



Ontology and axiology of artificial intelligence in maternal and neonatal health

Ontología y axiología de la inteligencia artificial en salud materno-neonatal

Elizabeth Laura Padilla Saavedra¹  

¹ Posdoctorado En Investigación Mixta Con Inteligencia Artificial Versión II, Dirección de Posgrado, Universidad Pública de El Alto, La Paz, Bolivia

Submitted: 07-05-2026 | Revised: 29-06-2026 | Accepted: 23-07-2026 | Published: 24-07-2026

Corresponding Author: Elizabeth Laura Padilla Saavedra 

ABSTRACT

The integration of artificial intelligence (AI) in maternal-neonatal health transcends technological innovation to become an ontological and axiological reconfiguration of clinical practice. This research analyzes, from a qualitative and philosophical approach, how AI constitutes new clinical realities. Through systematic review, the factum of AI capabilities was established, demonstrating high accuracy (AUC > 0.85; precision > 95%) in predicting preeclampsia, preterm birth, and neonatal mortality. Conceptual analysis based on frameworks by Heidegger (ontology, temporality), Varzi (ontological inventory), and Echeverría (axiology) was employed. Results show AI introduces ontological entities such as 'pre-symptomatic patient' and 'risk score,' altering care's temporal structure toward probabilistic future. AI's 'value' reveals itself as contextual and contested function. Ethical challenges were identified including algorithmic bias, 'black box' opacity, and responsibility gap. It concludes that responsible AI governance demands ontological humility and adaptive regulatory framework prioritizing equity, transparency, and human-centered care.

Keywords: Artificial Intelligence, Maternal-Neonatal Health, Ontology, Axiology, Ethics

RESUMEN

La integración de la inteligencia artificial (IA) en la salud materno-neonatal trasciende la innovación tecnológica para convertirse en una reconfiguración ontológica y axiológica de la práctica clínica. Esta investigación analiza, desde un enfoque cualitativo y filosófico, cómo la IA constituye nuevas realidades clínicas. A través de una revisión sistemática, se estableció el factum de las capacidades de la IA, evidenciando alta precisión (AUC > 0.85; precisión > 95%) en predicción de preeclampsia, parto prematuro y mortalidad neonatal. Se empleó análisis conceptual basado en marcos de Heidegger (ontología, temporalidad), Varzi (inventario ontológico) y Echeverría (axiología). Los resultados muestran que la IA introduce entidades ontológicas como el 'paciente pre-sintomático' y 'puntuación de riesgo', alterando la estructura temporal del cuidado hacia un futuro probabilístico. El 'valor' de la IA se revela como función contextual y disputada. Se identificaron desafíos éticos como sesgo algorítmico, opacidad de 'caja negra' y brecha de responsabilidad. Se concluye que la gobernanza responsable de la IA exige humildad ontológica y marco regulatorio adaptativo priorizando equidad, transparencia y cuidado centrado en el ser humano.

Palabras clave: Inteligencia Artificial, Salud Materno-Neonatal, Ontología, Axiología, Ética

INTRODUCTION

The integration of artificial intelligence (AI) into maternal-neonatal health represents a fundamental transformation that redefines clinical knowledge and medical practice. This transformation is not merely a technological update but an ontological and axiological reconfiguration that changes the “being” of the patient’s condition and the “value” of care. The philosophical tradition, particularly in the work of Martin Heidegger, criticized the simplistic view of knowledge as a relationship between “subject” (clinician) and “object” (patient). The emergence of AI as a third actor that mediates, interprets, and predicts compels us to confront this conception. AI is not a passive instrument; it is an agent that actively constitutes a new clinical reality, populated by novel entities such as “risk scores,” “predictive diagnoses,” and “algorithmically verified ultrasound planes” (Drukker et al., 2023). The documented advances in the literature demonstrate unprecedented predictive capabilities. Machine learning models achieve an AUC of 0.89 in preterm birth prediction and 95.7% accuracy in prematurity, with 99.7% accuracy in neonatal mortality prediction (Garcés-Galeano et al., 2023). Systems like HeRO reduce sepsis-associated mortality by between 22% and 40% (Moorman et al., 2011).

This research is structured around a fundamental question: What is the purpose and foundation of this new form of algorithm-mediated clinical knowledge? What kind of “being” and system of “values” emerge when technology interposes between caregiver and care? The objective of this study is to analyze, from an ontological and axiological perspective, how artificial intelligence in maternal-neonatal health constitutes new clinical realities and redefines the value of care, and to identify the ethical and political implications for responsible governance.

METHODS

This study is based on a qualitative analytical-interpretive approach with a documentary design that emphasizes critical philosophical reflection on the role of artificial intelligence in maternal-neonatal health. The methodological approach is structured in two complementary phases.

Phase 1: Systematic Literature Review

A literature search was conducted in academic databases (PubMed, Scopus, IEEE Xplore, ScienceDirect, Google Scholar) using specific descriptors in Spanish and English.

The inclusion criteria were:

- Research published between 2018-2024
- Explicit use of AI in risk prediction, clinical diagnosis or monitoring in maternal-neonatal health
- Studies with documented methodological rigor
- Articles with full text access

The exclusion criteria included:

- Studies without specific application in maternal-neonatal health
- Articles without AI performance data
- Publications without peer review

Phase 2: Conceptual and Philosophical Analysis

Conceptual analysis was conducted based on the following theoretical frameworks:

- Heidegger’s Ontology: Concepts of temporality, *das Man*, *aletheia*, and being-in-the-world
- Varzi’s Ontological Inventory: Classification of Entities and Properties
- Axiology of Echeverría: Unsaturated and Contextual Value Functions

This hermeneutic approach goes beyond technical description to explore the deeper implications of the changes induced by AI.

Thematic Organization

The results were organized into three axes:

1. Clinical Risk Prediction
2. Image-assisted diagnosis
3. Expansion of Care Through Remote Monitoring

RESULTS

Overview of Artificial Intelligence in Maternal-Neonatal Care

The systematic review identified a representative core of research documenting the current state of AI in maternal-neonatal health. After a rigorous selection process, four key studies were included, outlining the main areas of application and emerging challenges.

Predictive Analytics for Risk Stratification

The most established applications use machine learning algorithms to anticipate obstetric complications. XGBoost and Random Forest models demonstrate consistently high effectiveness:

- Preterm birth: AUC of 0.89, accuracy of 95.7% (Garcés-Galeano et al., 2023)
- Preeclampsia: AUC of 0.71-0.80, identification of 48.6% more at-risk patients compared to standard methods (Asri et al., 2022; Zeng et al., 2023)
- Neonatal mortality: 99.7% accuracy with XGBoost (Garcés-Galeano et al., 2023)

Table 1. Performance of AI Models in Predicting Maternal Complications

Complication	AI Model	Data sources	Key metric	Reference
Preterm birth	XGBoost, Random Forest	Maternal bioinformatics, EHG, clinical data	AUC = 0.89; Accuracy = 95.7%	Garcés-Galeano et al., 2023
Preeclampsia	Logistic regression, XGBoost, Neural Networks	Longitudinal data from EMR, biomarkers	AUC = 0.71– 0.80	Zeng et al., 2023
Neonatal mortality	XGBoost	Fetal-maternal medical data	Precision = 99.7%	Garcés- Galeano et al., 2023

Note. AUC = Area under the ROC curve; EHG = electrohysterography; EMR = electronic medical records. Data adapted from Garcés-Galeano et al. (2023) and Zeng et al. (2023).

AI-Augmented Diagnosis and Remote Monitoring

Convolutional neural networks in obstetric ultrasound demonstrate significant improvement in accuracy of fetal anomaly detection. Detection of neural tube defects reaches sensitivity of 88.9% and specificity of 98.0% (Bennis et al., 2024). AI-enabled portable ultrasound devices, such as Butterfly iQ+, allow expert-level scans by non-specialist personnel, democratizing access to quality diagnosis in low-resource settings.

Continuous Monitoring in UCIN

HeRO (Heart Rate Observation) system represents the most successful application, predicting late-onset sepsis up to 24 hours before clinical manifestation, reducing associated mortality between 22-40% (Moorman et al., 2011). Algorithms like Pose AI use video streams to track neonatal movements, identifying neurological changes with ROC-AUCs up to 0.91 (Masand et al., 2024).

Ontological Analysis: New Categories of the Clinical Being

Following Varzi’s (2005) framework on ontological inventory, AI adds novel entities to the “inventory” of the clinical world:

1. Pre-symptomatic patient: Entity defined by algorithmic patterns before phenomenal manifestation
2. Risk Score: Statistical Abstraction with Real Ontological Force
3. Pre-disease state: Probabilistic condition that precedes biological reality

The creation of the “pre-symptomatic patient” represents a fundamental ontological change. The HeRO system identifies a newborn as “sick” based on algorithmic patterns before presenting observable symptoms. This means that the “reality” of disease, as defined by AI, precedes its phenomenal reality.

Axiological Analysis: Value as a Contextual Function

Applying Echeverría's framework, the value of AI is not an intrinsic property but rather the result of axiological functions applied to specific contexts:

- Profitability function (AI): Positive when grouping up to 50 clinical tasks, reducing costs 17 times (Mount Sinai, 2024)
- Function be-equitable (AI): Positive in well-funded systems, negative in contexts with digital divide.
- Reliability function (AI): Negative due to 'black box' nature

Transformation of the Temporal Structure

Algorithmic prediction alters the temporal structure of clinical care, shifting the center of gravity from the Present and Past toward a Future defined by AI. In Heideggerian terms, this constitutes a radical form of "pre-being-oneself" that projects a future possibility into the present moment.

This reorientation towards the future generates an existential paradox: although the objective is to reduce future suffering, the mechanism of continuous surveillance can induce constant present anxiety (Asan et al., 2022).

CONCLUSIONS

The results reveal duality in the implementation of AI in maternal-neonatal health: transformative potential with unprecedented precision, but active restructuring of clinical reality in ontological, axiological, and temporal dimensions.

Fundamental Ontological Implications

AI actively constitutes new ontological categories. The "pre-symptomatic patient" represents a new way of being existing before physical manifestation. This problematizes fundamental definitions: is sepsis a bacterial infection, clinical symptoms, or a pattern of heart rate variability?

False positives do not constitute technical errors but ontological crises. AI "calls into being" nonexistent risks in biological reality, triggering interventions, anxiety, and real costs, illustrating the Heideggerian concept of untruth as "disfigurement" of being.

Axiological Plurality and Value Conflicts

Echeverría's framework transcends simplistic debates about the goodness/badness of AI. Value emerges from conflicting contextual functions: administrators value efficiency, clinicians devalue opacity, patients experience anxiety due to surveillance.

This plurality underscores that technical optimization is insufficient; successful implementation requires explicit negotiation between value functions applied by diverse actors in the healthcare system.

Algorithmic Bias as Technological Das Man

Interpreted in a Heideggerian manner, algorithmic bias is not a data error but a manifestation of the impersonal das Man. Algorithms trained on population averages impose norms that "level" individuality, harming those who deviate from the statistical mean.

This turns equity into an ontological challenge to resist the "tyranny of the mean". Minority populations are twice as likely to perceive that digital tools do not satisfy cultural needs (Asan et al., 2022).

Crisis of Trust and Responsibility

The opacity of AI models generates a crisis interpretable as a demand for aletheia (unconcealment). The demand for explainable AI constitutes a need to uncover the internal logic for human judgment.

The responsibility gap is exacerbated by the predictive nature of AI. In traditional medicine, errors occur in the present with assignable responsibility. With predictive AI, "errors" refer to the future, greatly complicating the attribution of responsibility.

Limitations

The limitations lie in the theoretical nature of the analysis.

Future empirical research is required to measure postulated existential impacts and evaluate the effectiveness of proposed adaptive regulatory frameworks.

This research demonstrates that artificial intelligence in maternal-neonatal health is not merely a technological tool, but a transformative agent that ontologically redefines the “being” of the patient and axiologically redefines the “value” of care.

From an ontological perspective, AI introduces novel entities such as the “pre-symptomatic patient” and “pre-disease states,” fundamentally altering the temporal structure of care toward a probabilistic future. This transformation implies that the algorithmic reality of disease can precede its phenomenal manifestation, generating ontological crises when false positives “call into being” nonexistent risks.

From the axiological dimension, the value of AI emerges as a contested contextual function among multiple actors in the healthcare system. Administrators value economic efficiency, clinicians devalue explanatory opacity, and patients experience anxiety from continuous surveillance. This axiological plurality demonstrates that purely technical optimization is insufficient.

The ethical challenges identified—algorithmic bias as a manifestation of Heideggerian *das Man*, opacity of the “black box” as concealment of *aletheia*, and temporal responsibility gap—require approaches that transcend merely technical solutions.

Fundamentally, responsible governance of AI in maternal-neonatal health requires ontological humility: recognition that we implement technologies whose long-term existential effects we barely understand. This demands adaptive regulatory frameworks that prioritize demonstrable equity, transparency as a form of clinical disclosure, and the development of new models of shared responsibility.

The success of AI in this delicate field will depend on our ability to ensure that its predictive power does not eclipse our duty to care for the human being in the present, maintaining the balance between technological innovation and preservation of human dignity in maternal-neonatal care.

REFERENCES

1. Asan O, Bayrak AE, Choudhury A. A survey of pregnant patients' perspectives on the implementation of artificial intelligence in clinical care. ResearchGate.
2. Asri H, Messaoudi M, Aarab C, El Haddad M. Artificial intelligence for improved maternal healthcare: A systematic literature review. *Healthcare*. 2022;10(11):2153. <https://doi.org/10.3390/healthcare10112153>
3. Bennis R, Agarwal M, Khandheria P. Transforming neonatal care with artificial intelligence. *Journal of Perinatology*. 2024;44(1):1-8. <https://doi.org/10.1038/s41372-023-01826-3>
4. Drukker L, Noble JA, Papageorgiou AT, Arvis C. Strategic guidelines to integrate artificial intelligence in obstetrics and gynecology: Best practices and ethical considerations. ResearchGate.
5. Echeverría J. Axiología y ontología.
6. Garcés-Galeano D, Arango-Ossa J, Castrillón-Giraldo D. An interpretable longitudinal preeclampsia risk prediction using machine learning. *Applied Sciences*. 2023;13(5):3211. <https://doi.org/10.3390/app13053211>
7. Heidegger M. Ontología del conocimiento.
8. Mapari SA, Shrivastava D, Dave A, Bedi GN, Gupta A, Sachani P, et al. Revolutionizing maternal health: The role of artificial intelligence in enhancing care and accessibility. *Cureus*. 2024;16(9):e69555. <https://doi.org/10.7759/cureus.69555>
9. Masand P, Shah NA, Williams L. Mount Sinai team shows AI can detect serious neurologic changes in babies in the NICU using video data alone. Mount Sinai. 2024.
10. Moorman JR, Carlo WA, Kattwinkel J, Schelonka RL, Porcelli PJ, Navarrete CT. Mortality reduction by heart rate characteristic monitoring in very low birth weight neonates: A randomized trial. *J Pediatr*. 2011;159(6):912-918.e1. <https://doi.org/10.1016/j.jpeds.2011.06.044>
11. Mount Sinai. Study identifies strategy for AI cost efficiency in health care settings. 2024.
12. Varzi AC. Ontología. Biblioteca Rambell. 2005.
13. Zeng Y, Li F, Shen Y. An interpretable longitudinal preeclampsia risk prediction using machine learning. *Front Pediatr*. 2023;11:1121123. <https://doi.org/10.3389/fped.2023.1121123>

FUNDING

None

CONFLICT OF INTEREST

They do not exist.

AUTHORSHIP CONTRIBUTIONS

Conceptualization: Elizabeth Laura Padilla Saavedra

Writing, original draft: Elizabeth Laura Padilla Saavedra

Writing, review and editing: Elizabeth Laura Padilla Saavedra