

# Artificial Professional Advice

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## ABSTRACT

What does it mean to give professional advice, and how do things change when various forms of technology, such as decision-support software or predictive advice-generating algorithms, are inserted into the process of professional advice-giving? Professional advice is valuable to clients because of the asymmetry between lay and expert knowledge where professionals have knowledge that their clients lack. But technology is increasingly changing the traditional process of professional advice-giving.

This Article considers the introduction of artificial intelligence (AI) into the healthcare provider-patient relationship. Technological innovation in medical advice-giving occurs in a densely regulated space. The legal framework governing professional advice-giving exists to protect the values underlying the provider-patient relationship. This Article first sketches the regulatory landscape of professional advice-giving, focusing on the values protected by the existing legal framework. It then considers various technological interventions into the advice-giving relationship, identifying the changes that result. Finally, it outlines legal responses aimed to integrate AI-based innovations into medical advice-giving while at the same time upholding the values underlying the professional advice-giving relationship. To the extent the existent regulatory framework is responsive to these changes, it ought to be kept in place. But when the introduction of AI into medical advice-giving changes the dynamics of the relationship in a way that threatens the underlying values, new regulatory responses become necessary.

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## INTRODUCTION

We've probably all consulted "Dr. Google" at one point or another. The popularity of health apps on various mobile devices prompt healthcare providers to explore novel ways to incorporate "mHealth" into medical care.<sup>1</sup> The next step involves artificial intelligence ("AI")<sup>2</sup>: in addition to professional use AI, technology companies connect existing consumer-facing technologies to diagnostics AI, creating new avenues of medical advice-giving. For example, a "triage app" gives medical advice through Amazon's Alexa. The founder and CEO of the company that developed "Dr. A.I." reportedly declared that "[t]he connection between Dr. A.I. and Alexa was digital love at first sight."<sup>3</sup> What seems like a new frontier in the delivery of healthcare services actually takes us back to the early days of AI—after all, ELIZA's DOCTOR script, developed in the mid-twentieth century, simulated a psychotherapist.<sup>4</sup>

Commentators seem confident that AI will have a transformative effect on healthcare delivery.<sup>5</sup> And as we may be moving from computer-aided diagnosis to algorithm-generated advice, new technical, medical, and legal questions emerge.<sup>6</sup> But before we can assess these changes, we first need to understand what exactly is different about AI in advice-giving. The professional advice-giving relationship

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1. See, e.g., Nathan Cortez, *The Mobile Health Revolution?*, 47 U.C. DAVIS L. REV. 1173 (2014).

2. As Ryan Calo notes, "There is no straightforward, consensus definition of artificial intelligence. AI is best understood as a set of techniques aimed at approximating some aspect of human or animal cognition using machines." Ryan Calo, *Artificial Intelligence Policy: A Primer and Roadmap*, 51 U.C. DAVIS L. REV. 399, 404 (2017). However, machine learning is most relevant for purposes of this paper.

3. Press Release, HealthTap, HealthTap's Dr. A.I. Meets Amazon's Alexa—Say "Hello" to Your New "Always-On Physician" Powered by Artificial and Emotional Intelligence (Mar. 29, 2017), <http://www.prnewswire.com/news-releases/healthtaps-dr-ai-meets-amazons-alexa----say-hello-to-your-new-always-on-physician-powered-by-artificial-and-emotional-intelligence-300430451.html>

4. See Joseph Weizenbaum, *ELIZA—A Computer Program for the Study of Natural Language Communication Between Man and Machine*, 9 COMM. ACM 36 (1966); Joseph Weizenbaum, *Contextual Understanding by Computers*, 10 COMM. ACM 474 (1967); see also Caroline Bassett, *The Computational Therapeutic: Exploring Weizenbaum's ELIZA as a History of the Present*, AI & SOCIETY (2018), <https://link.springer.com/article/10.1007/s00146-018-0825-9>.

5. See, e.g., Jane R. Bambauer, *Dr. Robot*, 51 U.C. DAVIS L. REV. 383 (2017); Nicolas P. Terry, *Appification, AI, and Healthcare's New Iron Triangle*, 21 J. HEALTH CARE L. & POL'Y 1, 8-9 (2018); Geoffrey Hinton, *Deep Learning—A Technology With the Potential to Transform Health Care*, 320 JAMA 1101 (2018); W. Nicholson Price II, *Artificial Intelligence in Health Care: Applications and Legal Issues*, 14 SCITECH LAWYER 10 (2017); W. Nicholson Price II, *Artificial Intelligence in the Medical System: Four Roles for Potential Transformation*, 18 YALE J. HEALTH POL'Y L. & ETHICS 122 (2019), 21 YALE J.L. & TECH. 122 (2019).

6. See, e.g., Siddhartha Mukherjee, *A.I. Versus M.D.*, NEW YORKER (Apr 3, 2017), <https://www.newyorker.com/magazine/2017/04/03/ai-versus-md>.

is a specific kind of social relationship. Precisely which changes occur within it depends on the type of technology used, and the manner in which it is used within a traditionally human interaction. Thus, novel forms of professional advice-giving involving various types of technologies raise enduring questions about the nature of the provider-patient relationship.

Technological innovation in healthcare occurs in a densely regulated space dominated by asymmetries of knowledge and social relationships based on trust. These relationships are governed by a legal framework of professional advice-giving that consists of several elements, including professional licensing, fiduciary duties, informed consent, and professional malpractice liability. It is designed to protect certain values we associate with human-to-human professional advice-giving. Traditionally, this legal framework assumed interactions between human actors. Introducing AI challenges these assumptions, though I will stipulate that AI does not entirely replace human doctors (for now).<sup>7</sup> This stipulation has a key consequence: the “professional,” at least for the time being, remains the human actor, rather than the machine. Nonetheless, the question arises whether, or how, the regulatory framework should be adapted when technological solutions—including AI—are inserted into the process of advice-giving.

Scholars and policymakers are considering a range of options. One approach offered in the health law literature conceptualizes tech solutions as medical devices and contemplates potential regulation by the U.S. Food and Drug Administration (“FDA”),<sup>8</sup> though it is “increasingly difficult [to determine] what is a medical device in a world ruled by consumer electronics.”<sup>9</sup> Indeed, the FDA has recently issued a whitepaper proposing greater regulatory involvement in medical AI.<sup>10</sup>

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7. See also Price, *Artificial Intelligence in the Medical System*, *supra* note 5, at 124 (noting that while “[s]ome have worried that AI will ‘replace’ physicians,” the more acute question is how AI and clinicians will interact).

8. See, e.g., Nathan G. Cortez, I. Glenn Cohen, & Aaron S. Kesselheim, *FDA Regulation of Mobile Health Technologies*, 371 *NEW ENGL. J. MED.* 372 (2014); W. Nicholson Price II, *Black-Box Medicine*, 28 *HARV. L. J. & TECH.* 419, 457-62 (2015); W. Nicholson Price II, *Regulating Black-Box Medicine*, *MICH. L. REV.* (forthcoming), draft available at <https://ssrn.com/abstract=2938391>; Samuel J. Dayton, Note, *Rethinking Health App Regulation: The Case for Centralized FDA Voluntary Certification of Unregulated Non-Device Mobile Health Apps*, 11 *IND. HEALTH L. REV.* 713 (2014); Kevin Khachatryan, Comment, *Medical Device Regulation in the Information Age: A Mobile Health Perspective*, 55 *JURIMETRICS* 477 (2015); Natalie R. Bilbrough, Casnote and Comment, *The FDA, Congress, and Mobile Health Apps: Lessons from DSHEA and the Regulation of Dietary Supplements*, 74 *MD. L. REV.* 921 (2015); Sarah Jean Kilker, Note, *Effectiveness of Federal Regulation of Mobile Medical Applications*, 93 *WASH. U. L. REV.* 1341 (2016). *But see* Price, *Artificial Intelligence in the Medical System*, *supra* note 5, at 130 (cautioning that “[i]t is seductively easy to focus on FDA as locus of quality control”).

9. Terry, *supra* note 5, at 2.

10. Casey Ross, *FDA Developing New Rules for Artificial Intelligence in Medicine*, *STAT* (April 2, 2019), <https://www.statnews.com/2019/04/02/fda-new-rules-for-artificial-intelligence-in->

Others suggest that AI, independent of its application, should be regulated by a separate agency.<sup>11</sup> I suggest that with respect to professional advice rendered by AI, we ought to start with the traditional regulatory framework of professional advice-giving.<sup>12</sup> This discussion builds on a theory of professional advice-giving that has the doctor-patient relationship at its core and conceptualizes professionals as members of knowledge communities.<sup>13</sup> So doing, it puts scholarship on professional regulation into conversation with the emergent literature on AI governance.

Outside of the medical context, Jack Balkin suggests that a rapid move from “the age of the Internet to the Algorithmic Society” is underway.<sup>14</sup> He defines the Algorithmic Society as “a society organized around social and economic decision making by algorithms, robots, and AI agents [] who not only make the decisions but also, in some cases, carry them out.”<sup>15</sup> In this emerging society, we need “not laws of robotics, but laws of robot operators.”<sup>16</sup> Here, “the central problem of regulation is not the algorithms but the human beings who use them, and who allow themselves to be governed by them. Algorithmic governance is the governance of humans by humans using a particular technology of analysis and decision-making.”<sup>17</sup>

We should likewise begin to consider forms of algorithmic governance in the medical advice-giving context. Rather than assessing each form of AI individually in order to consider whether and how it should be regulated, however, I suggest that we ought to first turn to the traditional regulatory framework that governs professional advice-giving.<sup>18</sup> The distinct advantage of this approach is that the

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medicine, (reporting on U.S. Food & Drug Administration, Proposed Regulatory Framework for Modifications to Artificial Intelligence/Machine Learning (AI/ML)-Based Software as a Medical Device (SaMD), Discussion Paper and Request for Feedback).

11. See, e.g., Andrew Tutt, *An FDA for Algorithms*, 89 ADMIN. L. REV. 83 (2017).

12. To be sure, advice-giving is only one of many functions AI can assume in the medical context that raises its own specific issues. For examples of other applications of AI in the medical system and the various issues they raise see Price, *Artificial Intelligence in the Medical System*, *supra* note 5, at 130-32.

13. See generally Claudia E. Haupt, *Professional Speech*, 125 YALE L.J. 1238 (2016) [hereinafter Haupt, *Professional Speech*].

14. Jack M. Balkin, *The Three Laws of Robotics in the Age of Big Data*, 78 OHIO ST. L.J. 1217, 1219 (2017).

15. *Id.*

16. *Id.* at 1221.

17. *Id.*

18. I have made parts of this argument in much abbreviated form as Claudia E. Haupt, *AI in the Doctor-Patient Relationship: Identifying Some Legal Questions We Should be Asking*, DATA & SOCIETY POINTS (June 19, 2018), <https://points.datasociety.net/ai-in-the-doctor-patient-relationship-1b44dd1b24c8> and Claudia E. Haupt, *The Algorithm Will See You Now*, BALKINIZATION (Oct 26, 2018) <https://balkin.blogspot.com/2018/10/the-algorithm-will-see-you-now.html>.

social relationship, rather than the technology employed in it, is at the center of attention. Importantly, the key question thus is not what is technologically possible but what is normatively desirable.<sup>19</sup> Though scholars have alluded to professional regulation in this context, its application remains underexplored.<sup>20</sup>

This Article proceeds in three parts. Part I outlines the existing regulatory framework of professional advice-giving with an emphasis on the values underlying the professional-patient relationship. It identifies regulatory access points at which the legal system shapes how professional advice is dispensed, and at which it seeks to ensure that the patient receives good advice from the provider. Part II turns to the numerous and varied ways in which technology has disrupted or is likely to disrupt the process of professional advice-giving. The wide range of possible technological innovations has very different effects on the advice-giving relationship. Machine learning AI that directly gives advice to patients poses the greatest challenge to the existing framework. But aside from this specific type of AI, the current regime to a large extent seems sufficiently responsive to technological innovations. Part III considers a range of potential legal responses to these changes at the regulatory access points identified earlier, focusing on normative interests. The goal of these responses is to integrate AI into the professional advice-giving relationship while upholding the values that traditionally characterize that relationship. In so doing, it seeks to provide guidance on what types of policy prescriptions best reflect and preserve the values underlying the provider-patient relationship.

## I. THE VALUES OF PROFESSIONAL ADVICE-GIVING

Technological innovation in healthcare delivery leads to “a transformation in how medical professionals will relate to one another, to patients, and to society.”<sup>21</sup> The medical provider-patient relationship is a distinctive social interaction. The initial focus when assessing changes introduced by technology therefore should be

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19. Cf. Madeleine Clare Elish, *The Stakes of Uncertainty: Developing and Integrating Machine Learning into Clinical Care*, 2018 EPIC PROC. 364 (2019) (“In the current climate of AI hype, it is common for new companies or projects to be technology-driven, as opposed to problem- or community-driven.”).

20. Cf. Price, *Black-Box Medicine*, *supra* note 8, at 457 n.189 (“In addition—and in tension with—the FDA’s regulation of black-box medicine as a medical device, black-box medicine can be considered a form of *practicing medicine*, which is typically not under the FDA’s jurisdiction. Rather, this is governed by state law.”) (emphasis added). See also Terry, *supra* note 5, at 2 (focusing more broadly on “the relationships between . . . various healthcare stakeholders and how emerging technologies impact those relationships or the stakeholders individually”); Bambauer, *supra* note 5, at 383 (discussing “the benefits and drawbacks of treating AI as professionals”).

21. Fazal Khan, *The “Uberization” of Healthcare: The Forthcoming Legal Storm Over Mobile Health Technology’s Impact on the Medical Profession*, 26 HEALTH MATRIX 123, 171 (2016).

on the relationship between providers and patients and the values that underlie this relationship.

This Part sketches the legal framework governing the provider-patient relationship. The core of this relationship is based on competence, trust, and patient autonomy and self-determination. At various regulatory access points, the existing legal framework governing professional advice-giving is designed to implement these values.<sup>22</sup> Where the “practice of medicine” framework is responsive in the sense that it protects the underlying values, the introduction of AI poses no fundamental challenge. But where the technological interventions evade regulatory grasp, changes to the legal framework governing professional advice are necessary.<sup>23</sup>

### *A. Competence and Knowledge*

Medicine historically is considered one of the paradigmatic “learned professions.”<sup>24</sup> The reason medical professionals’ advice is valuable to patients is that professionals possess knowledge that patients lack but that is necessary to enable patients to make important decisions about their own health. The knowledge asymmetry thus is a central feature of the professional relationship.<sup>25</sup> Only accurate, comprehensive advice will enable the patient to make a fully informed decision.<sup>26</sup> From the patient’s perspective, a central value is the reliability of advice. The legal system employs a range of mechanisms to ensure that the needs of the patient are served.

Before professionals may dispense advice to their clients, they are usually subject to licensing by the state. Despite a range of contemporary attacks on professional licensing regimes, it is worth remembering that professional advice requires a certain degree of knowledge, and licensing, properly calibrated, is in fact a useful mechanism to signal *ex ante* the reliability of expert advice.<sup>27</sup>

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22. This is not to say that, as a descriptive matter, the existing framework always adequately protects these values.

23. See *infra* Part III (discussing possible legal responses).

24. Haupt, *Professional Speech*, *supra* note 13, at 1248.

25. *Id.* at 1250.

26. See Claudia E. Haupt, *Unprofessional Advice*, 19 U. PA. J. CONST. L. 671 (2017) [hereinafter Haupt, *Unprofessional Advice*]; Claudia E. Haupt, *Religious Outliers: Professional Knowledge Communities, Individual Conscience Claims, and the Availability of Professional Services to the Public*, in LAW, RELIGION AND HEALTH IN THE UNITED STATES (Holly Fernandez Lynch, I. Glenn Cohen and Elizabeth Sepper eds.) 173, 173 [hereinafter Haupt, *Religious Outliers*] (noting that patients depend on professionals’ accurate, comprehensive and competent advice).

27. See Claudia E. Haupt, *Licensing Knowledge*, 72 VAND. L. REV. 501 (2019) [hereinafter Haupt, *Licensing Knowledge*] (arguing that while there may be good reasons to reconsider currently existing licensing regimes, professional licensing as such does not violate the First Amendment).

In some instances, likewise, AI may “provide sensitive services that, when performed by people, require training and certification.”<sup>28</sup> In terms of regulatory policy, “where AI performs a task that, when done by a human, requires evidence of specialized skill or training” a licensing or certification requirement of some sort might be considered. To date, however, technology has often been employed without licensing or certification as long as it was supervised by a human operator.<sup>29</sup> Presumably, where professional-use AI is supervised by human professionals, these professionals would be licensed as such initially. What that means for their qualifications regarding supervision of AI, however, is a different question. Imagine a licensed physician who is otherwise technology-illiterate tasked with the supervisory function. Supervision of AI, in other words, is only useful if the supervisor is qualified to do so.

A separate question concerns the capability of certain technologies to introduce skills into an environment where human professionals lack them. We might think of autonomous surgical robots as an example. Where highly qualified human surgeons are rare, the technology adds value by bringing an otherwise absent skill.<sup>30</sup> Human professionals dispensing legal, medical, or financial advice are held to fiduciary and other duties. They “must complete medical or law school and pass boards or bars. This approach may or may not serve an environment rich in AI, a dynamic that is already unfolding as the Food and Drug Administration works to classify downloadable mobile apps as medical devices and other apps to dispute parking tickets.”<sup>31</sup> Once licensed, the doctor is also subject to professional discipline.<sup>32</sup>

Another way in which the existing regulatory framework ensures that patients receive good advice from their providers is through protecting the speech within the provider-patient relationship. This is particularly relevant to guard against outside interference, most likely by state legislatures, that contradicts professional insights.<sup>33</sup> Whether traditional First Amendment theory and doctrine applies to AI is subject to debate.<sup>34</sup> With respect to professional speech, however, the answer hinges on the social context in which the speech occurs.

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28. Calo, *supra* note 2, at 417.

29. *Id.* at 419.

30. *Id.* See also Price, *Artificial Intelligence in the Medical System*, *supra* note 5, 127 (“AI can also bring care to patients in situations where provider access is extremely limited or nonexistent.”).

31. Calo, *supra* note 2, at 491.

32. See generally Nadia N. Sawicki, *Character, Competence, and the Principles of Medical Discipline*, 13 J. HEALTH CARE L. & POL’Y 285 (2010).

33. See, e.g., Haupt, *Unprofessional Advice*, *supra* note 26, at 673 (discussing state informed consent laws that require providers to advise patients in ways incompatible with professional insights).

34. See, e.g., Stuart Minor Benjamin, *Algorithms and Speech*, 161 U. PA. L. REV. 1445 (2013); Tim Wu, *Machine Speech*, 161 U. PA. L. REV. 1495 (2013).



Professional speech theory and doctrine remain contested.<sup>35</sup> Whereas several federal appellate courts have recognized professional speech as a separate analytical category,<sup>36</sup> the Supreme Court in *Nat'l Inst. of Family & Life Advocates v. Becerra* most recently emphasized that it has never specifically recognized this category of speech.<sup>37</sup> But under the First Amendment, professional speech is routinely treated differently than other types of speech, and the Court's majority opinion, without further analysis, readily accepted this doctrinal reality.<sup>38</sup>

Unlike other speakers, professionals are constrained in many ways in what they may say. Most importantly, bad professional advice—that is, advice inconsistent with the range of knowledge accepted by the relevant knowledge community—is subject to malpractice liability, and the First Amendment provides no defense.<sup>39</sup> Moreover, the doctrine of content neutrality, despite newly introduced ambiguity,<sup>40</sup> is incompatible with professional speech.<sup>41</sup> Content neutrality ordinarily requires the regulation of speech to be neutral as to its “communicative content,” since content-based regulations of speech “are presumptively unconstitutional.”<sup>42</sup> But the regulation of professional speech, in order to achieve its aim, cannot be content neutral. Indeed, the value of professional advice depends on its content.<sup>43</sup> Nor does the otherwise applicable doctrine of prior restraint prevent states from imposing licensing requirements on professionals before they may dispense advice.<sup>44</sup>

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35. Compare Haupt, *Professional Speech*, *supra* note 13 (providing a theory of First Amendment protection for professional speech based on an understanding of the professions as knowledge communities) with Rodney A. Smolla, *Professional Speech and the First Amendment*, 119 W. VA. L. REV. 76 (2016) (arguing against a distinctive First Amendment approach to professional speech).

36. See, e.g., *Pickup v. Brown*, 740 F.3d 1298 (9th Cir. 2014); *King v. Governor of N.J.*, 767 F.3d 216 (3d Cir. 2014); *Wollschlaeger v. Florida*, 848 F.3d 1293 (11th Cir. 2017).

37. 138 S. Ct. 2361, 2372 (2018) (“This Court’s precedents do not recognize such a tradition for a category called ‘professional speech.’”).

38. *Id.* at 2373 (discussing “[l]ongstanding torts for professional malpractice” and characterizing informed consent as “firmly entrenched in American tort law.”). See also Claudia E. Haupt, *The Limits of Professional Speech*, 128 YALE L.J.F. 185, 189 (2018) (arguing that *NIFLA* is theoretically incoherent, because “professional speech cannot logically be the same as other types of speech, yet be governed by a different doctrinal framework.”).

39. See Haupt, *Unprofessional Advice*, *supra* note 26, at 675.

40. *Nat'l Inst. of Family & Life Advocates*, 138 S. Ct. at 2374-75 (discussing content neutrality).

41. See Claudia E. Haupt, *Professional Speech and the Content-Neutrality Trap*, 127 YALE L.J.F. 150 (2016).

42. *Reed v. Town of Gilbert*, 135 S. Ct. 2218, 2226 (2015).

43. See Haupt, *supra* note 41.

44. See Haupt, *Licensing Knowledge*, *supra* note 27, at 50.

*B. Trust*

The provider-patient relationship is characterized by an asymmetry of knowledge.<sup>45</sup> It is also a social relationship based on trust.<sup>46</sup> Fiduciary duties address the knowledge asymmetries between professionals and their clients or patients, creating duties of loyalty and care. The patient entrusts medical professionals with providing guidance regarding important health decisions. In return, the provider must act in the patient's best interest according to the knowledge of the profession. In general terms, "a fiduciary is one who has special obligations of loyalty and trustworthiness toward another person."<sup>47</sup> In this relationship, "[t]he fiduciary must take care to act in the interests of the other person" who "puts their trust or confidence in the fiduciary, and the fiduciary has a duty not to betray that trust or confidence."<sup>48</sup> This results in the twin fiduciary duties of care and loyalty: First, fiduciaries "must take care to act competently and diligently so as not to harm the interests of the principal, beneficiary, or client."<sup>49</sup> Secondly, they "must keep their clients' interests in mind and act in their clients' interests."<sup>50</sup>

The medical context usefully illustrates contemporary debates concerning the existence and scope of professionals' fiduciary duties. Under one account, based upon "the existence of trust as a factual premise," the law attaches specific rules to the relationship.<sup>51</sup> Thus, the "various rights, responsibilities, and rules are premised on the strength and pervasiveness of trust in medical relationships."<sup>52</sup> Building on the patient's trust in professionals and institutions, "the law seeks to enforce or promote physician or institutional behavior that meets the expectations that trusting patients bring to treatment relationships, and the law punishes violations of those trusting expectations."<sup>53</sup> Normatively, it thus seeks to ensure that professionals and institutions act more in accordance with patient

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45. Haupt, *Professional Speech*, *supra* note 13, at 1271 ("The professional relationship is typically characterized by an asymmetry of knowledge.").

46. See, e.g., Mark A. Hall, *Law, Medicine, and Trust*, 55 STAN. L. REV. 463, 466 (2002) (suggesting that trust plays a central role "in the structure and content of health care law"). See also Robert Gatter, *Faith, Confidence, and Health Care: Fostering Trust in Medicine Through Law*, 39 WAKE FOREST L. REV. 395 (2004) (critiquing "medical trust" and arguing that with respect to health care delivery, "it is not clear that *trust* is necessary . . . something more akin to consumer *confidence* may be sufficient.").

47. Jack M. Balkin, *Information Fiduciaries and the First Amendment*, 49 U.C. DAVIS L. REV. 1183, 1207 (2016).

48. *Id.*

49. *Id.* at 1207-08.

50. *Id.* at 1208.

51. Hall, *supra* note 46, at 486.

52. *Id.* at 487.

53. *Id.*

expectations.<sup>54</sup>

One way the legal framework of advice-giving aims to ensure patients receive good advice is to ask about the trust the public typically places in them as a matter of fiduciary duties; another is to ask the same question with respect to the existence of a regime of professional malpractice liability, to which I turn next. Both aim to ensure that trust in professionals is met by their behavior.

### *C. Responsibility*

One policy problem the use of AI raises is “who bears responsibility for the choices of machines.”<sup>55</sup> This question gains salience as the technology moves from processing information and assisting in human decisionmaking to “exert[ing] direct and physical control over objects in the human environment.”<sup>56</sup> Professional malpractice liability enforces the provider’s responsibility for the outcome. The standard in medical malpractice is “customary care.”<sup>57</sup> This poses a challenge for innovation, since “[p]rovision of noncustomary care exposes physicians to a heightened prospect of liability.”<sup>58</sup> But the tension between liability and innovation has a long history in tort law where even in areas in which custom determines the standard of care courts have acknowledged progress and demanded its incorporation into the liability standard.<sup>59</sup>

Whereas the professional malpractice standard is determined by the practice of the profession, what is the appropriate standard for AI? With respect to driverless cars, one often voiced position is that the autonomous system ought to be “safer than humans.”<sup>60</sup> Must AI employed in medical advice-giving be better (perhaps more accurate?) than a human professional? What happens to the standard of care when AI becomes “better” at diagnosis than human doctors?<sup>61</sup> I will return to these questions in Part III.

### *D. Ethics*

Scholars note that “the unfolding development of a professional ethics of AI,

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54. *Id.*

55. Calo, *supra* note 2, at 416.

56. *Id.* at 417.

57. Gideon Parchomovsky & Alex Stein, *Torts and Innovation*, 107 MICH. L. REV. 285, 291 (2008).

58. *Id.*

59. *See* The TJ Hooper, 60 F.2d 737 (2d Cir. 1932).

60. Calo, *supra* note 2, at 417.

61. *See generally* A. Michael Froomkin, Ian Kerr & Joelle Pineau, *When AIs Outperform Doctors: The Dangers of a Tort-Induced Over-Reliance on Machine Learning*, 61 ARIZ. L. REV. 33 (2019).

while at one level welcome and even necessary, merits ongoing attention. History is replete with examples of new industries forming ethical codes of conduct, only to have those codes invalidated . . . as a restraint on trade.”<sup>62</sup> However, Calo contends, “even assuming moral consensus, ethics lacks a hard enforcement mechanism.”<sup>63</sup> Contrast this with professional ethics. When AI is deployed in a space dominated by traditional ethical frameworks—such as the ethics of self-regulated professions—the agreement upon them as well as the enforcement mechanism are already in place. In other words, professional AI must be embedded in the existing ethical framework that applies to the profession.

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We ought to think about AI in professional advice-giving as embedded into the regulatory framework that likewise governs human professional advice. It is possible that the framework needs improvement, and thinking about the role of AI within it lets us reassess the existing framework. It is also possible that there must be adaptations to the existing framework due to the specific nature of AI. What should guide our reassessment, however, are the values underlying the regulatory framework, regardless of who is the advice-giver.

## II. THE ROLE OF TECHNOLOGY IN PROFESSIONAL ADVICE-GIVING

The traditional professional-client relationship assumes at its core the personal connection between professional and client. The underlying values are competence and knowledge, trust, responsibility, and ethics. The introduction of technology either replaces the professional, or adds an additional element to the relationship.

The specific ways in which professional advice can be dispensed develop alongside available technologies, but a certain degree of realism is warranted as technological advances may sometimes be overstated.<sup>64</sup> For example, not long ago, IBM’s Watson was expected to potentially become “the best doctor in the world.”<sup>65</sup> But some of Watson’s advice-giving has reportedly proven “unsafe and incorrect.”<sup>66</sup> Nonetheless, rapid technological advances are changing the way in

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62. Calo, *supra* note 2, at 408.

63. *Id.*

64. See, e.g., David H. Freedman, *A Reality Check for IBM’s AI Ambitions*, MIT TECHNOLOGY REVIEW (Jun 27, 2017), <https://www.technologyreview.com/s/607965/a-reality-check-for-ibms-ai-ambitions>; Casey Ross & Ike Swetlitz, *IBM Pitched Its Watson Supercomputer as A Revolution in Cancer Care. It’s Nowhere Close*, STAT (Sept 5, 2017), <https://www.statnews.com/2017/09/05/watson-ibm-cancer>.

65. Lauren F. Friedman, *IBM’s Watson Supercomputer May Soon Be the Best Doctor in the World*, BUSINESS INSIDER, Apr 22, 2014, <http://www.businessinsider.com/ibms-watson-may-soon-be-the-best-doctor-in-the-world-2014-4>

66. Casey Ross & Ike Swetlitz, *IBM’s Watson Supercomputer Recommended “Unsafe and*

which professional services generally, and healthcare advice specifically, are delivered. Whereas online bulletin boards and websites once were the new frontier,<sup>67</sup> AI is now at the center of attention.<sup>68</sup> Although the basic concepts operative in AI today have been around for decades, “a vast increase in computational power and access to training data has led to practical breakthroughs in machine learning, a singularly important branch of AI. These breakthroughs underpin recent successes across a variety of applied domains, from diagnosing precancerous moles to driving a vehicle, and dramatize the potential of AI for good and ill.”<sup>69</sup> The rise of machine learning in particular will likely account for the most significant changes.

At the outset, it is useful to distinguish among the broad range of available technologies and their potential areas of use.<sup>70</sup> Some technological interventions challenge the advice-giving framework more than others. Machine learning AI that directly dispenses advice to the patient, without provider mediation, most likely presents the greatest challenge. But other technologies that are frequently discussed under the AI-umbrella<sup>71</sup> are less likely to significantly disrupt the regulatory framework. Take only the two examples of telemedicine and AI-guided robotic-assisted surgery. The former setup is fundamentally akin to the traditional healthcare provider-patient relationship where communication technology is inserted into the human-to-human communication. The latter seems to be a fairly straightforward addition to otherwise available surgery tools. Another way of providing a taxonomy would distinguish between content (such as evidence-based guidelines) and context (telemedicine); between involvement or absence of a professional; and between truly opaque black-box algorithms and explainable technologies.

### *A. Patient-Facing Applications*

We live in an age of unprecedented access to information that puts vast amounts of data out our fingertips. Access to the internet is widespread and relatively inexpensive. And yet, for the most part, all the available information

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*Incorrect” Cancer Treatments, Internal Records Show*, STAT (July 28, 2018), <https://www.statnews.com/2018/07/25/ibm-watson-recommended-unsafe-incorrect-treatments/>

67. See, e.g., Katy Ellen Dedy, Note, *Cyberadvice: The Ethical Implications of Giving Professional Advice over the Internet*, 14 GEO. J. LEGAL ETHICS 891 (2001) (“Cyberadvice is the use of online bulletin boards and websites to provide legal and medical advice to anyone who asks.”).

68. See, e.g., Mukherjee, *supra* note 6.

69. Calo, *supra* note 2, at 402.

70. See also Price, *Artificial Intelligence in the Medical System*, *supra* note 5, at 125-30 (describing different applications); Nicolas Terry, *Of Regulating Healthcare AI and Robots*, 18 YALE J. HEALTH POL’Y L. & ETHICS 133 (2019), 21 YALE J.L. TECH. 133 (2019).

71. See Terry, *supra* note 70 (discussing the definitional problems in medical AI).

does not give patients the expert knowledge necessary to cure their own illnesses. At the same time, however, the abundance of information we can receive at any point in time influences the role of the professional whose advice we continue to seek.

Web-based professional advice platforms are the most basic version of advice-giving platform, and the one that most users will be familiar with. Perhaps the most well-known platform of this kind in the medical context is Web-MD. Its content is overseen by editors who are medical professionals.<sup>72</sup> The legal implications of dispensing professional advice on these platforms has generated a large body of scholarship spanning more than two decades.<sup>73</sup>

The fundamental problem here is the difference between information and knowledge. The client still needs the professional to interpret the information, and to apply it to her specific problem. This has two immediate results: the client places less reliance on the professional as a source of information, and at the same time expects a higher level of qualification of the expert. But access to information is not enough. What distinguishes the lay person from the professional is what the professional is able to do with the information. So there is a higher degree of specialization and expertise because of the widely available information expected of the information age professional. Web-MD claims to serve all of those informational needs.<sup>74</sup> In the end, the central innovation is accessibility of information. Whereas the same information may be found in books and journals, the web platform makes the information more easily available. But it does not fundamentally challenge the way professional advice is rendered.

Another form of technology-based professional service provider model is app-based professional advice akin to the telemedicine model. For example, the therapy app Talkspace connects users with therapists and their sessions can be text- or video-based.<sup>75</sup> Because of the app-based format, questions regarding the nature of

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72. *Who We Are*, WEBMD, <http://www.webmd.com/about-webmd-policies/about-who-we-are>.

73. See, e.g., Catherine J. Lanctot, *Does Legalzoom Have First Amendment Rights?: Some Thoughts About Freedom of Speech and the Unauthorized Practice of Law*, 20 *TEMPLE POL. & CIV. RTS. L. REV.* 255 (2011); Catherine J. Lanctot, *Attorney-Client Relationships in Cyberspace: The Peril and the Promise*, 49 *DUKE L.J.* 147 (1999); Catherine J. Lanctot, *Regulating Legal Advice in Cyberspace*, 16 *ST. JOHN'S J. L. COMMENT.* 569 (2002).

74. The site states: "We know that there is a difference between using a health site for health "performance" issues (e.g., flat abs) vs. health research needs (e.g., "What is type 2 diabetes?") vs. community support (e.g., "Does anyone else feel like me?") vs. e-commerce. Our mission is to fulfill all these needs in the most appropriate ways possible." *What We Do for Our Users*, WEBMD, <http://www.webmd.com/about-webmd-policies/about-what-we-do-for-our-users>.

75. The company defines "online therapy" as follows: "Online therapy is the delivery of mental health counseling via the Internet. People also know it as e-therapy, distance therapy, Internet therapy and web therapy. Therapists and online therapy networks use a variety of mediums such as apps for

the professional relationship have been raised that suggest somewhat of a departure from the traditional telemedicine setup:

if an app dictates much of how clinicians talk with patients, and totally controls access to client records, is it just a platform? Or is it a medical clinic, and thus subject to stricter rules and liabilities? If a patient is anonymous to their therapist, who is responsible for their safety and the safety of those around them?<sup>76</sup>

What does it mean to be a licensed therapist providing app-based therapy? The lack of “direct face-to-face contact between the doctor and his patient in cyberspace” makes the existence of a provider-patient relationship and its attendant legal duties less obvious. But such a relationship nonetheless “may be implied when a party solicits advice from a physician who agrees to give it.”<sup>77</sup> Though litigation thus far has focused on telemedicine, rather than cyberadvice, the underlying relationship seems sufficiently analogous.<sup>78</sup>

A further development in this area is exemplified by Dr. A.I.—by Amazon’s own characterization “not a doctor.”<sup>79</sup> The full disclaimer states: “The information presented through this skill is for educational and informational purposes only and does not constitute medical advice, diagnosis, or treatment recommendations. ‘Dr. A.I.’ is not a doctor—it is a tool that provides information from a doctor-created medical knowledge-base, including symptoms and possible related conditions. Immediately call or visit your doctor or local emergency services provider if you believe you may be having a medical emergency.”<sup>80</sup>

Despite this extensive disclaimer, it is likely that users might initially consult Alexa for medical issues. The advice dispensed may delay treatment, suggest wrong diagnoses, or otherwise have negative effects.<sup>81</sup> However, one open question is whether the user’s reliance on advice dispensed by Alexa may be

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texting, video chatting, voice messaging and audio messaging.” *Online Therapy: What You Need to Know*, TALKSPACE, <https://www.talkspace.com/online-therapy>.

76. Cat Ferguson, *Breakdown: Inside the Messy World of Anonymous Therapy App Talkspace*, THE VERGE (Dec 19, 2016), <http://www.theverge.com/2016/12/19/14004442/talkspace-therapy-app-reviews-patient-safety-privacy-liability-online>.

77. Deady, *supra* note 67, at 896 (Noting that “where [cybermedicine] consultations reflect traditional medical situations, the courts are likely to find a physician-patient relationship exists between the consultant and the patient.”).

78. *Id.*

79. *Dr. A.I. by HealthTap*, AMAZON, <https://www.amazon.com/HealthTap-Inc-Dr-A-I-by/dp/B06WRSVQH9>.

80. *Id.*

81. See, e.g., Timothy W. Bickmore et al., *Patient and Consumer Safety Risks When Using Conversational Assistants for Medical Information: An Observational Study of Siri, Alexa, and Google Assistant*, 20 (9) J. MED. INTERNET RES. e11510 (2018).

affected in some way by the interactive nature of the interaction that is unlike looking up advice on WebMD. Because of the verbal question and answer nature of the interaction, moreover, a smaller amount of information may be conveyed. Whereas a website may list a number of alternatives, Alexa's initial answer may be understood as the correct answer by the listener.

### *B. Professional-Use Algorithms and AI*

Healthcare professionals have incorporated various forms of technology into clinical practice for the last century.<sup>82</sup> One avenue of incorporating algorithmic decision support is through clinical decisions support programs which can assist with the implementation of evidence-based guidelines. A provider feeds patient data into an algorithm that compares the data with an intervention threshold. This results in a real-time recommendation for intervention if the threshold is reached. Evidence-based guidelines (EBGs) and other medical research provide the source of the rules applied by the algorithm. Importantly, however, it is the physician's decision whether to intervene according to the recommendation.<sup>83</sup> The technological innovation lies in the clinical decisions support program's real-time recommendations. Whereas the output can be considered advice-giving, the underlying explanation can be found in the EBGs themselves. In addition to being explainable, the output is then filtered through the professional who may or may not follow the advice. In this sense, the ultimate decision on whether to incorporate the output into professional advice still lies with the human professional.<sup>84</sup>

Contrast this with machine learning AI outputs which are increasingly used in clinical practice.<sup>85</sup> Commentators have noted that, from a clinician's perspective, "[t]he addition of deep learning to the AI family of techniques represents an advance similar in magnitude to the addition of the computed tomography scanner to the radiology toolkit."<sup>86</sup> The most promising features are technology's "demonstrable strengths in intricate pattern recognition and predictive model building from high-dimensional data sets."<sup>87</sup> While they are beneficial across many fields, the "clinical application of deep learning has been most rapid in

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82. See, e.g., Peter K. Spiegel, *The First Clinical X-Ray Made in America—100 Years*, 164 AM. J. ROENTGENOLOGY 241 (1995).

83. Khan, *supra* note 21, at 137.

84. Cf. Frank Pasquale, *Professional Judgment in an Era of Artificial Intelligence and Machine Learning*, 46 BOUNDARY 2 73 (2019).

85. William S. Stead, *Clinical Implications and Challenges of Artificial Intelligence and Deep Learning*, JAMA Aug 30, 2018 ("Artificial intelligence (AI) and deep learning are entering the mainstream of clinical medicine.").

86. *Id.*

87. C. David Naylor, *On the Prospects for a (Deep) Learning Health Care System*, JAMA (Aug 30, 2018).



image-intensive fields such as radiology, radiotherapy, pathology, ophthalmology, dermatology, and image-guided surgery.”<sup>88</sup> Indeed, these systems’ performance has already proven superior to that of clinicians.<sup>89</sup> In addition to image interpretation, additional applications considered “include risk stratification for a broad range of patient populations, and health care organizations are capitalizing on deep learning and other machine-learning tools to improve logistics, quality management, and financial oversight.”<sup>90</sup>

Based on big data inputs, the characteristic of machine learning is accumulation of information that then generates opaque outputs the professional may incorporate into advice without understanding how exactly they were generated. “Unlike deep learning, expert human interpretation fails to capitalize on all the patterns, or ‘regularities,’ that can be extracted from very large data sets and used for interpretation of still and moving images. Deep learning and related machine-learning methods can also learn from massively greater numbers of images than any human expert, continue learning and adapting over time, mitigate interobserver variability, and facilitate better decision making and more effective image-guided therapy.”<sup>91</sup>

But professionals “who use decision-support software to guide them through analyses or diagnoses,” as Nicolas Carr points out, are particularly susceptible to “automation bias.” He specifically describes the use of computer-aided detection systems in radiology that may result in only cursory review of the outputs.<sup>92</sup> (This ties into the larger story of deprofessionalization by tech: “The researchers found that while computer-aided detection tends to improve the reliability of ‘less discriminating readers’ in assessing ‘comparatively easy cases,’ it can actually degrade the performance of expert readers in evaluating tricky cases. When relying on the software, the experts are more likely to overlook certain cancers.”<sup>93</sup>) The response is that clinicians “should maintain an index of suspicion that the prediction may be wrong,” as they already do with laboratory results, and “should judge whether the prediction applies to the patient who is in front of them and decide if additional data or expertise is needed to inform that decision.”<sup>94</sup>

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88. *Id.*

89. *Id.* (“In many cases, interpretation of images by deep learning systems has outperformed that by individual clinicians when measured against a consensus of expert readers or gold standards such as pathologic findings.”)

90. *Id.* See also Elish, *supra* note 19, (providing an anthropological study of Sepsis Watch, “a machine learning-driven system that assesses a patient’s risk of developing sepsis,” at Duke University Hospital).

91. Naylor, *supra* note 87.

92. NICHOLAS CARR, *THE GLASS CAGE: HOW OUR COMPUTERS ARE CHANGING US* 70 (2014).

93. *Id.* at 70-71.

94. Stead, *supra* note 85.

### III. LEGAL RESPONSES

The regulatory framework governing professional advice-giving should be designed to ensure continued protection of the values underlying the healthcare provider-patient relationship: that the professional communicates accurate and comprehensive advice to the patient, according to the current state of the knowledge community's standards; that the professional's advice is personally tailored to the situation of the patient; that, as the fiduciary duty demands, the professional serves the patient's best interests; and that, if the professional fails to meet the professional standard in giving advice, she is liable for resulting harm. The discussion of potential legal responses in this Part mirrors the values discussed at the outset.<sup>95</sup> These are the regulatory access points at which the legal system aims to ensure patients receive accurate, comprehensive professional advice. This Part outlines the legal mechanisms available at each access point and sketches some of the considerations that should guide AI regulatory policy when the existing framework proves insufficiently responsive.

#### *A. Professional Licensing and Professional Discipline*

Some commentators note that the real transformative potential lies in combining technological advances with lower skill requirements. So understood, a larger number of less-skilled individuals delivers services in a more convenient, less expensive way.<sup>96</sup> In order to realize this potential in the health context, however, technology should be “combined with the legislative efforts to relax restrictive state licensing and scope of practice laws so that non-physicians (i.e., ‘less-skilled people’) can provide care independent of physicians (i.e., ‘expensive specialists’) and outside of traditional clinics and hospitals (i.e., ‘centralized inconvenient locations’).”<sup>97</sup> This would incentivize big technology companies’ support of expanding scope of practice laws in favor of nurse practitioners and physician assistants.<sup>98</sup> Thus, “the mobile health industry can rhetorically frame the relaxing of overly restrictive licensing and scope of practice laws for physician extenders vis-à-vis doctors, as a long overdue rebalancing of medical authority that will empower both non-physician medical providers and consumers of healthcare.”<sup>99</sup> It might be worth pointing out that such an expansion of providers

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95. See *supra* Part I.

96. Khan, *supra* note 21, at 127.

97. *Id.*; Price, *Artificial Intelligence in the Medical System*, *supra* note 5, at 124-25.

98. Khan, *supra* note 21, at 127. See also Terry, *supra* note 5, at 35-40 (discussing licensure for healthcare AI).

99. Khan, *supra* note 21, at 127.

would be welcome even absent technological innovation.<sup>100</sup> As I have discussed elsewhere, such a retailoring of professional licensing would not open the market to unlicensed providers, but rather expands the market of licensed professionals.<sup>101</sup>

Existing licensing regimes, moreover, should take into account that some degree of technical literacy is necessary, though the level of understanding the technology employed may vary among professionals. In other words, it may not be clinicians who need the highest level of technical understanding.<sup>102</sup>

From the perspective of the professional, the connection between licensing and expertise looms large. One anecdote in the story of IBM's Watson illustrates this point:

In order to be useful, the IBM team realized, the machine needed to interact with human doctors in a manner that made collaboration pleasant. David McQueeney, the vice president of software at IBM Research, described programming a pretense of humility into the machine: 'Our early experience was with wary physicians who resisted by saying, *'I'm licensed to practice medicine,* and I'm not going to have a computer tell me what to do.' So we reprogrammed our system to come across as humble and say, 'Here's the percentage likelihood that this is useful to you, and here you can look for yourself.' Doctors were delighted, saying that it felt like a conversation with a knowledgeable colleague.<sup>103</sup>

Indeed, not dictating how professionals do their job seems to be a key concern in the introduction of technology into clinical practice more broadly, as it is related directly to the trust a professional will place in the technology.<sup>104</sup> This raises another, perhaps even more important, change that results from introducing AI into the professional relationship: opacity as to the decisions AI makes, which raises

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100. *Id.* at 129 ("Independent of mobile health, there are solid arguments to reform restrictive scope of practice and licensing laws within healthcare...").

101. Haupt, *supra* note 27, at 21 (discussing Limited License Legal Technicians and observing that "[a]s compared to legal service providers, the healthcare professions display a wider variety of licensed professions performing some tasks previously primarily allocated to physicians. Take only the emergence of physician assistants in the twentieth century as an example.").

102. *But see* Stead, *supra* note 85 ("Clinicians should take the time to refresh their understanding of statistics and learn about measures such as calibration that are applicable to prediction to prepare to partner with AI.").

103. WALTER ISAACSON, *THE INNOVATORS: HOW A GROUP OF HACKERS, GENIUSES, AND GEEKS CREATED THE DIGITAL REVOLUTION* 477 (2014) (emphasis added).

104. *See* Elish, *supra* note 19, at 369 (noting that for those involved in the development of Sepsis Watch, "it was important to tread carefully and not be or be seen as telling other people how to do their work.").

new questions of transparency, explainability, and interpretability of the AI's recommendations. This is the paradigmatic black box problem.<sup>105</sup> Under Nicholson Price's definition, "black-box medicine" is "the use of opaque computational models to make decisions related to health care."<sup>106</sup>

Once licensed, professionals are subject to professional discipline. Perhaps unsurprisingly, medical professionals identify self-regulation as the "key to the future of health care tech."<sup>107</sup> This assertion of professional autonomy ties back to the understanding of the individual professional as expert and emphasizes the need for some degree of deference in designing technologies to be employed in clinical practice.

### *B. Fiduciary Duties*

The twin duties of trust and care that are based on the fiduciary relationship between professional and client may shift depending on whether trust continues to be placed in the human professional. The primary knowledge asymmetry, moreover, will no longer be between professional and client, but between AI and client.

Another fiduciary duty may be added. Jack Balkin and Jonathan Zittrain have suggested that platforms ought to have fiduciary duties to their users regarding their data (that is, they should be "information fiduciaries."<sup>108</sup>) But if the service provided is a traditional professional service that in its "real world" form carries with it a set of fiduciary duties, all of these must be replicated. In other words, if your therapist is Talkspace, information fiduciary duties and the traditional fiduciary duties ought to overlap entirely.

### *C. Malpractice Liability*

With respect to black-box medicine, Price notes that it "raises significant tort law questions: If an algorithm is unknown or impossible to disclose, under what

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105. See W. Nicholson Price II, *Medical Malpractice and Black-Box Medicine*, in *BIG DATA, HEALTH LAW, AND BIOETHICS* (I. Glenn Cohen, Holly Fernandez Lynch, Effy Vayena & Urs Gasser eds., 2018) (noting that "black-box medicine is, by its nature, opaque; that is, the bases for black-box decisions are unknown and unknowable.").

106. Price, *Black-Box Medicine*, *supra* note 8, at 421.

107. Troy Parks, *Self-regulation Key to the Future of Health Care Tech*, *AM. MED. ASS'N* (Sept. 27, 2016), <https://wire.ama-assn.org/life-career/self-regulation-key-future-health-care-tech>.

108. Balkin, *supra* note 14, at 20-27; Balkin, *supra* note 47; Jack M. Balkin & Jonathan Zittrain, *A Grand Bargain to Make Tech Companies Trustworthy*, *THE ATLANTIC* (Oct 3, 2016), <https://www.theatlantic.com/technology/archive/2016/10/information-fiduciary/502346/>; Jack Balkin, *Information Fiduciaries in the Digital Age*, *BALKINIZATION* (Mar 5, 2014), <https://balkin.blogspot.com/2014/03/information-fiduciaries-in-digital-age.html>.

context can physicians be liable for decisions relying on that algorithm? Is knowledge of the reliability of the algorithm sufficient to immunize against such liability?”<sup>109</sup> Some suggest that this will move malpractice liability away from physicians.<sup>110</sup>

The technical reality of AI makes opacity a particularly salient problem.<sup>111</sup> While scholars emphasize that straightforward explainability would be preferable,<sup>112</sup> the healthcare context might actually be less likely to allow for explainability.<sup>113</sup> Especially in the clinical context, however, some warn against overemphasizing the problem of explainability. The black-box problem in clinical practice, the argument goes, has existed well before the introduction of AI.<sup>114</sup> Why certain medical treatments work is much less explainable than we would think. And “[m]aking a model ‘technically interpretable’ . . . does not equate to make the technology interpretable or trusted by doctors.”<sup>115</sup> The question, then, is whether we have a higher standard for AI explainability than for human clinical practice. Custom in the malpractice regime addresses this issue to some degree. If a

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109. Price, *Black-Box Medicine*, *supra* note 8, at 457 n.188.

110. Shailin Thomas, *Artificial Intelligence, Medical Malpractice, and the End of Defensive Medicine*, BILL OF HEALTH (Jan. 26, 2017), <http://blogs.harvard.edu/billofhealth/2017/01/26/artificial-intelligence-medical-malpractice-and-the-end-of-defensive-medicine>.

111. On the sources of opacity, see Hinton, *supra* note 5. (“However, when a deep neural network is trained to make predictions on a big data set, it typically uses its layers of learned, nonlinear features to model a huge number of complicated by weak regularities in the data. It is generally infeasible to interpret these features because their meaning depends on complex interactions with uninterpreted features in other layers. Also, if the same neural net is refit to the same data, but with changes in the initial random values of the weights, there will be different features in the intermediate layers. This reflects that unlike models in which an expert specifies the hidden factors, a neural net has many different and equally good ways of modeling the same data set. It is not trying to identify the ‘correct’ hidden factors. It is merely using hidden factors to model the complicated relationship between the input variables and the output variables.”); Price, *supra* note 105, at 297 (“This opacity is not deliberate, though some secrecy by developers could compound it. Instead the opacity is unavoidable. Sometimes, patterns are opaque because they are too complicated; that is, even if the computer could state the set of, for example, thousands of genes and interacting patient-history factors, we could not understand it. Other times, the opacity is a result of the machine-learning techniques used to find patterns; a trained neural network (one such technique) typically cannot output the artificial neurons’ ‘connections’ in any meaningful sense, and thus does not demonstrate how it reached its result.”).

112. Hinton, *supra* note 5 (“Understandably, clinicians, scientists, patients, and regulators would all prefer to have a simple explanation of how a neural net arrives at its classification of a particular case.”); Price, *supra* note 105, at 297 (“To be clear, this opacity is also not desirable; it would be preferable to know and understand the relationships being used.”).

113. *Cf.* Elish, *supra* note 19, at 371 (noting that “this troubles a growing emphasis on explainability and interpretability in technical and social science research communities.”).

114. *See, e.g., id.* at 371 (quoting a Sepsis Watch researcher as saying “ ‘Our machine learning is easy to call a black box—but the human body is a black box!’ Sepsis is like a black box, inside another black box.”).

115. *Id.* at 371.

professional standard has developed around certain treatments, but the treatments themselves are not at all or only partially explainable, custom will nonetheless provide a shield against liability.

#### *D. Informed Consent*

We might think about a specialized informed consent requirement depending on the technology employed. “At an intuitive level, it is hard to imagine precisely what ‘informed’ means in the context of a recommendation where no-one knows exactly how it works . . . . It is entirely possible that in most circumstances neither a reasonable provider nor a reasonable patient would find information about black-box medicine’s development or opacity material to disclose, just as patients need not be informed about the strength of clinical trial evidence for most interventions recommended today.”<sup>116</sup>

#### *E. Professional Ethics*

Some contend that “[d]eep learning shows promise for streamlining routine work by health care professionals and empowering patients, thereby promoting a safer, more humane, and participatory paradigm for health care.”<sup>117</sup> One avenue to enhance ongoing patient participation under this view is the use of “wearables, remote monitoring, and digital consultations” as means by which “deep learning and other machine-learning techniques can bypass the time-honored model of intermittent data collection and interpretation at the clinical encounter. These advances may promote more effective and informed self-care by patients and families.”<sup>118</sup>

The negative version of this statement, of course, is constant patient surveillance. Outside of the scope of this discussion are important questions of data privacy and security: Who has access to the data, and for what purposes?<sup>119</sup> But proponents of this model argue that “while concerns are understandably raised that automation could de-humanize clinical care, these advances could provide professionals and patients alike with vastly better and more specific information, and . . . give physicians more time ‘to focus on the tasks that are uniquely human: building relationships, exercising empathy, and using human judgment to guide

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116. Price, *supra* note 105, n.16.

117. Naylor, *supra* note 87.

118. *Id.*

119. Chris Matyszczyk, *Judge Rules Pacemaker Data Can Be Used Against Defendant*, CNET (July 12, 2017), <https://www.cnet.com/news/judge-rules-pacemaker-data-can-be-used-against-defendant> (reporting on an arson case in which evidence of the defendant’s heart rate, collected by an implanted pacemaker, was found admissible).

and advise.”<sup>120</sup>

## V. CONCLUSION

Advances in AI are finding their way into health care delivery, a densely regulated space in which the law has to ensure the integrity of the doctor-patient relationship. “Barriers to adoption will rightly be more rigid in health care than in many other fields in which software programs relying on deep learning and other forms of machine learning are used daily by billions of people. However, pressure to deploy deep learning and a range of tools derived from modern data science will be relentless.”<sup>121</sup> As this pressure builds, the regulatory approach has to adapt to new challenges posed by AI.

“[B]ehind the robots, AI agents, and algorithms are social relations between human beings and groups of human beings.”<sup>122</sup> The healthcare provider-patient relationship is a specific social relationship. The starting point for regulating AI within this relationship therefore should be the values that define it. Despite aggressive claims to novelty, not all potential uses of medical AI raise fundamentally new legal problems. To the extent the existent regulatory framework is responsive to these changes, it ought to be kept in place. But when the introduction of AI into medical advice-giving changes the dynamics of the relationship in a way that threatens the underlying values, new regulatory responses become necessary. Ultimately, the underlying social relationship between healthcare provider and patient, rather than the technology employed in, must guide the legal response to innovation in this space.

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120. Naylor, *supra* note 87. See also Kevin B. O’Reilly, *High-quality mHealth Apps Can Be Blended Into Care*, AM. MED. ASS’N (Nov. 15, 2016), <https://wire.ama-assn.org/ama-news/high-quality-mhealth-apps-can-be-blended-care>.

121. Naylor, *supra* note 87.

122. Balkin, *supra* note 14, at 1226.