

AIs as Substitute Decision-Makers

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ABSTRACT

We are witnessing an interesting juxtaposition in medical decision-making. Increasingly, health providers are moving away from traditional substitute decision-making for patients who have lost decisional capacity, towards supported decision-making. Supported decision-making increases patient autonomy as the patient—with the support and assistance of others—remains the final decision-maker. By contrast, doctors' decision-making capacity is diminishing due to the increasing use of AI to diagnose and treat patients. Health providers are moving towards what one might characterize as substitute decision-making by AIs. In this article, we contemplate two questions. First, does thinking about AI as a substitute decision-maker add value to the development of AI policy within the health sector? Second, what might the comparison with traditional substitute decision-making teach us about the agency and decisional autonomy of doctors, as AI further automates medical decision-making?

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INTRODUCTION

We are witnessing an interesting juxtaposition in medical decision-making.

Heading in one direction, patients' decision-making capacity is increasing,¹ thanks to an encouraging shift in patient treatment. Health providers are moving away from traditional substitute decision-making²—which requires a designated person to take over a patient's health care decisions, should that patient's cognitive capacity become sufficiently diminished. Instead, there is a movement towards supported decision-making,³ which allows patients with diminished cognitive capacity to make their own life choices through the help of a team of (human) supporters.

Heading in the exact opposite direction, doctors' decision-making capacity is diminishing,⁴ due to a potentially concerning shift⁵ in the way doctors diagnose and treat patients. For many years now, various forms of data analytics and other technologies have been used to support doctors' decision-making. Now, doctors and hospitals are starting to employ artificial intelligence (AI) to diagnose and treat patients, and for an existing set of sub-specialties, the more honest characterization is that these AIs no longer support doctors' decisions—rather they often make them. As a result, health providers are moving towards what one might characterize as substitute decision-making by AIs.

In this brief article, we contemplate two questions. First, does thinking about AI as a substitute decision-maker add value to the development of AI policy within the health sector? Second, what might the comparison with traditional substitute decision-making teach us about the agency and decisional autonomy of doctors, as AI further automates medical decision-making?

1. Nat'l Res. Ctr. for Supported Decision-Making, *Stories of Supported Decision-Making*, SUPPORTED DECISION MAKING (2019), <http://www.supporteddecisionmaking.org/impact>.

2. Nandini Devi, Jerome Bicken & Gerold Stucki, *Moving Towards Substituted or Supported Decision-making? Article 12 of the Convention on the Rights of Persons with Disabilities*, 5 EURO. J. DISABILITY RES. 249 (2011).

3. Robert Dinerstein et al., *Emerging International Trends and Practices in Guardianship Law for People with Disabilities*, 22 ISLA J. INT'L & COMP. L. 435 (2016); Piers Gooding, *Supported Decision-Making: A Rights-Based Disability Concept and Its Implications for Mental Health Law*, 20 PSYCHIATRY, PSYCHOL. & L. 431 (2013).

4. Jason Millar & Ian Kerr, *Delegation, Relinquishment and Responsibility: The Prospect of Expert Robots*, in ROBOT LAW 102, 115 (Ryan Calo, A. Michael Froomkin & Ian Kerr eds., 2016).

5. A. Michael Froomkin, Ian Kerr & Joëlle Pineau, *When AIs Outperform Doctors: Confronting the Challenges of a Tort-induced Over-reliance on Machine Learning*, 61 ARIZ. L.R. 33 (2019).

I. FROM TRADITIONAL SUBSTITUTE DECISION-MAKING TO SUPPORTED DECISION-MAKING

Substitute decision-making is a long-standing social practice; assigning third parties to make choices on behalf of those deemed unable to decide for themselves is a tradition that dates back to ancient Rome.⁶ Generally speaking, substitute decision-making in health care takes an all-or-nothing approach. Until a patient develops the capacity to decide and, again, once a patient's decisional capacity is deemed lost, the substitute decision-maker is legally responsible for making all health care decisions affecting the patient. By way of substitution, the patient becomes subject to the authority of the substitute decision-maker.⁷ However, such authority is not unbounded. In exercising her authority, the substitute decision-maker must make decisions based on the prior wishes, values and beliefs of the patient; a "substituted judgment."⁸

The substitute decision-maker's role is to place herself in the patient's position. The substitute decision-maker is asked to determine, where possible, what treatment *the patient herself* would want. Although the precise legal requirements vary from jurisdiction to jurisdiction, substitute decision-makers are expected to make a decision in accordance with the previously expressed wishes of the patient expressed when she had capacity.⁹ Where the patient's wishes are not known, the decision-maker is expected to make a decision that is consistent with the patient's known values and beliefs. Unfortunately, in some cases, it may not be possible to know what the patient would have wanted in the particular situation. It is only where the patient's specific wishes, values or beliefs are not known, that the decision-maker is asked to make a decision based on the patient's best interests, weighing the burdens and benefits of the proposed treatment.¹⁰

Because substitute decision-making laws require the decision-maker to put herself in the patient's shoes, it is preferable for the relationship between substitute decision-maker and patient to be based on trust, though this is not a legal

6. Johnathan Martinis et al., *Substitute Decision-making as an Alternative to Guardianship*, in *HANDBOOK OF POSITIVE PSYCHOLOGY IN INTELLECTUAL AND DEVELOPMENTAL DISABILITIES: TRANSLATING RESEARCH INTO PRACTICE* (Karrie A. Shrogren, Michael L. Wehmeyer & Nirbhay N. Singh, eds. 2017).

7. Eike-Henner W. Kluge, *Incompetent Patients, Substitute Decision Making, and Quality of Life: Some Ethical Considerations*, 10 *MEDSCAPE J. MED.* 237 (2008).

8. Yu-Ping Chang et al., *Decisional Conflict Among Chinese Family Caregivers Regarding Nursing Home Placement of Older Adults with Dementia*, 25 *J. AGING STUD.* 436 (2011); Joan M. Gilmour, *Legal Capacity and Decision-making*, in *CANADIAN HEALTH LAW AND POLICY* (Joanna Erdman, Vanessa Gruben & Erin Nelson eds., 5th ed. 2017).

9. Robert A. Pearlman, *Substitute Decision Making*, in *THE CAMBRIDGE TEXTBOOK OF BIOETHICS* 58, 61 (Peter A. Singer & Adrian M. Viens eds., 2008).

10. *Id.* at 62.

requirement.¹¹ Thus, the substitute decision-maker may be a person designated by the patient or a close family member. The preference for a trusted decision-maker who has intimate knowledge of the patient is reflected in the law, which generally establishes a hierarchy of who can act as a substitute decision-maker.¹² This ranking often includes a person appointed by the patient, a spouse, adult child, parent or sibling.¹³ Where no one is willing or able to step into this role, the law permits the court to appoint a substitute decision-maker who may be unknown to the patient.

Despite its long history, substitute decision-making is increasingly the subject of significant criticism.¹⁴ While there are a range of concerns, two are noteworthy. First, even if well-intentioned, having someone else decide is inherently paternalistic. It displaces the decision-making authority of the patient who, by force of law, loses the right to participate in decisions regarding his or her health and well-being.¹⁵ Although one of the goals of substitute decision-making is to protect those who may be vulnerable, the inability to make decisions for oneself is a significant encroachment on one's independence and autonomy. By removing the right to make decisions, the law no longer respects an individual's ability to make choices—including choices that may involve some degree of risk or that some would consider to be unwise.¹⁶

Second, substitute decision-making and the process for determining legal capacity rest on a long history of discrimination and devaluation of those who lack capacity, whether because of a medical condition, an intellectual disability, a mental health condition or aging.¹⁷ Pervasive negative stereotypes and attitudes

11. Health Care Consent Act, S.O. 1996, c 2 sched. A; Substitute Decisions Act, S.O. 1992, c 30; Gavin Davidson et al., *An International Comparison of Legal Frameworks for Supported and Substitute Decision-making in Mental Health Services*, 44 INT'L J.L. & PSYCHIATRY 30 (2016).

12. Lisa Caulley et al., *Substitute Decision Making in End-of-Life Care*, 378 NEW ENGLAND J. MED. 2339 (2018).

13. LAW COMM'N OF ONT., *supra* note 6; Alex D. Colvin & Patricia J. Larke, *Family Members' Views on Seeking Placement in State-Supported Living Centers in Texas*, 6 J. MENTAL HEALTH RES. INTELL. DISABILITIES 208 (2013).

14. LAW COMM'N OF ONT., *supra* note 6; Lawrence A. Frolik, *Standards for Decision Making*, in *COMPARATIVE PERSPECTIVES ON ADULT GUARDIANSHIP* 47 (A. Kimberly Dayton ed, 2014).

15. IAN KERRIDGE ET AL., *ETHICS AND LAW FOR THE HEALTH PROFESSIONS* 369-371 (4th ed. 2013).

16. Leslie Salzman, *Rethinking Guardianship (Again): Substituted Decision Making as a Violation of the Integration Mandate of Title II of the Americans With Disabilities Act*, 81 U. COLO. L. REV. 157 (2010).

17. Mary T. Zdanowicz, *Refusing the Right to Refuse: Coerced Treatment of Mentally Disordered Persons*, 59 PSYCHIATRIC SERVICES 215 (2008) (reviewing GRANT H. MORRIS, *REFUSING THE RIGHT TO REFUSE: COERCED TREATMENT OF MENTALLY DISORDERED PERSONS* (2006)); Michael L. Perlin & Naomi M. Weinstein, *Said I, But You Have No Choice: Why a Lawyer Must Ethically Honor a Client's Decision About Mental Health Treatment Even If It Is Not What S/He Would Have Chosen*, 15 CARDOZO PUB. L. POL'Y & ETHICS J. 73 (2016/17); Thaddeus Mason Pope, *Unbefriended*

may result in health care providers presuming that an individual lacks capacity and requires a substitute decision-maker.¹⁸ Ableist and ageist stereotypes may also fuel assumptions that the feelings, perspectives and desires of individuals with an intellectual disability or older persons are “not sufficiently meaningful to take into account in decision-making.”¹⁹ Further, substitute decision-making laws can be stigmatizing. By designating someone as ‘incapable’, the law shifts the focus away from the abilities of the individual requiring decision-making assistance and may perpetuate the assumption that she is less worthy and deserving of respect.

In response to these concerns, many have advocated for a shift towards a supported decision-making approach,²⁰ which leaves legal responsibility for health care decisions with the patient.²¹

There is no single approach or definition to supported decision-making.²² Rather, the objective of supported decision-making is to promote and extend the patient’s own decision-making skills and competencies.²³ It seeks to ensure the patient maintains agency and remains at the centre of the decision-making process—even if that process needs to be supported by other sources of information, knowledge or wisdom. Because it is intended to promote individual autonomy and decisional independence, supported decision-making arrangements are freely entered into by the patient.

Supported decision-making seeks to identify and implement supports that will facilitate and promote patient decision-making. This may include appointing one person to act as a designated supporter,²⁴ or it may be more appropriate to appoint

and Unrepresented: Better Medical Decision Making for Incapacitated Patients Without Healthcare Surrogates, 33 GA. ST. U.L. REV. 923 (2017).

18. MARGARET HALL, *ADVANCING SUBSTANTIVE EQUALITY FOR OLDER PERSONS THROUGH LAW, POLICY AND PRACTICE* 21-36 (2009), <https://www.lco-cdo.org/wp-content/uploads/2014/01/older-adults-commissioned-paper-hall.pdf>.

19. LAW COMM’N OF ONT., *supra* note 6.

20. Penny Weller, *Supported Decision-Making and the Achievement of Non-Discrimination: The Promise and Paradox of the Disabilities Convention*, 26 LAW CONTEXT 85 (2008); Melissa Hart, *Subjective Decisionmaking and Unconscious Discrimination*, 56 ALA. L. REV. 741 (2005).

21. Nina A. Kohn et al., *Supported Decision-Making: A Viable Alternative to Guardianship*, 117 PENN ST. L. REV. 1111 (2013).

22. Gavin Davidson et al., *Supported Decision Making: A Review of the International Literature*, 38 INT’L J.L. & PSYCHIATRY 61 (2015); Leslie Salzman, *Guardianship for Persons with Mental Illness - A Legal and Appropriate Alternative?*, 4 SAINT LOUIS U.J. HEALTH L. & POL’Y 279 (2011); Nandini Devi, *Supported Decision-Making and Personal Autonomy for Persons with Intellectual Disabilities: Article 12 of the UN Convention on the Rights of Persons with Disabilities*, 41 J.L. MED. & ETHICS 792 (2013).

23. KARRIE ANN SHOGREN ET AL., *Introduction to Supported Decision-Making and Its Emergence in the Disability Field*, in SUPPORTED DECISION-MAKING: THEORY, RESEARCH, AND PRACTICE TO ENHANCE SELF-DETERMINATION AND QUALITY OF LIFE 3 (2019).

24. For example, in British Columbia, the *Representation Agreement Act (1996)* permits an individual to authorize one or more personal supporters to become representatives to assist in

a group of supporters.²⁵ A “circle of support” or “micro board”²⁶ generally includes family members and friends who “normally understand the individual’s life history, their form of communication, and the things they desire.”²⁷ Together, they create a network of support to enable the patient to exercise her decisional autonomy. To do so, the supporters will meet with the individual on a regular basis to assist with a range of decisions.²⁸ The supported decision-making process varies with the level of functioning of the individual and may include promoting informal conversations with supporters and peers to supplying decision-making aids that guide the consequences of making a decision.²⁹ In other words, the supports and peers help the assisted individual with appreciating the potential consequences that flow from the various options that patient may choose from. As Martinis explains, supported decision-making is similar to how most adults make decisions about a range of subjects, whether it is medical care or purchasing a new car: “they seek advice, input and information from friends, family or professionals who are knowledgeable about those issues, so they can make their own well-informed choices.”³⁰

Supported decision-making suggests that good decision-making often employs multiple, sophisticated, reliable and understandable inputs in order to create sound, healthy, beneficial outputs. Its key insight is that good decision-making is relational and based on human cooperation rather than mere delegation.

managing his or her own personal affairs and if necessary to make health care decisions. *See generally* Representation Agreement Act, R.S.B.C. 1996, c 405 [hereinafter *Representation Agreement Act*]; Robert M. Gordon, *The Emergence of Assisted (Supported) Decision-Making in the Canadian Law of Adult Guardianship and Substitute Decision-Making*, 23 INT’L J.L. & PSYCHIATRY 61 (2000).

25. Robert D. Dinerstein, *Implementing Legal Capacity Under Article 12 of the UN Convention on the Rights of Persons with Disabilities: The Difficult Road From Guardianship to Supported Decision-Making*, 19 HUM. RTS. BRIEF 8 (2012); JAMES DOWNAR ET AL., LAW COMM’N OF ONT., BALANCING THE INTERESTS OF PATIENTS, SUBSTITUTE DECISION-MAKERS, FAMILY AND HEALTH CARE PROVIDERS IN DECISION-MAKING OVER THE WITHDRAWAL AND WITHHOLDING OF LIFE SUSTAINING TREATMENT (2017).

26. Kohn et al., *supra* note 21; Tim Stainton, *Supported Decision-making in Canada: Principles, Policy, and Practice*, 3 RES. & PRAC. INTELL. & DEVELOPMENTAL DISABILITIES 1, 7 (2016).

27. Devi, *supra* note 22.

28. Kohn et al., *supra* note 21. *See also* NAT’L COUNCIL ON DISABILITY, BEYOND GUARDIANSHIP: TOWARD ALTERNATIVES THAT PROMOTE GREATER SELF-DETERMINATION (2018).

29. Karrie A. Shogren et al., *Supported Decision Making: A Synthesis of the Literature Across Intellectual Disability, Mental Health, and Aging*, 52 EDUC. & TRAINING AUTISM & DEVELOPMENTAL DISABILITIES 144, 152 (2017); Anna Arstein-Kerslake et al., *Future Directions in Supported Decision-Making*, 37 DISABILITY STUD. Q. (2017).

30. Jonathan G Martinis, *Supported Decision-making: Protecting Rights, Ensuring Choices*, 36 BIFOCAL 107, 109 (2015) (quoting QUALITY TRUST ET AL., SUPPORTED DECISION MAKING: AN AGENDA FOR ACTION (2014)).

In light of its recent success in establishing such beneficial outcomes, supported decision-making is increasingly being adopted by courts,³¹ law-makers³² and policy-makers, relegating substitute decision-making to the sidelines.

In order to better appreciate the juxtaposition between supported versus substitute decision-making—and what it might mean to think of an AI as a substitute decision-maker—it is instructive to understand what happens when medical decision-making involves the substitution of a machine for a human.

II. THE SUBSTITUTION EFFECT

Jack Balkin has made a number of interesting observations about what happens when we let robots and AIs stand in for humans, which he calls the “substitution effect”.³³ It occurs when—in certain contexts and for certain purposes—we treat robots and AIs as special purpose human beings. Sometimes we deliberately construct these substitutions, other times they are emotional or instinctual. We saw this, for example, when members of the U.S. Army stationed in Taji, Iraq in 2013 gave “Boomer”—a low cost military robot programmed to locate and decommission explosives—a funeral. Not just a commemorative ceremony or burial but a traditional military tribute, honoring the MARCbot with a formal 21-gun salute and valorizing it with a Purple Heart and a Bronze Star Medal.³⁴

Balkin is very careful to explain that we ought not to regard mechanical substitutes as fully identical to that for which they are a substitute. Rather—as with artificial sweeteners—it is merely a provisional equivalence; we reserve the right to reject the asserted identity whenever there is no further utility in maintaining it. Robots and AIs are not persons even if there is practical value, in limited circumstances, to treat them as such. In this sense, Balkin sees their substitution as partial. Robots and AIs only take on particular aspects and capacities of people.

It is the very fact that the substitution is only partial—that robots and AIs “straddle the line between selves and tools”—that makes them, at once, both better and worse. For example, a robot soldier may be a superior fighter because it is not subject to the fog of war. On the other hand, its quality of mercy³⁵ is most definitely

31. *In re Guardianship of Dameris L.*, 956 N.Y.S.2d 848 (N.Y. Sur. Ct. 2012); *Ross v. Hatch*, 2013 VA Cir. Ct. for the City of Newport News CWF120000426P-03 U.

32. *See, e.g., Representation Agreement Act*, *supra* note 24; Adult Protection and Decision-Making Act, S.Y. 2003, c 21 (Can. Yukon); TEX. EST. CODE ANN. §§1101.101, 1002.031, 1357.003 (2015). *See generally* Arstein-Kerslake, *supra* note 29.

33. Jack B Balkin, *The Path of Robotics Law*, 6 CAL. L. REV. 45, 55 (2015).

34. Megan Garber, *Funerals for Fallen Robots*, THE ATLANTIC, Sept. 20, 2013, <https://www.theatlantic.com/technology/archive/2013/09/funerals-for-fallen-robots/279861>.

35. WILLIAM SHAKESPEARE, *THE MERCHANT OF VENICE* 4.1.181 (Jay L. Halio ed., Oxford Univ. Press, 1993) (1596-1599).

strained (and “droppeth [not] as the gentle rain from heaven upon the place beneath”).³⁶

Still, as Balkin explains, there is sometimes practical legal value in treating robots as if they are human beings. As an example, Balkin cites Annemarie Bridy’s³⁷ idea that a court might treat AI-produced art as equivalent to human ‘work made for hire’ if doing so minimizes the need to change existing copyright law.

Legal maneuvers of this sort are reminiscent of Blackstone’s famous account of the use of fictions in law:

We inherit an old Gothic castle, erected in the days of chivalry, but fitted up for a modern inhabitant. The moated ramparts, the embattled towers, and the trophied halls, are magnificent and venerable, but useless. The inferior apartments, now converted into rooms of conveyance, are cheerful and commodious, though their approaches are winding and difficult.³⁸

As Blackstone describes through his famous metaphor of the common law as an evolving castle, the use of the legal fiction allows us to incorporate novel legal components by pretending these shiny new things are just like an existing legal category (even if they are not). Indeed, had Lon Fuller lived in these interesting times³⁹ he would have appreciated the logic of the fiction that treats robots ‘as if’⁴⁰ they have legal attributes for special purposes. Properly circumscribed, provisional attributions of this sort might enable the law to keep calm and carry on until such time as we are able to more fully understand the culture of robots in healthcare and produce more thorough and coherent legal reforms.

Indeed, scholars in robotics and AI law and policy have already begun to explore what Fuller would have called an ‘expository fiction’—contemplating the prospect of expert robots in medical decision-making.⁴¹ Rejecting Neil Richards’ and William Smart’s it’s-either-a-toaster-or-a-person⁴² approach and following

36. *Id.* at 4.1.182.

37. Annemarie Bridy, *Coding Creativity: Copyright and the Artificially Intelligent Author*, 5 STAN. TECH. L. REV. 1 (2012).

38. 3 WILLIAM BLACKSTONE, COMMENTARIES ON THE LAWS OF ENGLAND, ch. 17 (Thomas P. Gallanis eds., Oxford Univ. Press, 2016).

39. LON L. FULLER, LEGAL FICTIONS (1986).

40. HANS VAHINGER, THE PHILOSOPHY OF “AS IF”: A SYSTEM OF THE THEORETICAL, PRACTICAL AND RELIGIOUS FICTIONS OF MANKIND (C.K. Ogden trans., Routledge & K. Paul 2d ed. 1968) (1924).

41. Millar & Kerr, *supra* note 4.

42. Neil M. Richards & William D. Smart, *How Should the Law Think About Robots?*, in ROBOT LAW, *supra* note 4, at 3.

Peter Kahn,⁴³ Ryan Calo,⁴⁴ and others, Jason Millar and Ian Kerr take the view that law may need to start thinking about intermediate ontological categories where robots and AIs substitute for human beings. Their main example is in the field of medical diagnostics AIs. They suggest that these AI systems may, one day, outperform human doctors; that this will result in pressure to delegate medical diagnostic decision-making to these AI systems; and that this, in turn, will cause various conundrums in cases where doctors disagree about the diagnostic outcomes generated by machines.⁴⁵

To better understand how the substitution effect might push us to create new categories of understanding, consider what happens once machine learning (ML) is capable of producing diagnostic outcomes that are superior to human doctors.

III. SUPERIOR ML-GENERATED DIAGNOSTICS

In the past five years, the success of diagnostics generated by ML is rapidly advancing.⁴⁶ When it was announced, in 2016, that IBM Watson was able to diagnose a rare form of leukemia that had gone unnoticed by a team of doctors, the writing was on the wall.⁴⁷ ML and other cognitive computing systems were poised to learn to see patterns in the data that doctors cannot see. With this enhanced ability at pattern matching, ML would offer a novel form of functional value to the practice of medicine. It is perhaps fair to say that—despite IBM Watson’s overhyped claims⁴⁸ and recent stumbles⁴⁹—a number of other⁵⁰ ML-generated diagnostics have already outperformed, or are on the verge of outperforming, doctors⁵¹ in a narrow range of tasks and decision-making. Although this may be

43. Peter H. Kahn, Jr. et al., *The New Ontological Category Hypothesis in Human-Robot Interaction*, HRI 2011—PROC. 6TH ACM/IEEE INT’L CONF. ON HUMAN-ROBOT INTERACTION (2011).

44. Ryan Calo, *Robotics and the Lessons of Cyberlaw*, 103 CAL. L. REV. 513 (2015).

45. Millar & Kerr, *supra* note 4.

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

47. Monegain B. *IBM Watson Pinpoints Rare Form of Leukemia After Doctors Misdiagnosed Patient*. Healthcare IT News. (August 8, 2016) <https://www.healthcareitnews.com/news/ibm-watson-pinpoints-rare-form-leukemia-after-doctors-misdiagnosed-patient>. See also Fei Jiang, *Artificial Intelligence in Healthcare: Past, Present and Future*, 2(4) STROKE VASCULAR NEUROLOGY 230 (2017).

48. David H. Freedman, *A Reality Check for IBM’s AI Ambitions*, MIT TECH. REV. (June 27, 2017), <https://www.technologyreview.com/s/607965/a-reality-check-for-ibms-ai-ambitions>.

49. Daniela Hernandez & Ted Greenwald, *IBM Has a Watson Dilemma*, WALL STREET J. (Aug. 11, 2018, 12:19 AM), <https://www.wsj.com/articles/ibm-bet-billions-that-watson-could-improve-cancer-treatment-it-hasnt-worked-1533961147>.

50. Andre Esteva et al., *Dermatologist-level Classification of Skin Cancer with Deep Neural Networks*, 542 NATURE 115 (2017).

51. Erwin Loh, *Medicine and the Rise of the Robots: A Qualitative Review of Recent Advances of Artificial Intelligence in Health*, 2 BMJ LEADER 59 (2018).

difficult to measure, one thing is certain: it is getting harder and harder to treat these AIs as mere support tools. AI is starting to generate powerful decisions that the medical profession and our health systems are relying upon with increasing dependence.

This is not surprising when one considers that ML software can see certain patterns in medical data that human doctors cannot. If spotting patterns in large swaths of data enables ML to generate superior diagnostic track records without human intervention or oversight, it is easy to imagine Balkin's substitution effect playing out in medical decision-making. To be clear, no one will claim ML to be people, nor will they exhibit anything like the general skills or intelligence of human doctors. ML will not perfect or even generate near perfect diagnostic outcomes in every case. ML is certain to make mistakes.⁵² In fact, as Froomkin et al.⁵³ have demonstrated, ML-generated errors may be even more difficult to catch and correct than human errors.⁵⁴

Froomkin et al. offer many reasons to believe that diagnostics generated by ML will have demonstrably better success rates than those generated by human doctors alone.⁵⁵ They go on to argue that existing medical malpractice law will come to require superior ML-generated medical diagnostics—rather than doctors—as the standard of care in clinical settings. Consequently, in time, effective ML will create overwhelming legal, ethical, and economical pressure to delegate the diagnostic process to machines.

Whether mandated by law or not, an increasing substitution of medical decision-making by machines, we believe, could have a significant effect on doctors' decision-making capacity. This becomes especially worrisome if there ever comes a time when the bulk of clinical diagnoses collected in databases result from ML-generated diagnoses that are not easily audited or understood by human doctors.

For these reasons, there is value in unpacking some of the by-products of the substitution effect.

IV. FAUXTOMATION

Given Balkin's substitution effect and our general propensity to imbue machines with human attributes, it is not difficult to see how the success of ML-

52. Casey Ross & Ike Swetlitz, *IBM's Watson Supercomputer Recommended 'Unsafe and Incorrect' Cancer Treatments, Internal Documents Show*, STAT (July 25, 2018), <https://www.statnews.com/2018/07/25/ibm-watson-recommended-unsafe-incorrect-treatments>.

53. Froomkin, Kerr & Pineau, *supra* note 5.

54. *Id.* at 48.

55. *Id.* at 39.

generated diagnosis⁵⁶ could catalyze the view of AI as a kind of substitute decision-maker. However, it is important to remember that today’s diagnostic AI is nothing more than a bunch of clever computer science techniques that permit machines to perform tasks that would otherwise require human intelligence. It is therefore important to understand what happens when we delegate decision-making to an AI.

Simply put, AI transforms a major effort into a minor one.

Doctors can delegate to AI the work of an army of humans; behind every successful AI there stands a multitude of medical researchers, practitioners, and technicians; frantically feeding the machines massive amounts of medical data, tirelessly training algorithms to interpret, process and understand that data as meaningful medical knowledge.⁵⁷ Through these processes, AI is permitted to stand in for significant human labor that is happening invisibly, behind the scenes. References to “deep learning”, AIs as “substitute decision-makers”, and similar concepts offer some utility—but they also reinforce the illusion that machines possess a kind of intelligence that they do not in fact have.

Astra Taylor was right to warn us about this sleight-of-hand, which she refers to as fauxtimation.⁵⁸ Fauxtimation occurs not only in the medical process of teaching a machine to recognize a tumor⁵⁹ but across a broader range of devices and apps that are characterized as AI. To paraphrase her simple but effective real-life example of an app used for food deliveries, we come to say things like: ‘How did your AI know that my order would be ready twenty minutes early?’ to which the human server at the take-out counter then replies: ‘because the response was actually from me. I sent you a message via the app once your organic rice bowl was ready!’⁶⁰

This example is the substitution effect gone wild: general human intelligence is attributed to a so-called smart app for no good reason. Though we have tried to demonstrate that there may be value in understanding some AIs as substitute decision-makers in limited circumstances—because AI is only a partial substitute—the metaphor loses its utility once we start attributing anything like general intelligence or, in this case, complete autonomy to the AI.

Having examined the metaphorical value in thinking of AIs as substitute decision-makers, we now turn to our second question: what might the comparison

56. Esteva et al., *supra* note 50.

57. Pedro Domingos, *A Few Useful Things to Know About Machine Learning*, 55 COMM. ACM 78 (2012).

58. Astra Taylor, *The Automation Charade*, 5 LOGIC MAG. (August 2018), <https://logicmag.io/05-the-automation-charade>.

59. *Id.*

60. *Id.*

with traditional substitute decision-making teach us about the agency and decisional autonomy of doctors and patients, as medical decision-making becomes more and more automated? In asking this question, we recognize that deciding whether a mass on a CT scan is benign or malignant is, in many ways, a different kind of decision than the decision of whether a particular kind of intervention is compatible with a patient's values. However, as this field has demonstrated over and over, there is no decision that is value neutral. Despite attempts to build "unbiased AI", values are regularly presumed and proxies are developed which undermine the possibility of value-neutral AI decision-making.

Further obfuscating the landscape is the increasing possibility of machine autonomy, to which we now turn.

V. MACHINE AUTONOMY AND THE AGENTIC SHIFT

Recent successes in ML-generated diagnosis and other applications in which machines are trained to transcend their initial programming have catalyzed a shift in discourse from automatic machines to machine autonomy.⁶¹ With increasing frequency, the final dance between data and algorithm takes place without understanding, often with human intervention or oversight. Indeed, in many cases, humans have a hard time explaining how or why the machine got it right (or wrong).

Curiously, the fact that a machine is capable of operation without explicit command has become understood as the machine is self-governing, that it is capable of making decisions on its own. But, as Ryan Calo rightly warns, "the tantalizing prospect of original action"⁶² should not lead us to presume that machines exhibit consciousness, intentionality or, for that matter, autonomy. Neither is there good reason to think that today's ML successes prescribe or prefigure machine autonomy as something health law, policy, and ethics will need to consider down the road.

As the song goes, "the future is but a question mark."⁶³

Rather than prognosticating about whether there will ever be machine autonomy in the strong sense,⁶⁴ our current aim is to briefly interrogate the

61. NEIL POSTMAN, *TECHNOPOLY: THE SURRENDER OF CULTURE TO TECHNOLOGY* 40 (Vintage Books 1993) (1992); Ian Kerr, *Schrödinger's Robot: Privacy in Uncertain States*, 20 *THEORETICAL INQUIRIES L.* 123 (2019).

62. Calo, *supra* note 44.

63. STING, *Bring On the Night*, on *BRING ON THE NIGHT* (A&M, 1986).

64. Many popular books are preoccupied with this question, including RAY KURZWEIL, *THE SINGULARITY IS NEAR: WHEN HUMANS TRANSCEND BIOLOGY* (2005); and NICK BOSTROM, *SUPERINTELLIGENCE: PATHS, DANGERS, STRATEGIES* (2017). Our point of view is that such questions distract us from pressing legal, ethical and policy questions that we already face. For an

perception of autonomy in machines that generate medical decisions, with a view to understanding the effects of this perception on doctors' decision-making capacity. As suggested at the outset, our concern is that when AI is understood as a substitute decision-maker, doctors' decisional autonomy might diminish. To illustrate why this is so, we borrow from Stanley Milgram's well known notion of an 'agentic shift'⁶⁵—"the process whereby humans transfer responsibility for an outcome from themselves to a more abstract agent."⁶⁶

In understanding how the outcomes of Milgram's experiments on obedience to authority apply to the potential diminution of doctors' decision-making capacity through the delegation of diagnostic decisions to machines, it is useful to understand the technological shift from automatic machines to so-called autonomous machines.

Automatic machines are those that simply carry out their programming. The key characteristic of automatic machines is their relentless predictability. With automatic machines, unintended consequences are to be understood as a malfunction.⁶⁷ Machines that display autonomy are different in kind. Instead of simply following commands, these machines are intentionally devised to supersede their initial programming.⁶⁸ ML is a paradigmatic example of this—it is designed to make predictions and anticipate unknown circumstances (think: object recognition in autonomous vehicles⁶⁹). With so-called *autonomous machines*, the possibility of generating unintended or unanticipated consequences is not always a malfunction. Sometimes, it is a feature, not a bug.⁷⁰

To bring this back to medical decision-making, it is important to see what happens once doctors start to understand ML-generated diagnosis as anticipatory, autonomous machines—as opposed to software that merely automates human decisions by if/then programming. Applying Milgram's notion of an agentic shift, there is a risk that doctors, hospitals, or health policy professionals who perceive AIs as autonomous, substitute decision-makers, will transfer responsibility for an outcome from themselves to the AIs.

This agentic shift explains not only the popular obsession with AI

elaboration of this point, see Kerr, *supra* note 61.

65. STANLEY MILGRAM, *OBEDIENCE TO AUTHORITY: AN EXPERIMENTAL VIEW* (1974).

66. *Id.* at 124.

67. JANET R. HUNZIKER & TREVOR O. JONES, *PRODUCT LIABILITY AND INNOVATION: MANAGING RISK IN AN UNCERTAIN ENVIRONMENT* (1994).

68. WENDELL WALLACH & COLIN ALLEN, *MORAL MACHINES: TEACHING ROBOTS RIGHT FROM WRONG* (2009); DAVID J. GUNKEL, *THE MACHINE QUESTION: CRITICAL PERSPECTIVES ON AI, ROBOTS, AND ETHICS* (2012).

69. Samuel Greengard, *Gaming Machine Learning*, 60 *COMM. ACM* 14 (2017).

70. Millar & Kerr, *supra* note 4.

superintelligence⁷¹ but also some rather stunning policy recommendations regarding liability for robots that go wrong—including the highly controversial report by the European Parliament to treat robots and AIs as “electronic persons”.⁷²

According to Milgram, when humans undergo an agentic shift, they move from an autonomous state to an agentic state.⁷³ In so doing, they no longer see themselves as moral decision-makers. This perceived moral incapacity permits them to simply carry out the decisions of the abstract decision-maker that has taken charge. There are good psychological reasons for this to happen. An agentic shift relieves the moral strain felt by a decision-maker.⁷⁴ Once a moral decision-maker shifts to being an agent who merely carries out decisions (in this case, decisions made by powerful, autonomous machines), one no longer feels responsible for (or even capable of making) those decisions.

To get a sense of how this plays out in practical terms, let us take the familiar example of navigational AI used to facilitate decision-making about which routes to take on (un)known roads. Reflecting anecdotally, a first-time user very quickly shifts from being in the driver’s seat to feeling like the proverbial cog in the wheel. Over time, as the machine pumps out routing suggestions and traffic-related decisions, the driver relinquishes agency in the navigation of the vehicle and becomes a kind of human cartilage, cushioning the moral friction between the navigational AI and the vehicle. In carrying out basic decisions, actuating the logic in the machine, the driver’s decisional autonomy is surrendered to the machine. Other than programming the final destination, the driver tends to do as instructed—even when there is a pretty clear sense that the car is headed in the wrong direction. In such case, the driver has moved from an autonomous state into an agentic state. Of course, one *could* still challenge or ignore the machine. But there is a strong inclination to capitulate, relying on the navigational AI to come up with the appropriate decision, which the driver then follows without a moment’s reflection. This is the power of Balkin’s substitution effect.

Although many people seem perfectly happy with the shift from an autonomous to an agentic state when it comes to navigating the roads, if one reflects on the matter, there is a strange dissonance in such delegated decision-making. Many people (both authors of this article included) will often promise themselves not to over-rely on navigational AI—fearing that their navigational abilities will degrade. Still, most of us continue to use them anyway, with our navigational decision-making skills diminishing accordingly.

71. BOSTROM, *supra* note 64.

72. Comm. on Legal Affairs, *Report with Recommendations to the Commission on Civil Law Rules on Robotics*, E.U. A8-0005/2017, subsec. 59(f) (Jan. 27, 2017).

73. MILGRAM, *supra* note 65, at 124.

74. *Id.* at 153.

Our hypothesis is that an over-reliance on diagnostic AI risks a similar agentic shift, and that such a shift could diminish medical practitioners' decisional autonomy—especially as AI starts to be involved in a broader range of medical practice such as the development of treatment plans, etc. We contend this shift will occur, even though AI will never fully substitute the physician's role. With increasing dependence on diagnostic AI, medical decision-makers previously in autonomous states might, quite easily, shift to agentic states. By definition, they will relinquish control, moral responsibility and, in some cases, legal liability to AI substitute decision-makers.

This claim is not merely dystopic doom-saying. There will be many beneficial social outcomes that accompany such agentic shifts. For example, the entire concept of “chain of command” that drives military and corporate action is made possible by the agentic shift. Simply put, we are able to accomplish many things not previously possible by relinquishing some autonomy to machines or other abstract authority figures. Although many benefits arise from these agentic shifts, there are also significant concerns associated with the attendant loss of decisional autonomy. We return now, in our final section, to our earlier discussion of traditional substitute decision-making to explore some of these concerns and how permitting AIs to stand in for diagnosticians might compromise decision-making from medical practitioners' point of view.

VI. SUBSTITUTION AND THE CAUSAL AGENT

Recall from our prior discussion in Part I, traditional substitute decision-making is premised on the assumption that some external decision-maker will make a better decision than the patient. In other words, there is an assumption that the patient—who is deficient in certain decisional capacities—will ultimately benefit by allowing the substitute to make the decision instead, that the patient would be worse off if she were permitted to make her own decision. While this may be true for certain conditions, or with respect to certain types of decisions, it is important to be mindful of the possibility that the patient may not, in fact, benefit from decisions made by a substitute. Indeed, the loss of autonomy and self-determination that flows from not being able to make one's own decisions can negatively impact the patient's personal health and well-being.

The ability to make decisions for oneself is an essential exercise of personal autonomy and self-determination. As Blanck and Martinis explain, self-determination “describes actions that enhance the possibilities for people to make or cause things to happen in their lives.”⁷⁵ Thus, when an individual makes a

75. Peter Blanck & Jonathan G. Martinis, “*The Right to Make Choices*”: *The National Resource Center for Supported Decision-Making*, 3 *INCLUSION* 24 (2015) at 25. See also Karrie A.

decision, he or she is acting as a “causal agent.”⁷⁶ As a causal agent, one may choose to take a risky decision or a decision that some may not agree with—a decision that some might even consider to be an ill-advised or the wrong decision. This is, as Salzman puts it, the “dignity of risk.”⁷⁷

Research demonstrates that those who do not have the authority to make decisions for themselves and, as result, are not able to exercise autonomy or self-determination can experience a range of negative effects. For some, the inability to exercise self-determination leaves them feeling “helpless, hopeless, and self-critical.”⁷⁸ Further, some have been shown to experience, “low self-esteem, passivity, and feelings of inadequacy and incompetency” which mimic symptoms of clinical depression.⁷⁹

By contrast, there are real benefits with making one’s own decisions and, indeed, some of these benefits are evident in early research studies of supported decision-making.⁸⁰

A few small studies demonstrate that supported individuals benefit from supported decision-making agreements and the decisional autonomy that is promoted by supported decision-making. For example, an Australian study reported that the participants (who suffered from either brain injury or intellectual disabilities) benefitted from supported decision-making arrangements.⁸¹ They experienced increased confidence and engagement with the community and reported benefiting from having more control over their lives.⁸² In short, exercising self-determination enhances one’s quality of life.⁸³

Shogren et al, *Causal Agency Theory: Reconceptualizing a Functional Model of Self-Determination*, 50 EDUCATION AND TRAINING IN AUTISM AND DEVELOPMENTAL DISABILITIES 251 (2015).

76. *Id.*

77. See Salzman, *supra* note 16, at 179; Salzman, *supra* note 22; and Gooding, *supra* note 3. See also JOSEPH SHAPIRO, NO PITY: PEOPLE WITH DISABILITIES FORGING A NEW CIVIL RIGHTS MOVEMENT 162 (1994) (observing that as individuals with disabilities began to live independently and to fully participate in life’s activities, they were entitled to the corresponding “dignity of risk”).

78. EDWARD L. DECL, INTRINSIC MOTIVATION 208 (1976).

79. Bruce J. Winick, *The Side Effects of Incompetency Labeling and the Implications for Mental Health Law*, 1 PSYCHOL. PUB. POL’Y & L. 6, 21 (1995).

80. Scholars agree that more research on the effectiveness of supported decision-making needs to be done: see Kohn et al., *supra* note 21; KARRIE A. SHOGREN ET AL., *Supported Decision-Making and Self-Determination Research*, in SUPPORTED DECISION-MAKING: THEORY, RESEARCH, AND PRACTICE TO ENHANCE SELF-DETERMINATION AND QUALITY OF LIFE, *supra* note 23, at 183; Jacinta Douglas et al., *Factors that Underpin the Delivery of Effective Decision-making Support for People with Cognitive Disability*, 2 RES. & PRAC. INTELL. & DEVELOPMENTAL DISABILITIES 37 (2015); ELIZABETH PELL & VIRGINIA MULKERN, HUMAN SERVICES RESEARCH INST., SUPPORTED DECISION MAKING PILOT: PILOT PROGRAM EVALUATION YEAR 2 REPORT (2016).

81. MARGARET WALLACE, S. AUSTRALIAN OFFICE OF THE PUBLIC ADVOCATE, EVALUATION OF THE SUPPORTED DECISION MAKING PROJECT (2012).

82. *Id.*

83. Y. Lachapelle et al., *The Relationship Between Quality of Life and Self-determination: An*

Much research on the potential benefits of supported decision-making is ongoing.⁸⁴ A number of studies underway seek to measure such benefits.⁸⁵ In any event, it is not all that surprising to learn that many patients thrive when their decisional autonomy is promoted. Returning to AI substitutes, is it possible that medical decision-making might also benefit when AI is used as a support rather than a substitute?

Of course, there are clear and obvious differences between decisions made by patients and those made by doctors. As discussed above in Part I, traditional substitute decision-making requires the decision-maker to place herself in the patient's shoes. This is necessarily a subjective exercise. It requires the substitute decision-maker to use empathy and other social techniques as a means of taking into account the patient's prior wishes, values and beliefs. Similarly, supported decision-making rests on input from a wide range of data points from family members, friends and others who offer knowledge about the patient and her lifestyle and values. Advice, information and guidance from a variety of perspectives, experiences and opinions. In other words, in both traditional substitute decision-making and supported decision-making, the basis upon which decisions are subjective and dynamic. The same process could yield different results on different occasions. Although it is tempting to somehow think of AI decisions as more objective and static, this is not always the case. ML software is based on pattern discovery in medical data. This too can generate unexpected decisions that have no causal basis but end up working well. Although much uncertainty remains, an understanding the risks of substitute decision-making and the benefits of supported decision-making in the patient context, we suggest, is useful when thinking about the role of AI in medical decision-making.

In Part V, we illustrated how autonomy is diminished or relinquished when decisional authority is transferred to an AI substitute. Although doctors will never be fully substituted by AI, their decisional autonomy may be significantly diminished as a result of partial substitutions. Even partial substitutions risk what we call the "autonomous shift". This risk is precisely the reverse of Milgram's agentic shift observed in his famous experiments on obedience,⁸⁶ discussed above.⁸⁶ Following the very same logic in reverse, as humans find themselves more and more in agentic states, there are reasons to suspect that we will increasingly tend to project or attribute authority to autonomous machines. AIs will transform from their current role as data-driven agents⁸⁷ used to facilitate our decisions to being

International Study, 49 J. INTELL. DISABILITY RES. 740 (2005).

84. Nina A. Kohn & Jeremy A. Blumenthal, *A Critical Assessment of Supported Decision-making for Persons Aging with Intellectual Disabilities*, 7 DISABILITY & HEALTH J. S40 (2014).

85. SHOGREN ET AL., *supra* note 81; Arstein-Kerslake et al., *supra* note 29.

86. MILGRAM, *supra* note 65.

87. Mireille Hildebrandt, *Law as Information in the Era of Data-Driven Agency*, 79 MOD. L.

seen as autonomous and authoritative decision-makers in their own right. When this happens, doctors will no longer be causal agents.

Although the dignity considerations are different for patients and doctors, it is worthwhile reflecting on this notion of “dignity of risk” from the doctor’s point of view. The craft of medicine cannot be reduced to algorithmic inputs and outputs. Although medical decisions are about the patient’s—not the doctor’s—well-being, the practice of medicine by necessity involves permitting doctors to take risks that accord with their medical understanding rather than becoming slaves to the machine’s recommendation simply by virtue of its prior statistical success. The dignity of risk, in this context, is precisely how medical science has advanced.⁸⁸ Decision-making is a core function of medical practice. Indeed, removing humans from the decision loop creates risks of its own. As Froomkin et al. have demonstrated, loss of human agency and decisional autonomy gives rise to a number of safety considerations.⁸⁹ These include the possibility of a diagnostic monoculture, path dependent errors and sub-optimal diagnostic conclusions.⁹⁰

The lesson to be learned from the literature on supported decision-making is that relinquishment of control may be unnecessary. Although AI is increasingly used in diagnostics and some forms of treatment, the physician’s role extends beyond these discrete tasks—it also includes developing various treatment options and assisting the patient’s choice of treatment plan. These are important opportunities for physicians to continue to play an active role in patient care. One might go so far as saying that they are of vital necessity to the patient as well, since the physician will be the intermediary between the patient and the AI, just as physicians intermediate so many important technological interventions throughout the medical system. With all of this in mind, there are in fact good reasons to think of AI as a kind of medical support, rather than a substitute decision-maker. Indeed, if AI were carefully designed to operate merely as a support rather than a substitute, physicians might be better able to remain causal agents, maintaining authoritative decision-making capacity, becoming less susceptible to diagnostic deskilling and the agentic shift, and leaving space for their patients’ participation.

REV. 1 (2016).

88. See, e.g., MORTON A. MEYERS, HAPPY ACCIDENTS: SERENDIPITY IN MAJOR MEDICAL BREAKTHROUGHS IN THE TWENTIETH CENTURY (2007); Mark B. Pepys, *Science and Serendipity*, 7 CLINICAL MED. 562 (2007).

89. Their work goes even further by considering the possibility that such substitutions may one day be prescribed by law. See Froomkin, Kerr & Pineau, *supra* note 5.

90. Diagnostic monoculture exemplifies a more general problem arising when we rely, to our detriment, on a dominant mode of thinking to the exclusion of other possible solutions. Here, a diagnostic monoculture that leads to less input from human physicians could make quality control of diagnostic databases much more difficult. See Froomkin, Kerr & Pineau, *supra* note 5, Part III.

CONCLUSION

As we contemplate the future role of AI in medicine, it will be interesting to see if it will be treated as a support or a substitute.

In this article, we have considered two much more basic questions: (i) whether thinking about AI as a substitute decision-maker adds value to the development of AI policy within the health sector? (ii) what might the comparison with traditional substitute decision-making teach us about the agency and decisional autonomy of doctors, as AI further automates medical decision making?

In response to our first question, our analysis demonstrates that traditional substitute decision-making offers valuable lessons for the development of AI policy in health care. Both the traditional model of substitute decision-making (where third parties are charged with making a substitute decision for a patient who has lost decisional capacity) and AI substitute decision-making (where AI is used as a substitute for physician decision-making) share an important feature - they result in a loss of decisional autonomy. In our view, the research exploring the impact of this loss of decisional autonomy on patients as a result of substitute decision-making may be indicative of the potential consequences arising from the autonomous shift of AIs to substitute decision-makers.

As for the second question, we contend that the comparison with traditional substitute decision-making teaches us a great deal about the agency and decisional autonomy of doctors, as medical decision-making becomes more and more automated. Allowing AIs to substitute as decision-makers, rather than merely acting as decisional supports, will impact the agency and decisional autonomy of doctors. This, in turn, will impact doctors' decision-making capacity in much the same way as our navigational decision-making capacity is impacted when we permit navigational AI to substitute for human judgment. It will create an over-reliance on AI and will displace moral responsibility and, in some cases, legal liability.

Given this possibility, it is our position that much care must be devoted by those who develop AI diagnostic tools to ensure that they remain our supports, not our substitutes.