-dyn/content/article/2006/11/24/AR2006112400985.html (detailing one of the more infamous examples of malpractice resulting from fatigue and overwork is the 1984 case of 18 year old Libby Zion who died from a dosing error under the care of medical students working a 36 hour shift). For further discussion of sleep deprivation during residency programs and on malpractice cases, see, Danielle M. Scavuzzo, The Resident Remedy: A Judicial Solution to the Problem of Sleep Deprivation in Medicine, 78 U. MO. KAN. CITY L. REV. 263 (Fall 2009).

could give Dr. Burns a pill that would make him alert, attentive and responsive during his entire shift - something different from mere caffeine, something that would enhance Dr. Burns’ cognitive functioning, be non-addictive, and allow him super-human attributes. Adderall is just the tip of the iceberg!

Coming to a hospital near you, the medically enhanced doctor, a doctor who thinks faster, is better with short and long term memory, is calmer during surgery, can work double shifts with little cognitive fatigue, and one day may have the memories of years of experience without actually having had them. In the words of the 1970’s TV series The Six Million Dollar Man, “we can rebuild him, we have the technology, . . . better than he was before, better, stronger, faster…..”\textsuperscript{5}

So, if we can “make” this doctor, then why shouldn’t we? And if we do, what happens to the standard of care in medical malpractice cases? What will be the effect on all of those other doctors who choose to remain “normally unenhanced,” or to the practice in general? Will these “super docs” increase the standard of care for all doctors, or will we hold those enhanced doctors to a different standard than other doctors? Perhaps the invisible hand of the marketplace will make doctors who refuse to enhance themselves obsolete. And, if these enhancements can be shown to improve patient care, then should we mandate them for all physicians who would benefit?

This article will introduce some of these issues and offer some possible guidelines which may eventually guide cases of medical malpractice and medical care in the face of neurointerventions. First, I will briefly address the standard of care in medical malpractice

\textsuperscript{5} \textit{The Six Million Dollar Man} (Harve Bennett Productions, Silverton Productions & Universal Television 1974-1978).
cases in general. Second, I will discuss some of the existing and potential physical and neurological enhancements available for physicians. And finally, I will explore how these neurointerventions could alter the standards for medical malpractice for both the enhanced doctors and the entire medical profession.

II. Causes of Medical Malpractice

Of course, there are many different categories of medical malpractice cases and, within each category, there are many different causes. One of the major categories is misdiagnosis, accounting for between 10 and 20% \(^6\) in some studies to 29% in others. \(^7\) In addition to misdiagnoses, other categories include “treatment errors (27 percent), surgical mishaps (24 percent), obstetrical problems (7 percent), medication errors (5 percent), anesthesia disasters (3 percent) and several smaller groups.”\(^8\)

In examining the diagnostic errors, one Harvard Medical Practice Study found that 75% of misdiagnosis errors involved negligence such as a failure to follow up on test results.\(^9\)

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\(^6\) Mark L. Graber, MD, Robert M. Wachter, MD & Christine K. Cassel, MD, Bringing Diagnosis into the Quality and Safety Equations, 308(12) J. AM. MED. ASS’N 1211 (September 26, 2012). See also Sandra G. Boodman, Misdiagnosis Is More Common than Drug Errors or Wrong-Site Surgery, WASH. POST (MAY 6, 2013).


\(^8\) Id.

Another study from doctors at Johns Hopkins found that preventable, diagnostic errors resulting in injury or death range annually from 80,000-160,000.\textsuperscript{10}

So what causes these errors? Specifically for diagnostic errors, research points to decays in cognitive skills\textsuperscript{11} and faulty clinical reasoning as significant causes.\textsuperscript{12} Central to the focus of this article, factors that may influence diagnostic performance include stress, anxiety, fatigue, emotion regulation, self-efficacy, prior experience, and the physician’s baseline of skills or expertise.\textsuperscript{13}

Many believe that time and experience can help in the diagnostic phase, reducing medical errors the more experience a doctor has in practice. However, experience also means age, raising another malpractice issue – declining physical and cognitive skills.\textsuperscript{14}

Some studies on aging physicians attempt to connect the specific cognitive and physical declines of aging and incidents of malpractice, but even the author notes that “the problem has attracted only scant interest and little study.”\textsuperscript{15} With these limitations, these studies do offer some evidence of a link in cognitive and physical decline of the doctor to malpractice cases and are illustrative of other malpractice cases. One issue is the changes in medical education over

\begin{itemize}
  \item \textsuperscript{10}Brown, \textit{supra} at n.7 and Saber Tehrani, \textit{supra} at n.7.
  \item \textsuperscript{11}“The human performance literature defines skill decay as loss or decline in the quality of acquired knowledge or skills over time due to nonpractice and nonuse. This differs from cognitive decline associated with disease or aging. Diagnostic skill decay can thus be defined in terms of breakdowns in the diagnostic reasoning process. More specifically, absolute skill decay is defined as loss of skills from a prior base-line and is differentiated from relative skill decay, defined as skills stasis in the face of changing scientific knowledge and diagnostic standards over time.” Weaver, \textit{supra} n.2 (citations omitted).
  \item \textsuperscript{12}Weaver, \textit{supra} n.2.
  \item \textsuperscript{13}Weaver, \textit{supra} n.2 at Table 1.
  \item \textsuperscript{14}Ralph B. Blasier, MD, JD, \textit{The Problem of the Aging Surgeon: When Surgeon Age Becomes a Surgical Risk Factor}, 467 (2) \textsc{Clinical Orthopaedics Related Res.} 402 (Oct. 31, 2008).
  \item \textsuperscript{15}Blasier, \textit{supra} n.14.
\end{itemize}
time. The older the doctor, the more outdated the information taught in medical school becomes and the more remote the training.\textsuperscript{16} While doctors must continue their education to remain current in the field, cognitive skill and knowledge decay will continue.\textsuperscript{17} As cognitive skills and knowledge decline, faulty clinical reasoning becomes more prevalent.\textsuperscript{18}

One group of medical leaders suggest that another part of the problem is the “increasing fragmentation of the health-care system, as well as relentless time pressures squeezing doctors and the overuse of expensive, high-tech tests that have supplanted traditional hands-on skills of physical diagnosis.”\textsuperscript{19} These researchers seem to suggest that altering the practice of medicine may solve some of the malpractice issues associated with the identified issues. While “relentless time pressures” and other administratively based “problems” may be some of the “causes,” perhaps the real issue is the doctor’s physical or mental inability to work through these pressures.

Some of the suggested solutions involve administrative changes such as electronic medicine cross-checking, electronic charting, and other safeguards on physician decision making. These “solutions,” however, are merely checks for physician error rather than treatments for the root cause of the potential mistakes. While these checks on performance

\textsuperscript{16} Blasier, \textit{supra} n.14.
\textsuperscript{17} See Weaver, \textit{supra} n.2.
\textsuperscript{18} “The human performance literature defines \textit{skill decay} as loss or decline in the quality of acquired knowledge or skills over time due to nonpractice and nonuse. This differs from cognitive decline associated with disease or aging. Diagnostic skill decay can thus be defined in terms of breakdowns in the diagnostic reasoning process. More specifically, \textit{absolute skill decay} is defined as loss of skills from a prior base-line and is differentiated from \textit{relative skill decay}, defined as skills stasis in the face of changing scientific knowledge and diagnostic standards over time.” Weaver, \textit{supra} n.2 (citations omitted).
\textsuperscript{19} See Graber, \textit{supra} at n.6 and Boodman, \textit{supra} at n.6.
are likely valuable, prevention of the physicians’ physical or cognitive deficiencies that cause the mistakes may be equally helpful.

III. Standard/Duty of Care

While studies have attempted to categorize the causes of malpractice errors in medicine, of more importance in this discussion are the legal standards in a malpractice case and whether those cases would change with the introduction of neurointerventions.

In general, medical malpractice cases track general negligence actions. In these claims, the plaintiff must show there was a duty of care owed to the plaintiff; a breach of that duty by the defendant, harm to the plaintiff, and that the actions of the defendant caused the harm to the plaintiff. For the purposes of this paper, I will focus on the duty of care and the breach of that duty. To determine if a breach has taken place, we must look to the “standard of care” in the medical profession. The core part of the standard of care discussion in all medical malpractice is to establish a baseline for comparison to the medical standards and practices in the “field.” This is typically done by eliciting testimony from other physicians. However, far less established, is defining the “field” of standards against which medical care is compared.

A. Skills:

In general a doctor must use care which is reasonable in light of the superior learning and knowledge and any special skills or training they may have. A doctor will ordinarily be

21 Michael D. Greenberg, Medical Malpractice and New Devices: Defining an Elusive Standard of Care, 19 Health Matrix 423, 427 (Spring 2009).
22 Greenberg, supra n. 21, 427.
understood to have the standard professional skill and knowledge of those in good standing in the medical profession. While some may call this an “average” physician, that is not quite accurate. It is only those doctors in good standing who are considered for comparison. Within those of good standing, it is not the average of all of those doctors, but only the minimum standard of that group. But, a doctor may voluntarily raise his own standard of care to which he will be compared. For example, if a doctor makes assertions about his own abilities or the outcomes of a case beyond mere promises, possibly in contract, then that doctor is held to his stated standard. Further, if a doctor holds himself out to have a specialty or greater skill, then the doctor is held to that higher standard of his cohort group.

B. Comparative Skills

To determine what the comparative norm is for a doctor, courts will often consider a standard of care using the “degree of care and skill employed by qualified physicians in the same ‘school’ as the defendant physician.” This “school” was historically based on a physician's locality. This standard was later expanded to “similar localities” and, more recently, included a comparison to those in “the defendant physician's field of specialization.”

These locality and specialization comparatives often made medical malpractice cases difficult.

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23 Prosser, supra n.20 at § 32, p.187.
24 Prosser, supra n.20 at § 32, p.187.
25 Prosser, supra n.20 at § 32, p.187.
26 Prosser, supra n.20 at § 32, p.186.
27 Prosser, supra n.20 at § 32, p.186.
28 Sam A. Mcconkey, IV, Simplifying the Law in Medical Malpractice: The Use of Practice Guidelines as the Standard of Care in Medical Malpractice Litigation, 97 W. Va. L. Rev. 491, 498 (1995) (citations omitted); Prosser, supra at n.20.
29 Mcconkey, supra n.28.
30 Mcconkey, supra n.28.
for the plaintiff to win. To establish the locality standard, the plaintiff would need a local
doctor willing to testify against the defendant doctor. This often proved difficult when doctors
refused to testify against one another, creating a potential “‘conspiracy of silence’ in the
plaintiff’s locality, which precludes the possibility of obtaining expert testimony.” 31

These local standards are now giving way to a more modern global approach to medical
comparative standards. “The potential for unjustifiable divergence in standards of medical care
based solely on geography, particularly given modern access to technology in almost all
communities, led most states to rethink their strict approach to the locality rule.” 32 “At least
twenty-nine states and the District of Columbia have adopted a national standard of care for
medical negligence litigation . . .” 33

Regardless of whether the measure is locality, discipline, or even to practice guidelines,
the standard of what counts as malpractice remains mostly linked to norm-referenced
standards as opposed to criterion-referenced standards. 34 In other words, what makes a doctor

31 E. Lee Schlender, Malpractice and the Idaho Locality Rule: Stuck in the Nineteenth Century, 44
32 Mcconkey, supra n. 28 at p. 498.
33 Robert Jenkins, Chaos in the Community: Unraveling the Mess That is North Carolina’s “Same
or Similar Community” Standard of Care, 6 CHARLOTTE L. REV. 63, 66 (Spring 2015) (citations
omitted).
34 Carter L. Williams, Evidence-Based Medicine in the Law Beyond Clinical Practice Guidelines:
What Effect will EBM Have on the Standard of Care?, 61 WASH. & LEE L. REV. 479, 483 (Winter
2004 ). “CPG’s are ‘systematically developed standards to assist the practitioner and patient
decision about appropriate health care for specific clinical circumstances.’” (quoting GUIDELINES
FOR CLINICAL PRACTICE FROM DEVELOPMENT TO USE, 27 (Marilyn J. Field & Kathleen N. Lohr eds.,
1992)). Even in light of CPG’s and the fact that some jurisdictions are attempting to move away
from custom based phraseology in their standard of care language, “the degree to which a
medical practice is unique or generally accepted remains part of the evidentiary framework.”
From the use of testimony of expert witnesses, the standard of care is often based on
comparative evidence. “Thus, even when courts claim to employ a standard of care that is not
negligent is not just that he failed to do “x” number of required things, but that he failed to do “x” number of required things that other doctors would do. This distinction becomes important when considering how we may alter a physician through neurointerventions and when the physician becomes “different” than his comparative group.

C. Conflicting and Shifting Standards of Care

1. Clinical Equipoise

So what happens in a case where there are two seemingly equal medical courses of action? In cases of two conflicting techniques and a lack of evidence on which is best, we must look to the standards in the locality, similar locality, or similar practice. But, if given two equally acceptable courses of action, physicians are given wide latitude. Through the “error of judgement rule,” “if two or more acceptable schools of thought exist on a particular course of medical treatment, a physician is not negligent for choosing one course over another. In theory, the error of judgment rule permits a physician to exercise alternative treatment methods by admitting evidence of an accepted course of treatment.”

2. Reasonable Care

Nearly half of the states have adopted a “reasonable care” standard. In theory, “[r]ather than being based on what the majority of medical practitioners actually do, this standard is based on what is ‘reasonable to expect of a professional given the state of medical

\[\text{Based on custom, they nonetheless may allow evidence of custom to play a paramount role in the analysis.} \text{ Williams, supra n.34 at p. 504.}\]

\[\text{Mcconkey, supra n. 28 at p.501 (citing Mark A. Hall, The Defensive Effect of Medical Practice Policies in Malpractice Litigation, 54-2 LAW & CONTEMP. PROBS. 119, 126 (1991)). See also Anna B. Laakmann, When Should Physicians be Liable for Innovation, 36 Cardozo L. Rev. 913, 925 (February 2015).}\]
knowledge at the time of the treatment in issue.” 36 This reasonable care standard may allow courts more latitude in reviewing medical knowledge and customs. 37 As dramatic a shift as this may seem, the standard of care remains comparative, just a widening of the comparative information. Juries would be allowed to hear what other doctors in other locations do in similar circumstances and to hear about medical advances and changes in practice. In reality this change has little effect on the comparative nature of the standard of care, particularly since most information presented in court would be done by medical experts who will testify to what could or should be done. 38

3. Staying Up-to-Date and Medical Advances

If the standard is measured by comparative standards, then how could a doctor implement a new technique or an experimental treatment? Since the standards are in one way or another based on a comparative standard, a new technique would, by definition, be outside of the normal standard of care. 39 Courts have addressed these issues and have found that “delivering experimental treatment in a clinical trial does not of itself constitute malpractice, even though such trials might otherwise be viewed as a departure from customary care.” 40

Perhaps more difficult would be the use of a new medical device or drug approved by the FDA. While the comparative standards discussed above would still apply, it would be more difficult to find other physicians who had used the new techniques or drugs. One commentator contemplates that courts may compare the risks of the new device or drug with the risks of the

36 Greenberg, supra n.21 at 429.
37 Greenberg, supra n.21 at 429.
38 See Greenberg, supra n.21 at 429.
39 Laakmann, supra n. 35 at p.916.
40 Greenberg, supra n.21 at 429-30.
status quo. If the risks are similar or less than the standard treatment and the new treatment offers benefits, then comparative testimony may be favorable – finding that it was reasonable to take the new course of action. However, if the risks are greater, then the comparison testimony may not be as favorable to the doctor. The greater the unknown or the greater the risk of the new procedure, the more likely a successful plaintiff malpractice case will be.41 These shifting standards based on risk, reward, and potential outcome illustrate the difficulty in meeting patients’ constantly expanding expectations and in meeting the shifting comparative standard of care.

Further, doctors have a “‘duty to stay abreast,’ which means that physicians have an obligation to be aware of evolving practices in medical care, and to make appropriate use of new scientific knowledge in medicine as it emerges.”42 “A physician's duty to keep current on the latest medical developments is an integral component of the standard of care.”43 For example, in Nowatske v. Osterloh the court noted that the skill and judgment to which the medical professional should be held is not necessarily that of “customary practice,” but rather “the practice of physicians who keep abreast of advances in medical knowledge.”44

New technologies also affect the standard of care.45 In fact, there have been several notable cases in which doctors have been held liable for malpractice in cases where they failed to adopt new methods of technology that had not yet become industry standard.46 Malpractice

41 Greenberg, supra n.21 at 431-32.
42 Greenberg, supra n.21 at 430.
45 Laakmann, supra n. 35; Greenberg, supra n.21; and Jurevic Sokol, supra n.43.
46 See Greenberg, supra n.21 at 432-33 and Jurevic Sokol, supra n.43.
has been found in cases including such actions as a failure to perform glaucoma tests on patients under 40 when not standard practice, failure to use the newest techniques for oxygen delivery of newborns when other methods were common, and a failure to use a database of adverse medication effects at the dawn of such technologies have all been found to be malpractice. These types of cases clearly show that the legal duty of care shifts and is often difficult to determine when new technology becomes available. While these cases are related to the care delivered by the physician during practice, the same may be true in the decision to enhance the doctor herself. While availability of an internet database is not a direct enhancement to the doctor, the failure to avail herself of the information during treatment of a patient could be malpractice. Similarly, an accident caused by poor eyesight due to the failure to wear prescribed corrective lenses during a surgical procedure would almost certainly be malpractice. While these are external “interventions,” as other forms of enhancing become standard in the practice and are shown effective, at what point does a practitioner commit malpractice by being unenhanced?

These issues raise an interesting side dilemma for medical professionals. With widely available information, when patients search to determine the appropriateness of what their doctors should have done, they may find there is a potentially better treatment. They, of course, want their doctor to have used that treatment, even if other doctors do not currently

47 Jurevic Sokol, supra n.43 (discussing Harbeson v. Parke-Davis, Inc., 656 P.2d 483 (Wash. 1983) (failure to perform literature search on the adverse effects of Dilantin resulted in malpractice liability for wrongful birth); Oelling v. Rao, 593 N.E.2d 189 (Ind. 1992); Helling v. Carey, 519 P.2d 981 (Wash. 1974) (holding that a failure to perform glaucoma pressure test on a patient under age 40, while not customary practice, was malpractice)).
48 Laakmann, supra n. 35.
use it. This places doctors in the middle of two conflicting desires of the patient: 1) don’t expect unusual medical treatment and 2) expect the doctor to do whatever works. Doctors may feel anxiety over these decisions as they cannot tell ahead of time which would count as the effective treatment and may be pressured to push newer developments to please patients and provide the best services.

4. What Does the Doctor Say He Can Do?

Finally, doctors will be held not only to community standards, but also to their own standards. If a doctor makes an affirmative statement of what he can do, that could be a contract of performance. There are numerous examples of contracts between doctors and patients, many of which have been found enforceable and involve some assertions of a cure or remedy. For example, in Gill v. Schneider, a doctor had business cards that stated “[c]an cure any and all chronic diseases, also remove cancers and tumors without operation or drugs.” In its instructions to the jury, the court noted that this case was for a breach of contract and that the tumors had not been cured. There are significant other examples including many promises of failed sterilizations after vasectomies or tubal ligations.

In addition to contract type promises, a doctor could raise his own standard of care by his training and specialty. Any doctor who holds himself out to have a specialty or greater skill is held to that higher standard. In fact, some have argued that common jury instructions “that

50 110 P. 62, 63 (Co. 1910).
51 Id.
53 PROSSER, supra n.20 at § 32, p.187. See also R. E. LaG, Physician’s or Surgeon’s Warranty of Success of Treatment or Operation, 27 A.L.R. 1250 (1923).
the physician must use her ‘best judgment’ by relying on any superior knowledge or skill that she possesses” actually creates a standard of care greater than the “average reasonable practitioner.”

5. **Comparison Age, Gender or Other Categories of Comparison**

While it may seem obvious, given the discussion of the standards of care above, that there would be none, it is important to note for this article that there appears to be no shift in the standard of care for doctors with faltering abilities due to age or other issues. In other words, the standards do not seem to decrease (or increase) over time for aging doctors. They are not compared to doctors of the same age or physical capabilities, only those in the same specialty, locality, or comparative standards, depending on the jurisdiction’s standard of care. Essentially, however, this pushes medical professionals to make sure they are at least as skilled as everyone else – perhaps pressuring them to make sure they were always slightly better than others. If the standard of care requires certain physical or mental abilities of our doctors, then falling below the abilities required would mean the doctor could no longer meet her standard of care. This certainly creates an affirmative duty to enhance education and to remedy such common ailments such as eyesight or high blood pressure. It could also mean correcting other age related declines or physical/mental deficiencies. In the near future, however, it could also mean enhancing to keep up with others who are physically and mentally superior, either through the natural lottery or through neuroenhancements.

Looking specifically at aging physicians, they have their own set of issues. For example:

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54 Laakmann, *supra* n. 35 at p. 926-27.
a)  **Physical**

The first items to go are typically strength and eyesight and soon followed by dexterity and finally cognitive abilities.\textsuperscript{55} While knowledge and experience can be factors which can increase with time and age, those factors may not be enough to compensate for the loss of physical and mental decline.\textsuperscript{56} Physical skills begin to decline around age 28, yet, “it is widely agreed that most surgeons reach their peak of overall performance around the second half of the fifth decade (45-50 years of age). What appears to be happening is that, for more than two decades, growing experience can and does more than compensate for diminishing physical skills.”\textsuperscript{57}

b)  **Cognitive Decline**

Studies on the effects of aging have shown major declines in “reactivity, attention, numeric recall, verbal memory, visuospatial facility, reasoning and mental calculation.”\textsuperscript{58} By age 75, physicians lose approximately 25% of their starting scores on tests designed to detect “impaired competence occurring late in a physician’s career.”\textsuperscript{59} Specifically, these tests measure “reactivity, attention, numeric recall, verbal memory, visuospatial facility, reasoning, and mental calculation”\textsuperscript{60} The decline is rapid among those over 60.\textsuperscript{61} One New Zealand study of practicing psychiatrists over the age of 55 found that 49% reported greater confidence and

\textsuperscript{55} Blasier, supra n.14.
\textsuperscript{56} Blasier, supra n.14.
\textsuperscript{57} Blasier, supra n.14.
\textsuperscript{58} Blasier, supra n.14.
\textsuperscript{59} Blasier, supra n.14 (“Trunkey and Botney have developed a series of tests, together named the ‘Microcog.’”) (citations omitted).
\textsuperscript{60} Blasier, supra n.14.
\textsuperscript{61} Blasier, supra n.14 (citing D.D. Trunkey & R. Botney, Assessing Competency: A Tale of Two Professions, 192(3) J. AM. COLL. SURG. 385 (March 2001)).
competence, 21% reported a more mature life perspective, and 22% reported that age
corroded greater credibility and respect. “However, 27% reported fatigue interfering with
work, 12% [had] difficulty keeping up with advances in knowledge, and 10% [reported] poor
memory.” 62

   c) American Medical Association’s Position on Physician Competence

   The American Medical Association recognizes that aging and its complications can have
a significant impact on the practice of medicine. The AMA’s ethical guidelines state:

   To preserve the quality of their performance, physicians have a responsibility to
maintain their health and wellness, construed broadly as preventing or treating
acute or chronic diseases, including mental illness, disabilities, and occupational
stress. When health or wellness is compromised, so may the safety and
effectiveness of the medical care provided. 63

   Clearly the AMA statement is an affirmative call for doctors to be at their healthy
physical and mental capacity. Likely, this includes correcting and treating illnesses and age
related declines to the extent possible even absent a malpractice mandate. 64

IV. Neuroenhancements for Medical Providers

   It is clear there are several pressures which could cause malpractice standards to shift,
from new technology to shifting comparative standards. Further, there are many

62 Blasier, supra n.14 (citing L.J. Greenfield & M.C. Proctor, When Should a Surgeon Retire?, 32
ADV. SURG. 385 (1999)).
63 Stuart A. Green, MD, Clinical Competence and the Aging Surgeon, AM. ACAD. ORTHOPAEDIC
SURGEONS NOW (September 2008) available at
http://www.aaos.org/news/aaosnow/sep08/managing3.asp (quoting American Medical
Association Ethical guidelines).
64 See Green, supra n.63 (discussing aging physicians and the need for maintaining healthy
lifestyles and taking measures to mitigate any health or wellness problems).
circumstances which may factor in a malpractice case including stress, anxiety, fatigue, emotion regulation, self-efficacy, prior experience, reactivity, attention, memory, and the physician’s baseline of skills or expertise.\textsuperscript{65} The recommendations for reducing malpractice cases are varied, but include continuing education to boost skills and improve diagnostic efficiency,\textsuperscript{66} treat cognitive or physical declines/illnesses in physicians,\textsuperscript{67} and even suggest retirement for aging physicians.\textsuperscript{68} But what if, in addition to all of the efforts by providers to reduce malpractice cases, we could also physically or cognitively enhance our doctors, making them less prone to the malpractice pitfalls in the first place? Beyond continuing education or mandatory retirement, there may be a more direct physical or neurological intervention method to create a better doctor – enter neurointerventions.

A. What is a Neurointervention?

Neurointerventions describes modifications (cognitive enhancers) which cover nearly any use of a neuroscientific or neurotechnological technique to alter what has previously been the limits of human abilities or capabilities.\textsuperscript{69} There are numerous categories of possible neurointerventions, many of which have been used for years such as psychological interventions including education, therapy, environmental stimulation, subliminal suggestion, or biofeedback.\textsuperscript{70} Another category is wearable technology. While not typically thought of

\textsuperscript{65} Weaver, supra n.2 at Table 1; Trunkey, supra n.61.
\textsuperscript{66} Weaver, supra n.2.
\textsuperscript{67} Green, supra n.63.
\textsuperscript{68} Blasier, supra n.14.
\textsuperscript{69} Patrick D. Hopkins PhD & Harvey L. Fiser JD, \textit{This Position Requires Some Alteration of Your Brain: On the Moral and Legal Issues of Using Neurotechnology to Modify Employees}, submitted for publication and under review.
\textsuperscript{70} Hopkins and Fiser, supra n.69.
when discussing neurointerventions, these are often some of the most used. Traditionally, these items include prescription glasses, protective clothing, magnifying lenses, or gloves. These items are also going through a technological renaissance. For example, Polo stress shirts, activity trackers, the Apple Watch, RFID tags and EEG controllers are technologies which can alter the behavior of people.  But more in line with the discussion of the neurointerventions in this paper are the pharmacological, the radiological and the mechanical and physiological.

Pharmacological interventions are probably the most commonly recognized type of intervention. These include such widely adopted enhancements such as caffeine, the well publicized Adderall, and a host of other pharmacological substances which can boost alertness, reduce anxiety, change social attitudes, alter memory and affect emotional attachment.

Radiological enhancements can also be used to diagnose, test or alter cognitive functioning. These include the well known Functional Magnetic Resonance Imaging (fMRI) and Positron Emission Tomography (PET) scans for acquiring information about the brain. But more relevant to neuroenhancements are Transcranial Magnetic Stimulation (TMS) or

71 Hopkins and Fiser, supra n.69.
72 A. Smith, Effects of Caffeine on Human Behavior, 40(9) FOOD AND CHEM. TOXICOLOGY 1243 (2002); Hopkins and Fiser, supra n.69.
73 See http://fmri.ucsd.edu/Research/whatisfmri.html.
75 W. Glannon, Psychopharmacology and Memory, 32 J. Med. Ethics 74 (2006); S. Tassy, Disrupting the Right Prefrontal Cortex Alters Moral Judgment, 7(3) SOC. COGNITION AND AFFECTIVE NEUROSCIENCE 282 (2012); L. Young, Disruption of the Right Temporoparietal Junction with Transcranial Magnetic Stimulation Reduces the Role of Beliefs in Moral Judgments, 107 PROC. NAT. ACAD. SCI. 6753 (2010); Hopkins and Fiser, supra n.69.
Transcranial Direct Current Stimulation (tDCS)\textsuperscript{76} which can alter mood, memory, dexterity or moral judgment.

Finally, the most invasive neurointerventions would include mechanical and physiological interventions. Brain implants such as artificial sensory organs or deep brain stimulators may also be used as neurointerventions. Also changes to the brain itself, through processes such as lesioning of the brain tissue or surgery, can alter cognitive functioning.\textsuperscript{77}

1. **Ameliorations versus Enhancements**

Neurointerventions are used for both corrective and enhancing purposes. There is a difference between ameliorating a problem that exists and enhancing a person who functions at a “normal” basis. For example, an aging doctor with Alzheimer’s may take Aricept to temporarily reduce the effects of the disease.\textsuperscript{78} That would be considered an ameliorative intervention – one that is restoring a person’s cognitive and physical abilities to what would be considered normal. These would be to bring that person up to the best normal he or she could be. Other ameliorative examples may be cholesterol drugs, drugs to slow the onset of macular degeneration, arthritis medications, etc. For the purposes of this discussion, these interventions are intended to bring a person back to the “norm” of the population or the medical profession – to correct an advancing age issue or other medical decline, illness or defect. They may also be considered ameliorations in normal healthy individuals where their normal abilities have been taxed or depleted. For example, consider a doctor who has worked

\textsuperscript{76} A. Karim, *The Truth About Lying: Inhibition of the Anterior Prefrontal Cortex Improves Deceptive Behavior*, 201(1) Cerebral Cortex 205 (2010); Hopkins and Fiser, *supra* n.69.

\textsuperscript{77} Hopkins and Fiser, *supra* n.69.

\textsuperscript{78} See http://www.aricept.com/.
Taking a drug to alleviate the fatigue associated with overwork and schedule changes would be considered amelioration, not enhancement. These would merely raise these doctors to the abilities they would normally have during a workday in which they have had sufficient rest. Finally, enhancements are those interventions which are not prescribed to bring up to the “norm” of functioning, but are used for the purpose of going beyond the norm, or even altering the norm.\textsuperscript{79} Neuroenhancements may therefore be categorized into three situations: 1) making defective people normal; 2) making normal but temporarily impaired people abnormally unimpaired; and 3) making normal people supernormal.

B. Examples of Enhancement

- Alertness or Sleep Reduction: Modafinil d-amphetamine (Provigil) and Armodafinil (Nuvigil) are specifically marketed to include the treatment for “shift work sleep disorder, also known as shift work disorder.”\textsuperscript{80} While marketed to those who are unable to switch from night to day work shifts, a physician would find this enhancement useful during long surgery or a long night on call.

- Memory Enhancement: TMS has been shown to improve associative memory,\textsuperscript{81} and general memory has shown enhancement with CREB-cycle activators.\textsuperscript{82} Strychnine has also been shown to improve task memory in animal studies.\textsuperscript{83}

\textsuperscript{79} See https://theconversation.com/the-rise-of-cognitive-enhancers-is-a-mass-social-experiment-40072.
\textsuperscript{80} N. Wesensten, 
\textsuperscript{81} J. Wang, 
• Memory Insertion: Scientists have shown that memory insertion is possible by creating specific false spacial memories.\textsuperscript{84}

• Empathy: “Oxytocin, the so-called love hormone ... increases feelings of social bonding and empathy while reducing anxiety.”\textsuperscript{85} Could a heightened sense of empathy assist a doctor in relating to his patient or to the family during a difficult situation?

• Problem Solving: The chemical methylphenidate had been shown to improve problem solving skills in healthy subjects.\textsuperscript{86} If called upon to consult in a particularly puzzling medical diagnosis, this could be helpful to the doctor in preparing to work through the possible causes of ailments.

• Utilitarian Moral Judgment: The use of Transcranial Magnetic Stimulation (TMS) has been shown to lead subjects to make moral judgments based more on consequences and less on mental states.\textsuperscript{87}

• Dexterity and Fine Motor Control: It is a poorly kept secret that orchestra musicians routinely take propranolol- beta blockers to control stage freight and calm nerves before a performance.\textsuperscript{88}

\begin{footnotes}
\item[82] W. Glannon, \textit{supra} n.75.
\item[87] Young, \textit{supra} n.75.
\end{footnotes}
- **Physical Surgical Enhancements**: For example, Tommy John surgery is the term known in baseball for the repair of a damaged ulnar collateral ligament in the elbow. This surgery is named after the first patient, Dodgers pitcher Tommy John. At age 31 he underwent surgery to repair the damaged ligament and after approximately a year in rehabilitation was able to return to baseball. This surgery has become quite common with statistics of 1 in 7 major league pitchers using this technique to extend their pitching careers.\(^8^9\) Others argue that this procedure makes a player even better than before the surgery.

- **Corrective Vision Surgery**: Millions of Lasik type procedures have been performed to give those with failing eyesight better vision. Tiger Woods, for example, had Lasik surgery performed. He had vision of 20/15 with contacts prior to surgery, but complained of the wind and weather effects on them. After surgery he reports an unassisted 20/15 vision, stating that the “the hole looks bigger and his ability to read greens has improved dramatically.”\(^9^0\) Better than 20/20 would certainly aid a doctor who needed the ability to see small blood vessels or nerves during surgery.

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possibilities come to mind. Recall that neurointerventions may be categorized into three situations: 1) making defective people normal; 2) making normal but temporarily impaired people abnormally unimpaired; and 3) making normal people supernormal. As part of each of these categories, we must determine, “what is normal?” Merriam-Webster includes many definitions of normal, each with a slightly different nuance. One defines normal as “occurring naturally.”91 Another definition in the same dictionary defines normal as “of, relating to, or characterized by average intelligence or development.”92 Equally instructive is the definition “according with, constituting, or not deviating from a norm, rule or principle.”93 Yes, this is basic. But it is also informative of the medical profession and medical malpractice standards. For example, “naturally occurring” mental or physical abilities might be normal for the overall population, but when compared to the population in the medical field, these may be below the average. After all, we are not talking about your average population – this is a subset (graduates of medical school) of a subset (graduates of college) of a subset (typically majors in chemistry, biology or the like) of a subset (high school graduates) of substantial achievers. Additionally, when thinking of aging, a naturally occurring phenomenon, a doctor may actually fall below the “average intelligence or development” of the comparative medical professional group by simply allowing nature to run its course. As closely as the term can be tracked to the medical malpractice standards set forth in the pages above, “normal” in this context refers to the mental and physical abilities of the average comparative cohort of doctors in the similar

fields and localities of practice. In addition to normal, I will refer to and define the terms “optinormal” and the “supernormal” in the following discussions.

1. Making “Defective” People Normal

One of the more straightforward ameliorative enhancements would be if we could make doctors stop aging – or at least slow the aging process. Studies show that doctors improve as they age, with the peak around 50 years of age. 94 From that date forward, age related decline seems to begin to chip away at the gains in experience. 95 Obviously, correcting physical issues would be one part of the corrective process. Declining eyesight could be corrected with the more traditional and well known Lasik 96 surgery to gene therapy showing promise for regeneration of eye tissues. 97 Doctors could begin TMS therapy for memory enhancements and start Modafinil for alertness. For Alzheimer’s patients, solanezumab, the first drug which appears to slow the damage Alzheimer’s does to the brain, would be the next step. 98 Most recently, studies are showing that a transfusion of the blood of a younger person to an older person may improve age related decline – potentially rejuvenating the brain. 99

94 Blasier, supra n.14.
95 Blasier, supra n.14.
Through these and other future developments, doctors may be able to work for more years, utilizing that experience factor that comes with age, but without the decline associated.

Beyond age, other defects may be corrected with neurointerventions which may bring doctors back to normal standards. For example, a diagnosed case of ADHD may be treated with Adderall or certain cases of narcolepsy may be treated with Modafinil. Antidepressants and antianxiety drugs prescribed for doctors who show abnormal levels of depression or anxiety would also fit this category. Each of these would be considered as ameliorating diagnosed conditions which effectively have placed the doctor in an “abnormal” condition relative to his comparative groups. Taking these neurointerventions is corrective, meant to bring that doctor to the status of other normally functioning physicians – i.e. back to “normal.” Not only does simple logic support this use of neurointerventions, but the AMA ethical guidelines seem to also support the use of such normative interventions.  

2. Making Temporarily Impaired People Abnormally Unimpaired.

Going beyond ameliorating declines due to normal, but not temporary, aging or other physical and mental impairments, doctors may use enhancements to continue to perform when their abilities have been taxed or depleted. For example, consider a doctor who has been “on call” from Friday afternoon through early Monday morning. Perhaps because it is a holiday weekend, the number of calls has been particularly high and beyond what is expected of one person, but all other available doctors are out of town and the doctor must press on. As a surgeon, she has been called in time and time again, causing her to sleep little or none in a 36 hour period. To help alleviate the fatigue associated with over work, she takes Provigil to

100 See supra at section III.C.5.c).
remain alert and awake during the remainder of her work through the weekend. She may not
have a prescription for Provigil, as she has no diagnosis of narcolepsy or shift work sleep
disorder, but she is aware that taking this medication will assist her in performing her job and
retaining her normal cognitive abilities.101 This use of neuroenhancements would be
categorized as simply bringing that doctor to a normal cognitive state from her sleep deprived
and mentally exhausted state, i.e. bringing her to “optinormal.”

Similarly, a cardiac surgeon faced with an unusually complicated and risky surgery is, not
surprisingly, experiencing quite normal anxiety. “Originally prescribed to treat high blood
pressure, [propranolol] became performance enablers when it became clear that Inderal (the
brand name) controlled stage fright.”102 No less intense than a performance on stage is a
critical surgical procedure. Reports are that cardiac surgeons and OB/Gyn surgeons often take
propranolol to cut anxiety and stop anxiety hand tremors.103 However, none of these uses of
neurointerventions would be considered to be bringing a person to a state of above average
abilities or correcting a defect. These neurointerventions would bring the doctor to a state of
optimum normal performance even in the face of real life, but somewhat less normal
conditions. To enhance in these situations would be to create the “temporarily abnormally
unimpaired” doctor or would bring him to “optinormal.”

101 See Amanda L. Chan, Provigil: Narcolepsy Drug Being Taken by People Without the Sleep
Disorder, THE HUFFINGTON POST (July 18, 2012) available at
102 Musicians Use Beta Blockers as Performance-Enabling Drugs, W.Q.X.R. (Brian Wise ed.
U.S. found one in four musicians using them to improve their live performances, with 70
percent of those getting their pills illicitly.”
103 Personal interview by author with medical school/hospital administrator, names withheld.
3. Making Normal People “Supernormal”

Finally, neurointerventions may be used to enhance doctors to something more than the “normal” doctor. What if your transplant surgeon could reduce his need for sleep and improve his concentration by taking Modafinil knowing he is facing a 15 hour surgery. While this borders on the category of “optinormal,” there is a difference when doctors preemptively enhance for superior abilities. Our doctor is taking Modafinil to begin the surgery with hyper alertness, above normal acuity, and is able to maintain that beyond normal state during the entire event. The doctor is going beyond the “normal” capacity and into the “supernormal.”

Other neuroenhancements may prove valuable for the medical profession. If called in to consult on a complicated and perplexing diagnosis, the physician could take methylphenidate, a substance shown to improve problem solving, making her a more effective diagnostician. Just before the pre-surgery consult, our surgeon takes Oxytocin to help him be more empathetic to the patient and the family for what they are going through, even though the surgeon has been through the procedure hundreds of times. When asked for an opinion on ending sustaining life support, a doctor could provide two consults: one as he currently is mentally, a normal doctor facing a difficult moral advisory position and a second after using Transcranial Magnetic Stimulation on himself, enhancing his ability to make moral judgments based more on consequences and less on his own current mental state. This alteration of his moral emotional state could, in effect, give the doctor his own “check” on decision making from two moral perspectives.

104 See Mehta, supra n.86.
105 See De Dreu, supra n.85.
106 See Young, surpa n.75.
There are countless other possible interventions available today and, more are on the way. While those mentioned above could have some impact on medical care, soon, advances could have an even greater impact on the practice of medicine. It may be possible to implant memories and other information into the brain, giving a surgeon the experience of having performed a particular surgery multiple times without ever having performed it.\textsuperscript{107} Memory enhancements will be more effective. Emotion and mood altering substances will become more targeted. Researchers are constantly finding ways of making our eyesight more acute and our bodies younger. Doctors may become have super-dexterity, able to perform micro-surgery with less external aids. They may have super-haptic sensitivity, able to detect the smallest skin imperfections or internal abnormalities by touch alone. In short, neuroenhancements are poised to create a new class of the “supernormal.”

4. The Artificially Loveable Physician – A Category All Its Own

When asked, what is the single best thing that could be done to lower the risk of being sued for malpractice, one leading medical malpractice defense attorney replied, “Do they make an anti-asshole pill?”\textsuperscript{108} This attorney is not alone in his assessment. According to the vice president of risk management at the Texas Medical Liability Trust, “[p]atients do not necessarily file lawsuits because they believe they were harmed by a medical error. They sue because they believe they were harmed by a medical error and something else happened during their

\textsuperscript{107} See Lavilleon, supra n.84.
\textsuperscript{108} Personal interview with licensed attorney primarily engaged in the practice of medical malpractice litigation and the author, name of the attorney withheld.
care.” One of the suggested causes of malpractice claims is “[f]ailing to listen to patients, spend adequate time with them, and communicate empathetically with them.”

So do they make an anti-asshole pill? Well, sort of. It may be highly addictive, but a Parkinson’s drug called tolcapone has been shown to make people “nicer” and care more for one another, likely because of the increased dopamine response. Perhaps being nicer and more empathetic to the patient and family could help in relationship building which could not only draw out important information from the patient and family resulting in better diagnoses, but also reduce the resentment toward the physician in the event that circumstances do not go as planned. This type of “attitude” adjustment could be considered in any of the other three categories outlined above. For those doctors who find their normal bedside manner more abrasive, this might be preventative/ameliorative, falling into the optinormal category. For those who may have a personality disorder, these may be merely to make our doctor normal. For those who already have an excellent rapport with families, however, this may be an enhancement. While these may not be officially part of the skills as a surgeon, etc. and only related to error prevention, it is still relevant to the practice of medicine. As discussed above, rapport with patients may be an integral part of patient care, or this may just be in the line of

110 TMLT, supra n.109.
112 TMLT, supra n.109.
malpractice lawsuit prevention, better described in the category of, “I make just as many mistakes as other doctors, but you will never sue me because I am artificially lovable.”\textsuperscript{113}

V. Possible Standard of Care Changes with Enhancers

While there have been significant changes in the measure of the standard of care in medical malpractice, the standard of care remains comparative, whether that comparison be of similar specialties, the community, the nation, or other comparative factors. Then if we are comparing doctors to others, then what will be the effect of our optinormally and supernormally enhanced doctors on the standard of care in the medical field? How will the standard of care shift, if at all? There are likely three options: 1) the standard of care does not increase for anyone, remaining unaffected by neurointerventions; 2) the standard of care would increase for those doctors who are enhanced and is now comparable to the community of doctors who are enhanced and 3) the standard of care would increase for all doctors, enhanced and not, creating the “New Normal”\textsuperscript{114} for all doctors.

A. Standard of Care Remains the Same for All

\textsuperscript{113} Quoted from Dr. Patrick D. Hopkins, Philosophy, Millsaps College.
Recall that the standard of care is based on “degree of care and skill employed by qualified physicians in the same ‘school’ as the defendant physician.”\textsuperscript{115} This “school” is often based on “similar localities”\textsuperscript{116} or “the defendant physician’s field of specialization.”\textsuperscript{117} So each doctor’s performance is typically measured against other doctors in similar situations. Assuming that a standard of care does not change when a doctor chooses to better himself through neurointerventions, then any doctor, regardless of any enhancement he chooses to undertake, will be subject to the standard of care as a static point. Of course, a difficulty would be setting that static point. The law already uses a baseline for the standard of care, and not the aspiration or perfect doctor standard. As one commentator put it, “there are doctors who strive beyond what is considered ‘average’ in their profession. . . . While doctors with exceptionally high skills are to be applauded, the appropriate inquiry is how the average doctor practicing in that particular field of medicine would have reacted under the same set of circumstances. A doctor will be held liable only if he fails to meet the standard applied to all doctors in the given field, but will not be held liable for failing to achieve above average results in his practice.”\textsuperscript{118}

So, if doctors are to be measured against the “average” in their profession, then enhanced doctors would be seen as excelling above the pack in both performance and potentially in defending medical malpractice claims. They may be more attentive and more alert than the “average” doctor to whom they are compared.

\textsuperscript{115} Mcconkey, \textit{supra} n.28 (citations omitted).
\textsuperscript{116} PROSSER, \textit{supra} n.20 pp. 187-88.
\textsuperscript{117} Mcconkey, \textit{supra} n.28 (citations omitted).
To keep the standard of care the same, or to “fix” the standard to a particular time, the purpose of much of medical treatment research or advancements could become wasteful. Why innovate, why create new procedures if the old procedures are always fine? Aside from the human goal to improve or to make money on new advances, there would be no legal incentive for improvement. However, the liberty interests of doctors may be advanced by this approach, since there would likely be less pressure to take neuroenhancements for doctors who didn’t want to enhance. If the standards remained the same, then doctors would have no legal need to improve beyond that comparative average practitioner..

Even if we somehow adopted a fixed standard of care, chances are the invisible hand of the market place will increase the standard of care even without other shifts. As information about doctors is more readily available through social media and other information and rank sharing technologies become available, more will be known about each doctor. Enhanced doctors could have a very strong advantage in the medical marketplace in both income (being able to see more patients through the use of neuroenhancements to stay awake longer and be more alert) and in malpractice (being better at their jobs through cognitive and physical enhancements), resulting in seeing more patients because they are more sought after and have made more time for patients.

The above discussion provides what may be possible for enhancements when used to reach a level of supernormal. Similar issues may occur when neuroenhancements are used for ameliorative effects. Older doctors will be able to work more years with less cognitive and physical loss. Whether they choose to do so will be up to them, not as a result of decline. In

\[119\] See, e.g., http://www.healthgrades.com/.
the case of remaining normal, older doctors may, as a group, raise the standards of performance of all doctors. With more experience without the aging declines, our older doctors could be the better doctors.

However, probably the most difficult issue with an argument for a static standard of care would be that the current standard of care is relative to those in the industry; therefore it cannot stay the same in the face of new techniques or changes in practice. If all doctors adopt a new procedure shown to be more effective or safer, then the doctors who choose not to do so are already risking malpractice for falling below the standard of care because they are compared to their cohort.\textsuperscript{120} When a new technology comes along, the standard of care raises ultimately forcing all to adopt it.\textsuperscript{121} If the standard of care didn’t shift, wouldn’t we arbitrarily have to fix standard of care to a certain level of care, i.e. this technology, this technique, etc. So too will follow the standard of care as doctors choose more and more enhancements.

\textbf{B. Standard of Care for Those Choosing Enhancements Increases for Only the Enhanced}

Another option for the standard of care would be a sliding scale based on enhancement use. If a doctor enhances herself to supernormal, then she may be held to a higher standard. Of course, there are many problems with this approach, but the legal precedence does exist to increase the liability standards for only the enhanced. First, courts treat cases involving medical specialties differently than other specialties – comparing doctors within specialties for the cohort comparative. For example, courts would hold a heart surgeon to those standards of a

\begin{footnotes}
\textsuperscript{120} See discussion, supra section III.
\textsuperscript{121} See discussion, supra at section III.C.3.
\end{footnotes}
heart surgeon, not a neurosurgeon’s techniques doing heart surgery.\textsuperscript{122} An ophthalmologist would be held to the standards of an ophthalmologist, not an optometrist. Further, recall one of the basic rules of malpractice, if a doctor holds himself out to have a specialty or greater skill, then the doctor is held to that standard.\textsuperscript{123}

Similar to the comparison in specialty or practice, doctors are held to varying (often increasing) standards when advances in medical care are available to them.\textsuperscript{124} Should there be a difference when the advance in medical care is, not an MRI or a new cancer treatment, but an enhancement to the doctor himself? Couldn’t he be judged by the same level as those who are also enhanced?

Obviously this creates a problem in that the standard of care within specialties would change depending on whether the doctor is “enhanced” or not? But this isn’t a new problem. The law already compares doctors within the specialties they practice, why not add the category of enhanced or not. Perhaps a more difficult question is, how do we establish the cohort against which the doctor is measured? Do we individually test the doctors for enhancements prior to procedures or do we keep a Board Certification of Enhanced Physicians? And what if one physician has enhanced eyesight while another chooses to be alert and attentive for 24 hours? Are they compared to one another, or do we compare enhancements?

Perhaps the easier course is to allow the market to weigh in. The population will choose those doctors who are best at their practice, whether that is because of enhancement or not. If enhancements are eventually shown to reduce malpractice incidents, then this choice

\footnotesize{
\textsuperscript{122} PROSSER, supra n.20 pp. 185.
\textsuperscript{123} PROSSER, supra n.20 pp. 185.
}
may be based on reported malpractice cases, rather than enhancement, although the two may
be tied. Is this significantly different than the draw of some of the major medical centers across
the United States? Traveling for the “best” medicine has become common. The Cleveland
Clinic and the Mayo Clinic for cardiology or the Memorial Sloan Kettering Cancer Center or the
University of Texas MD Anderson Cancer Center for cancer treatment are common destinations
well known for advances in medical treatment.\textsuperscript{125} Current law may hold these clinics and their
doctors to a national standard for treatment; or, more similar to the enhanced physician, would
they hold their treatment to a national standard among only elite institutions?

“Some courts allow jury instructions stating that the physician must use her ‘best
determination’ by relying on any superior knowledge or skill that she possesses, which might dictate
a higher standard of care than that of the average reasonable practitioner.”\textsuperscript{126} “General
negligence principles commonly require that a person not only exercise reasonable care, but
also apply any superior knowledge or skills that he may possess.”\textsuperscript{127} “In other words, ‘[t]he
standard becomes . . . that of a reasonable man with such superior attributes.’”\textsuperscript{128} As one
commentator noted, in the context of medical malpractice, this could be seen from two
different sides: 1) that the physician is compared to those of the “learned profession” and the
attributes of those experts or 2) more specifically to the attributes of a particular physician and

\textsuperscript{125} See http://health.usnews.com/best-hospitals/rankings.
\textsuperscript{126} Laakmann, supra n.35 (citing Joseph H. King, Jr., Reconciling the Exercise of Judgment and
the Objective Standard of Care in Medical Malpractice, 52 OKLA. L. REV. 49, 50 (Spring 1999)).
\textsuperscript{127} King, supra n.126 (citing RESTATEMENT (SECOND) OF TORTS § 289(b) (1965); see also id. §§ 299
cmt. f, 299A cmt. b (stating that if a person rendering professional services “has in fact greater
skill than that common to the profession ..., he is required to exercise that skill ....”)).
\textsuperscript{128} King, supra n.126 (citing RESTATEMENT (SECOND) OF TORTS § 289(b) (1965).
his superior knowledge or skill.\textsuperscript{129} For example, in \textit{Toth v. Community Hospital at Glen Cove},\textsuperscript{130} a case involving oxygen delivery to premature infants, the appellate court held that a physician “should use his best judgment and whatever superior knowledge, skill and intelligence he has” even if that is different than community standards.\textsuperscript{131} In this case, we see an example of how courts may be willing to hold physicians to a higher individual standard of care due to their “superior” knowledge. Why not, then, hold enhanced doctors to a higher standard of care than other doctors?

Just as we currently have premier health clinics in the United States, we could see premier and enhanced physicians – the supernormal. Those enhanced doctors could possibly have higher charges than others, could possibly advertise their better “enhanced” services, but they may also have a correspondingly higher standard of care – good for the patient, bad for the doctor.

But do the supernormal really raise the standard of care for themselves, increasing the potential for being held liable just because they have supernormal abilities? They are no more likely to make errors than an unenhanced, perhaps less so. But what counts as a breach of care could now be different. Knowing more about the practice of medicine, having more skilled hands, better eyesight, being more empathetic, more calm, more alert, and able to stay with one patient for longer hours could all enhance the physician. The physician would now be held to those enhanced standards. If she holds herself out as able to stay alert and attentive to a patient’s needs for 24 hours during that difficult delivery, then she should be held to that standard.

\textsuperscript{129} King, \textit{supra} n.126.
\textsuperscript{130} 239 N.E.2d 368 (N.Y. 1968).
\textsuperscript{131} \textit{Id.} at 372-73.
standard. She should have had the ability to do the microsurgery with tremor free hands and
eagle eye sharpness, because other enhanced physicians can do it and she is now enhanced so
that she can do it. She may not be error free, but that is not the standard of care. She may be
more error free than her unenhanced comparative cohort, but when determining what a
reasonable doctor in the same circumstances is able to do, we must compare her to the
supernormal group, not the normal.

C. Standard of Care Increases for All Doctors Given That These Enhancements are Readily Available

As more doctors become supernormal, the comparative standards will likely increase for
those doctors, particularly if they are in specialties that include doctors who are early adopters.
For example, anecdotal evidence indicates that cardiac surgeons routinely use beta blockers to
reduce anxiety and tremors during surgery.\footnote{132} As more and more of these surgeons take
advantage of beta blockers, just as concert musicians, the practice become the norm. As it
becomes the norm, the standard of care likely increases in that particular specialty – expecting
anxiety free-surgeons. As drugs or other alterations spread through the medical community
and as enhanced doctors enhance the standard of care, then the standard of care for all doctors
will begin to increase.

The raising of the standard of care is the norm when advances in medical care are used.
The adoption of technology often proceeds on a curve, with widespread adoption becoming the
norm.\footnote{133} Once there is more widespread adoption of technology or new techniques, it

\footnote{132} Personal interview by author with medical school/hospital administrator, names withheld.
\footnote{133} See Laakmann, supra n.35.
becomes the standard for all practices.\textsuperscript{134} For example, see the cases referred to above on oxygen delivery to premature infants. On at least two occasions following the current “standard of care” was found to be malpractice. Having superior knowledge and the ability to use new techniques which were believed to cause fewer problems, the failure to use the newest techniques was malpractice. So too could the use of neurointerventions increase the standards. Doctors who regularly work double shifts or are on call during late hours may be more alert and work better with the drug Provigil. This drug is shown to reduce mental fatigue and increase alertness, particularly in shift work – and actually can be prescribed for that purpose.\textsuperscript{135} Would an alert doctor function better than a doctor who is mentally fatigued by the rigors of a long shift? Would a neurosurgeon with anxiety tremors be as good at his job as an enhanced physician who took his propranolol and was tremor free? Soon, the standard could be an alert surgeon with perfect eyesight and no anxiety, the supernormal physician and a supernormal standard of care.

\textbf{VI. Should we Mandate Neurointerventions?}

If the supernormal physician is, in fact, better for overall care of patients, then why not ask all doctors who could benefit from such enhancements to take them. We already expect doctors to use the latest technical advances in medicine on patients. We ask doctors to read the latest studies on treatment and care and expect them to use that knowledge on us as we are treated. So why not improve the provider in addition to what is provided? Should we not adopt, or even mandate, neurointerventions for all of our doctors? Of course, a mandate

\textsuperscript{134} See Laakmann, supra n.35.
\textsuperscript{135} See discussion, supra at p.21.
brings with it questions of liberty, privacy and even safety. So how does the medical profession proceed in this new era?

A. Situation 1, Doctor’s Choice

Of course, allowing doctors to choose whether to enhance is the easiest course of action. Doctors could voluntarily choose to enhance themselves, and in fact, they already do. Beginning in medical school, and likely earlier, doctors are experimenting with neurointerventions for performance enhancement. Adderall and Provigil are becoming the performance enhancers for getting through medical school already. And, they are likely becoming more prolific and accepted in the medical profession as students who are used to enhancing continue through into the profession. As these supernormal doctors enter the medical field and make up a higher percentage of the medical profession, then the questions of the standard of care will become more real.

Aside from the standard of care issues, ethical issues also abound. From the potential side effects to the pressure of falling behind peers, doctors may face difficult choices. The issues to consider are financial, physical, and could even be legal. While a doctor currently has the freedom to choose, his freedom of choice could be made by the marketplace and by malpractice standards. If he remains unenhanced, a physician could see his business decline in favor of the enhanced doctors. Secondly, a failure to enhance may result in her performance level falling below those of her peers of supernormal doctors and therefore her “normal”

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136 J.R. Webb, M.A., M.A. Valasek, & C.S. North, Prevalence of Stimulant Use in a Sample of U.S. Medical Students, 25(1) ANNALS OF CLINIC. PSYCHIATRY 27 (Feb. 2013) (finding as many as 15% of medical students were currently using performance enhancing stimulants, 83% of whom used them specifically for cognitive performance enhancement).
performance is no longer acceptable. In effect, a “new normal”\textsuperscript{137} has been created. So, even if a doctor is given a freedom of choice, as we currently have today, her choices are not completely without consequence.

B. Situation 2, Licensure Mandate or Hospital Policy

In the future, we may find that enhancements are so effective that it would be hard to imagine a doctor performing without them. Enhancements might be seen as so effective that licensure may require doctors to take them.

For example, medical residents are often called upon to work long hours. After calls for reductions in work hours to reduce fatigue in the medical training programs, the Accreditation Council for Graduate Medical Education (ACGME) introduced restrictions on work hours in 2003 and again in 2011. Under the 2003 guidelines, trainees were allowed to work shifts of up to 30 hours. So the ACGME introduced intern restrictions to 16 hour work periods.\textsuperscript{138} However, one study suggests that limiting the hours of interns means that interns “spend less time in the hospital during the day when they have the most opportunity to learn from attending doctors, and could increase the number of times a patient’s care is passed between residents . . . .”\textsuperscript{139} The study found that a reduction in hours may have led to more sleep, although there was no reported improvement in sleep and general well being of the trainees, but the hand-offs actually reduced the quality of patient care. The reported error rate went up from 20% to

\textsuperscript{137}Vincent, supra n.114.  
\textsuperscript{138}Pittman, supra n.4.  
\textsuperscript{139}Pittman, supra n.4.
23%. While there were other suggestions from the study and many other questions raised about why these changes occurred, researchers may determined that working 24 hours straight may actually be better for intern training. So why not allow them, or even mandate it? And better yet, enhance them so that the 24 hours remain productive and the intern remains attentive to patient care and receives a continuous learning experience.

Obviously one of the major issues would be mandating that anyone take a drug against their wishes. However, particularly in the medical field, we already do this. Medical facilities regularly require inoculations of workers against the flu, pneumonia or hepatitis. Each of these “interventions” is not meant for the well being of the medical worker necessarily, but for patient care and overall hospital safety. Is it a stretch to see interns be required to take a pill to make them be alert and attentive in order to increase patient outcome care?

But this mandate is not without costs - physical, financial, and ethical. The financial cost of enhancements would be an increase for either the physician or their employer. More concerning would likely be the potential side effects of these interventions. While side effects may be an issue, mild side effects shouldn’t be a barrier to implementation. Vaccines are mandated with potential side effects, but society (and employers) have balanced those interests with the benefits to patient care and often found them to be appropriate. And yes, we may feel this is an intrusion on the liberty interests of the physician, but the precedence is

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140 Pittman, supra n.4.
there if we find that patient care would outweigh the side effects and liberty interests of the physician.

**VII. Conclusion**

Whether Dr. Burns wants to or not, he may eventually be called upon to take advantage of neurointerventions. Whether through mandate for the benefit of patient care, through rising medical malpractice standards, the inability to compete, or through the invisible hand of the marketplace, neuroenhancements are changing medical practice. Already in medical schools, colleges and even high schools, competition is bringing Adderall and similar drugs to the forefront and to widespread use.142 Already highly competitive places like Silicon Valley are seeing employees using these neurointerventions to compete against other companies and probably against their supernormal co-employees.143 The “new normal” is approaching the workplace, our educational institutions, and our medical profession.

The difference in many of these other scenarios and the medical profession is that doctors are not writing computer code to compete with other computer companies or co-employees. Doctors are responsible for providing patient care at standards that are accepted in the profession. Falling behind the standard of care by a doctor can result in liability for malpractice and catastrophic consequences for the patient. If the goal of the medical profession is patient care, then the emphasis should be on providing that care in the best way

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142 See, Webb, supra n.136.
reasonably possible. The medical profession already mandates that doctors use the latest technological advances and up-to-date research. We already ask our doctors to work extreme hours. Depending on the specialty, doctors must have excellent dexterity, memory, stamina, and calmness. Is it much more to ask them to be alert and awake during those long hours? Is it much more to ask them to enhance their memory or dexterity or attentiveness? And if a pill or non-invasive brain stimulation can help them do these things better and provide better patient care in the process, then is it difficult to ask our physicians to take their own medicine before dispensing ours? Physician, enhance thyself.