Cureus
Part of SPRINGER NATURE

Open Access Editorial

The Surgeon and the Algorithm: Why the Vatican's Bioethical Blueprint Is Essential for Modern Surgical Practice

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Review began 06/02/2026
Review ended 06/19/2026
Published 06/24/2026

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DOI: 10.7759/cureus.111430

Abstract

The rapid integration of artificial intelligence (AI), intraoperative predictive analytics, and automated tracking platforms within modern surgical workflows presents emerging ethical challenges regarding patient autonomy, transparency, and data governance. This editorial explores how the recent Papal Encyclical *Magnifica Humanitas* provides a human-centered bioethical blueprint for contemporary surgical practice. By emphasizing the intrinsic dignity of the patient, this framework offers guidance against reducing individuals to standardized data metrics. The essay further examines concerns surrounding "health data colonialism" - the extraction and commercialization of localized surgical registries, clinical video logs, and patient data by proprietary models without adequate patient transparency. To address these ethical challenges, we propose an overhaul of standard informed consent protocols to include a "Digital Sovereignty Addendum." True patient advocacy in the digital age requires transparently informing patients whether their clinical footprints are utilized for algorithmic training, ensuring that technological advancement remains aligned with human-centered clinical care.

Categories: Other, General Surgery, Health Policy
Keywords: artificial intelligence in surgery, bioethics, digital sovereignty, health data colonialism, informed consent, machine learning, medical theology, minimal access surgery, patient advocacy, surgical ethics

Editorial

The need for a new ethical compass

The integration of artificial intelligence (AI), predictive analytics, and automated data platforms into modern surgical practice has created unprecedented opportunities to improve clinical decision-making, efficiency, and patient outcomes [1]. At the same time, these technologies raise complex questions regarding autonomy, accountability, transparency, and the preservation of human dignity [2]. Existing bioethical frameworks, including principle-based ethics and human rights approaches, continue to provide valuable guidance; however, emerging challenges surrounding algorithmic decision support, secondary use of patient data, and digital governance have generated renewed ethical debate.

In this context, the recent Papal Encyclical *Magnifica Humanitas* [3] offers a distinctive contribution to contemporary discussions on surgical ethics. Rather than rejecting technological innovation, the document emphasizes the inherent dignity of the human person and argues that technological advancement should remain accountable to human flourishing. This editorial examines how these principles may inform current debates surrounding AI-assisted surgery, digital consent, and data sovereignty, while acknowledging the broader plurality of ethical perspectives that shape modern healthcare.

The bioethical core: the "patient face" versus the "Babel syndrome"

A primary danger in high-tech medicine is what the encyclical calls the "technocratic paradigm" - the tendency to let the logic of efficiency, control, and profit dictate clinical decisions. In surgical practice, this manifests as the temptation to reduce the profound mystery of the human person into standardized performance metrics, analytics, and data streams [1].

The Vatican rightly points out that while AI can process vast amounts of data at incredible speeds, it is fundamentally devoid of a moral conscience. Algorithmic systems do not undergo real experiences, nor do they understand compassion, mercy, or the deeper existential meaning of healing. When we allow automated systems to dictate patient pathways or determine resource allocation without strict human oversight, we risk falling into the "Babel syndrome," where human dignity is sacrificed for mechanical efficiency.

The theological advice from *Magnifica Humanitas* is an essential corrective for the modern clinician: the quality of our care must always be measured by our ability to recognize the patient as an irreplaceable face,

not merely a function [3]. AI should be utilized strictly as an assistant that reduces administrative friction, ultimately giving the surgeon more time to look the patient in the eye, honor their existential dignity, and practice genuine, human-centered care [1].

Health data colonialism: the new frontier of bioethics

International sharing of health data has contributed substantially to scientific discovery, quality improvement initiatives, and the development of safer and more effective AI systems. Diverse datasets can improve algorithmic performance, reduce bias, and facilitate advances in patient care across geographic boundaries. Nevertheless, ethical concerns arise when data collection, governance, and commercialization occur without meaningful transparency, equitable benefit-sharing, or adequate patient understanding. It is within this context that concerns regarding health data colonialism have emerged.

Perhaps the most urgent bioethical issue faced today revolves around patient data privacy and ownership [4]. AI models are trained on massive datasets, but in the surgical world, that "data" consists of the deeply personal biological, clinical, and anatomical information of patients [5].

Magnifica Humanitas delivers a striking and necessary warning about a new form of resource extraction: health data colonialism. Today, transnational tech companies and private entities are harvesting health data, epidemiological profiles, and genetic maps, treating them as the new "rare earths" of global power. This data is routinely used to build proprietary predictive models, often without the explicit understanding or structural benefit of the populations who provided it [4].

From a bioethical standpoint, the Vatican's assertion that this data must be treated as a common good rather than an instrument of asymmetric dominance is absolutely correct. If we ignore this warning, the digital age will simply become a new, unchecked form of colonial exploitation under a technical guise [4]. This theological stance demands a radical, immediate update to current informed consent protocols [5].

Overhauling surgical consent for the digital age

Currently, standard surgical consent forms are primarily focused on the physical risks of a procedure, such as bleeding, infection, or damage to adjacent structures. However, the Vatican’s ethical framework insists that patient autonomy and transparency must be fiercely protected in the digital realm as well. To align practice with the principles of social justice and the universal destination of goods, informed consent must be expanded to encompass the patient's digital footprint.

True patient advocacy requires that standard surgical consent forms be modified to address the following issues [5].

Algorithmic Transparency

Patients must be explicitly informed if their surgical video logs, clinical outcomes, or biological data will be utilized to train proprietary AI models or optimize robotic software [1,5].

Data Sovereignty

Consent protocols must clearly outline where the patient’s digital data will be stored, who controls the underlying models, and whether it will be monetized or transferred to private third parties [4,5].

The Right to Decide

Clinicians must restore to patients the definitive ability to decide how their most intimate clinical data is utilized, ensuring they are treated as an end in themselves and never as a mere commodity to be sold off [5].

To align our practice with the principles of social justice and the universal destination of goods, informed consent must be expanded to encompass the patient's digital footprint.

The proposed Digital Sovereignty Consent Addendum should be regarded as a conceptual framework intended to stimulate discussion among clinicians, ethicists, institutions, and policymakers. It is not presented as a finalized legal or regulatory instrument but rather as a practical example of how existing informed consent processes might evolve to address emerging questions regarding algorithmic transparency, secondary data use, and patient autonomy in the digital age. A practical framework for this intervention is provided in the Appendix.

Limitations

This editorial is primarily a normative and conceptual analysis rather than an empirical investigation. Consequently, the arguments presented are not supported by prospective clinical outcome data, patient-

reported measures, or formal assessments of clinician attitudes toward algorithmic governance. Future studies should evaluate whether the proposed principles influence patient trust, informed consent quality, shared decision-making, or clinical outcomes.

Furthermore, although *Magnifica Humanitas* provides a coherent ethical framework grounded in Catholic social teaching, alternative secular, human rights-based, and pluralistic bioethical traditions may arrive at similar conclusions regarding patient autonomy, transparency, accountability, and protection from exploitation. The applicability of this framework may therefore vary across healthcare systems, cultural settings, and legal environments [2].

The discussion of health data colonialism intentionally highlights potential risks associated with unequal data governance and commercialization of health information. However, international data sharing has also generated substantial scientific, educational, and public health benefits. Future scholarship should focus on identifying governance structures that preserve innovation while ensuring transparency, fairness, and equitable distribution of benefits.

Finally, the rapid evolution of AI technologies, privacy regulations, and data governance frameworks may alter contemporary understandings of algorithmic transparency, data ownership, and digital sovereignty. As a result, the ethical recommendations proposed in this editorial should be viewed as adaptive principles requiring periodic reassessment as technology and regulatory environments continue to evolve [4,5].

Conclusion: embracing the theological standard

As the boundaries of surgical innovation continue to expand through robotics, machine learning, and advanced digital platforms, clinicians must ensure that technological progress remains aligned with the fundamental purpose of medicine: the care of persons. Questions surrounding algorithmic influence, data governance, and informed consent are no longer theoretical concerns but practical challenges that increasingly affect everyday surgical practice [1].

Regardless of one's religious or philosophical commitments, the emergence of surgical AI necessitates renewed attention to patient dignity, transparency, accountability, and meaningful informed consent. *Magnifica Humanitas* contributes a distinctive perspective to this discussion by emphasizing that technological innovation should remain accountable to the human person whom it is intended to serve [3]. By fostering dialogue on digital consent and responsible stewardship of patient data, the surgical community can help ensure that technological advancement enhances, rather than diminishes, the humanity at the center of clinical care.

Appendix

Proposed Informed Consent Addendum for Digital Sovereignty in Surgery

Proposed Informed Consent Addendum for Digital Sovereignty in Surgery

Patient Name:	(Please attach the Hospital Identification Sticker)
Hospital/UHID Number:	
Proposed Procedure:	
Operative Surgeon:	

In addition to the physical risks and benefits associated with your upcoming surgical procedure, modern healthcare systems utilize digital tracking, imaging, and recording technologies. In alignment with absolute clinical transparency and respect for your personal dignity, you have the right to govern how your digital data is managed. Please read and initial your choices below:

1. Algorithmic Transparency & Data Training

During your operation, routine digital data—including laparoscopic or robotic video logs, intraoperative still images, and automated clinical outcomes—may be recorded.

[ ] I CONSENT to allow my anonymized surgical data, video logs, or clinical outcomes to be utilized to train, refine, or optimize artificial intelligence (AI) diagnostic models and robotic surgical software.

[ ] I DO NOT CONSENT to the use of my surgical data for machine learning or algorithmic training purposes. I request that my digital files be used strictly for my personal, direct medical care and immediate quality control.

2. Data Sovereignty & Third-Party Transfer

Your digital clinical footprints are an extension of your medical history. They are traditionally stored on hospital servers or encrypted institutional cloud databases.

[ ] I ACKNOWLEDGE that my local institution will retain absolute sovereignty over my data pools. I strictly prohibit the transfer, licensing, or monetization of my clinical footprints to private third-party technology developers or transnational device corporations without further explicit written permission.

3. Right to Withdraw & Data Destruction

I understand that I may withdraw my consent for the non-clinical use of my digital data at any time without prejudice to my ongoing care. Upon withdrawal, I request that all digital files utilized for research or algorithmic training purposes be permanently deleted or securely destroyed, as far as technically feasible.

[ ] I ACKNOWLEDGE

4. Data Security & Breach Notification

I acknowledge that while the hospital maintains robust security, no digital system is entirely immune to compromise. In the event of a confirmed security breach involving my non-anonymized digital clinical data, I request to be notified immediately and provided with a detailed account of the data affected.

[ ] I ACKNOWLEDGE

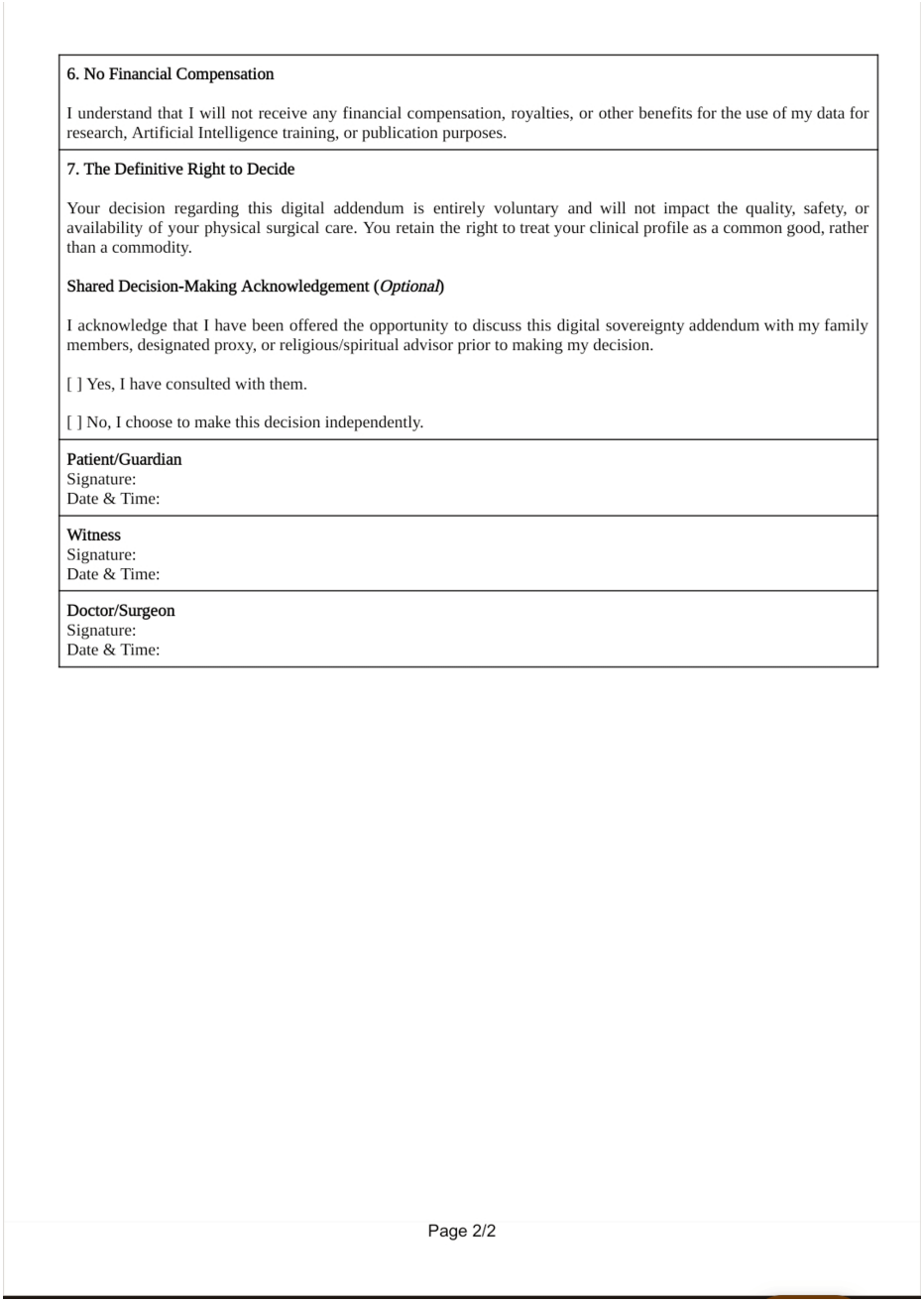
5. Confidentiality and Privacy Commitment

I acknowledge the hospital's commitment that, to the extent permitted by law and institutional policy, my identity will be kept confidential and my non-anonymized data will not be publicly presented.

[ ] I ACKNOWLEDGE

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FIGURE 1: Digital Consent Addendum, page 1



6. No Financial Compensation

I understand that I will not receive any financial compensation, royalties, or other benefits for the use of my data for research, Artificial Intelligence training, or publication purposes.

7. The Definitive Right to Decide

Your decision regarding this digital addendum is entirely voluntary and will not impact the quality, safety, or availability of your physical surgical care. You retain the right to treat your clinical profile as a common good, rather than a commodity.

Shared Decision-Making Acknowledgement (*Optional*)

I acknowledge that I have been offered the opportunity to discuss this digital sovereignty addendum with my family members, designated proxy, or religious/spiritual advisor prior to making my decision.

[ ] Yes, I have consulted with them.

[ ] No, I choose to make this decision independently.

Patient/Guardian
Signature:
Date & Time:

Witness
Signature:
Date & Time:

Doctor/Surgeon
Signature:
Date & Time:

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FIGURE 2: Digital Consent Addendum, page 2

Additional Information

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All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Acquisition, analysis, or interpretation of data: Andrew Lourdunathan

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Disclosures

Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

Acknowledgements

The author wishes to express sincere gratitude to the Department of General Surgery at St. Martha's Hospital for fostering an institutional environment that encourages rigorous bioethical inquiry alongside clinical excellence. The hospital's enduring commitment to its faith-based values provided a deeply supportive backdrop for exploring the intersection of modern technology and Catholic social teaching. Deep appreciation is also extended to the colleagues and mentors whose ongoing discussions regarding patient advocacy and technological integration helped shape the perspectives presented in this editorial.

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