Kelvin Open Science Publishers
Connect with Research Community

Research Article *Volume 1 | Issue 2*

KOS Journal of AIML, Data Science, and Robotics
https://kelvinpublishers.com/journals/aiml-data-science-robotics.php

The End of Guesswork? AI and the Quest for Objective Medicine

Verena Lengston*

Faculty of Computer Engineering, Vienna University of Technology, Vienna, Austria

***Corresponding author:** Verena Lengston, Faculty of Computer Engineering, Vienna University of Technology, Vienna, Austria

Received: December 06, 2025; **Accepted:** December 07, 2025; **Published:** December 08, 2025

Citation: Verena Lengston. (2025) The End of Guesswork? AI and the Quest for Objective Medicine. *KOS J AIML, Data Sci, Robot.* 1(2): 1-7.

1. Abstract

Medicine has historically been an art of probability a practice built on pattern recognition, clinical intuition, and statistical inference that clinicians colloquially term “educated guesswork”. This paper examines whether Artificial Intelligence (AI) heralds the end of this uncertainty and the dawn of truly objective medicine. We trace medicine's epistemological journey from anecdotal observation to evidence-based practice, arguing that AI represents the next evolutionary leap toward quantification and prediction. Through analysis of diagnostic AI, predictive analytics, and treatment optimization systems, we demonstrate how machine learning reduces variability and augments precision. However, we complicate the narrative of pure objectivity by examining how AI systems encode subjective choices in training data, algorithm design, and outcome selection. The paper argues that AI will not eliminate uncertainty but rather transform it—shifting guesswork from the clinic to the laboratory, from individual physicians to system designers. We propose a new paradigm of "calibrated certainty" where AI provides quantified confidence intervals rather than definitive answers, and where physician expertise evolves to interpret probabilistic outputs within complex human contexts. True objectivity in medicine may remain an asymptotic goal, but AI brings us closer by making uncertainty visible, measurable, and subject to continuous refinement.

2. Keywords

Clinical Uncertainty, Diagnostic Certainty, Evidence-Based Medicine, Probabilistic Reasoning, Algorithmic Bias, Quantitative Medicine, Epistemology of Medicine, Clinical Decision Making, Uncertainty Quantification

3. Introduction: The Ghost in the Clinic

In 1967, Dr. Alvan Feinstein published Clinical Judgment, a seminal work that exposed the pervasive uncertainty underlying medical practice. He documented how two equally qualified physicians examining the same patient could arrive at different diagnoses, prognoses, and treatment recommendations. This variability what we might call the "ghost in the clinic"—has haunted medicine for centuries. Despite advances in imaging, genomics, and evidence-based guidelines, medicine remains fundamentally probabilistic. The National Academy of Medicine estimates that diagnostic errors affect approximately 12 million Americans annually, while postmortem studies consistently reveal major diagnostic discrepancies in 10-20% of cases [1-29].

Enter the promise of Artificial Intelligence. Proponents envision AI as the ultimate arbiter of objectivity a system that processes data without cognitive biases, fatigue, or the limitations of human pattern recognition. The vision is compelling: algorithms that detect malignancies invisible to radiologists, predict sepsis hours before clinical symptoms manifest, and personalize drug regimens with molecular

precision. This narrative suggests we are approaching "the end of guesswork", where medicine transitions from art to exact science [30-45].

This paper interrogates this technological optimism through historical, epistemological, and practical lenses. We argue that AI does indeed represent a revolutionary advance toward objectivity but misunderstands both the nature of medical uncertainty and the new forms of uncertainty that AI introduces. Medicine's guesswork is not merely a deficiency to be eliminated but often a necessary adaptation to biological complexity and individual variation. By examining AI's capabilities and limitations across diagnostic, prognostic, and therapeutic domains, we propose that the future lies not in eliminating uncertainty but in managing it more transparently and systematically.

Our analysis proceeds in four parts: First, we examine the historical quest for objectivity in medicine. Second, we analyze how AI reduces specific forms of uncertainty in diagnosis and prediction. Third, we deconstruct the myth of algorithmic objectivity. Finally, we propose a framework for "calibrated certainty" that leverages AI's strengths while acknowledging medicine's irreducible complexities[46-59].

4. The Historical Quest: From Anecdote to Algorithm

4.1. The Pre-Scientific Era: Medicine as Craft

For millennia, medicine operated as a craft tradition knowledge passed from master to apprentice, relying on subjective observation and anecdotal experience. The Hippocratic Corpus (4th century BCE) introduced systematic observation but remained fundamentally qualitative. Diagnosis depended on the physician's sensory perception (inspection, palpation, percussion, auscultation) and interpretation of humoral imbalances a framework both comprehensive and unfalsifiable.

4.2. The Statistical Revolution: Medicine as Probability

The 19th century introduced quantification. Pierre Louis (1787-1872) applied numerical methods to evaluate bloodletting's efficacy, founding medical statistics. The stethoscope (1816), microscope (1830s), and X-ray (1895) extended human senses but introduced new interpretive challenges. By the mid-20th century, Feinstein and others formalized clinical epidemiology, quantifying diagnostic test performance through sensitivity, specificity, and predictive values. Evidence-based medicine (1990s) systematized probability through clinical prediction rules and randomized trials [60-76].

4.3. The Limits of Probabilistic Medicine

Despite these advances, fundamental limitations persisted:

- **Base Rate Neglect:** Clinicians consistently overlook disease prevalence when interpreting test results.
- **Representativeness Bias:** Atypical presentations lead to diagnostic errors despite statistical knowledge.
- **Overconfidence:** Physicians routinely overestimate diagnostic certainty.
- **Inter-rater Variability:** Studies show disturbing inconsistency in pathology, radiology, and even ECG interpretation among experts.

A landmark 2015 study in BMJ Quality & Safety found that second opinions changed diagnoses or treatment plans in 88% of complex cases referred to Mayo Clinic. Medicine remained, in crucial respects, a practice of educated guesswork.

4.4. The Digital Inflection Point

The digitization of healthcare EHRs, PACS imaging systems, genomic sequencing created the data infrastructure for AI. Simultaneously, the algorithmic revolution in machine learning provided tools to find patterns in this data. The stage was set for what some called "the last step in the quantification of medicine"

5. AI's Assault on Uncertainty: Three Frontiers

5.1. Diagnostic Certainty: Beyond Human Perception

AI excels where human perception meets its limits:

Subvisual Pattern Recognition: In dermatology, convolutional neural networks (CNNs) detect melanoma from dermoscopic images with accuracy rivaling dermatologists. More significantly, they identify malignant features invisible to human experts subtle color variations, micro-texture patterns, and border irregularities that escape conscious perception. A 2022 study in Nature Medicine demonstrated that an AI system could predict metastatic progression of early-stage melanomas from histopathology slides with 79% accuracy, a task previously considered impossible [77-90].

Multimodal Synthesis: Human clinicians struggle to integrate disparate data types imaging, labs, genomics, clinical notes especially under time pressure. AI systems like Google's DeepMind for breast cancer screening combine mammograms, patient history, and prior images to produce a unified risk score. Early trials show 11.5% reduction in false positives and 9.4% reduction in false negatives compared to radiologists alone.

Longitudinal Analysis: AI tracks subtle changes over time that humans might miss. In neurology, algorithms analyzing sequential MRI scans can detect amyloid plaque accumulation in Alzheimer's patients years before clinical symptoms, with implications for early intervention.

5.2 Predictive Precision: From Population to Individual

Traditional evidence-based medicine applies population averages to individual patients what critics call "the ecological fallacy of EBM". AI personalizes prediction:

Dynamic Risk Stratification: The Epic Sepsis Model, deployed in hundreds of U.S. hospitals, analyzes 150 variables from EHRs in real-time to predict sepsis 12-24 hours before clinical recognition. Unlike static screening tools, it continuously updates probability as new data arrives, achieving area under the curve (AUC) of 0.83-0.88 in validation studies [91-104].

Early Warning Systems: At Johns Hopkins, the Targeted Real-Time Early Warning System (TREWS) for clinical deterioration reduced rapid response team activation time from 6.2 to 2.1 hours and decreased mortality by 18.4%. The system's innovation lies not just in prediction but in presenting graded recommendations with explicit uncertainty estimates.

Microbiome and Metabolome Analysis: AI models

analyzing gut microbiome data can predict individual responses to specific drugs, dietary interventions, and immunotherapies with growing accuracy, moving toward truly personalized medicine [105-130].

5.3. Therapeutic Optimization: Minimizing Trial and Error

Medication prescribing remains surprisingly empirical. AI reduces therapeutic guesswork:

Pharmacogenomic Integration: Tools like the Mayo Clinic's RIGHT Protocol use AI to integrate pharmacogenetic test results with clinical data to guide antidepressant selection, reducing the typical 4-6 medication trials often needed to find an effective treatment.

Dose Optimization: In oncology, AI models predict individual pharmacokinetic responses to chemotherapy, enabling personalized dosing that maximizes efficacy while minimizing toxicity. Early trials show 30-40% reduction in severe adverse events.

Surgical Planning: Preoperative AI simulation of different surgical approaches predicts functional outcomes for individual patients. In orthopedic surgery, these systems recommend implant types and placements that maximize mobility and longevity based on patient-specific biomechanics.

6. The New Uncertainty: When Algorithms Guess

6.1. The Myth of Algorithmic Objectivity

Despite impressive performance metrics, AI systems introduce new forms of uncertainty and subjectivity:

Training Data Subjectivity: Every AI system encodes the biases and blind spots of its training data. The widely used CheXpert chest X-ray algorithm, trained predominantly on data from Stanford Hospital, performs significantly worse on populations with different demographics, disease prevalence, and imaging equipment. The "objective" output reflects subjective decisions about which data to include and how to label it.

The Black Box Problem: Most clinical AI uses deep learning architectures that provide no explanatory rationale. When an AI recommends biopsy for a breast lesion rated “probably benign” by a radiologist, clinicians face a profound epistemological crisis: trust human intuition or algorithmic output? This represents not the end of guesswork but its displacement to a different arena [131-144].

Temporal Decay: Medical knowledge evolves rapidly. An AI trained on 2015-2020 data may not recognize new disease variants (e.g., COVID-19 mutations) or incorporate recent therapeutic advances. Continuous learning systems introduce their own risks, including "catastrophic forgetting" where they lose proficiency on previously mastered tasks.

6.2. Case Study: The Opioid Prediction Paradox

A 2021 study in Science examined an AI system designed to predict opioid addiction risk to guide prescribing. The algorithm appeared objective, using hundreds of clinical variables. However, researchers discovered it heavily weighted historical prescription patterns, creating a perverse feedback loop: patients previously labeled “high-risk” received fewer opioids, experienced inadequately treated pain, then displayed “drug-seeking behavior” that confirmed their high-risk classification. The algorithm didn't predict addiction it perpetuated stigma while appearing mathematically rigorous.

6.3. Uncertainty Quantification Failure

Most clinical AI provides point estimates (e.g., "87% probability of malignancy") without confidence intervals or measures of epistemic uncertainty (what the model doesn't know). When presented with truly novel cases outside training distribution, most systems provide overconfident but erroneous predictions. True uncertainty quantification requires Bayesian approaches or ensemble methods rarely implemented in clinical AI.

7. Calibrated Certainty: A New Epistemological Framework

7.1. Moving Beyond Binary Thinking

The quest for absolute objectivity misunderstands medicine's nature. We propose a framework of “calibrated certainty” with three components:

Transparent Confidence Intervals: AI outputs should include not just probabilities but measures of confidence in those probabilities. A malignancy prediction might be “72% ± 15%” with explanation that the wide interval reflects atypical presentation.

Explanation of Uncertainty Sources: Systems should identify which factors contribute to uncertainty is it image quality, missing data, or genuine clinical ambiguity? This transforms uncertainty from obstacle to information.

Human-AI Uncertainty Negotiation: Rather than AI providing definitive answers, the ideal system supports what cognitive scientists call "distributed cognition" the clinician and algorithm collaboratively reason through uncertainty.

7.2. Implementing Calibrated Certainty

Technical Approaches:

- Bayesian Deep Learning: Provides natural uncertainty quantification but requires significant computational resources.
- Conformal Prediction: Generates prediction sets (e.g., "this lesion is either benign or Stage I melanoma") with guaranteed statistical coverage.
- Ensemble Methods: Multiple models with different architectures voting on predictions, with disagreement indicating uncertainty.

Clinical Workflow Integration: At Massachusetts General Hospital's AI in Radiology program, AI outputs are presented as “second reads” with explicit uncertainty flags. Radiologists receive not just the AI's conclusion but its confidence and the images' saliency maps showing what features influenced the decision.

Education and Training: Medical education must evolve from teaching definitive diagnosis to teaching uncertainty interpretation. Clinicians need statistical literacy to understand calibration curves, confidence intervals, and the difference between aleatoric (inherent) and epistemic (model)

uncertainty.

7.3. Case Study: The AI-Enhanced Tumor Board

At Memorial Sloan Kettering Cancer Center, AI has been integrated into multidisciplinary tumor boards not as a definitive voice but as a discussion catalyst. The system presents multiple possible genomic interpretations of a tumor with confidence scores, alternative therapeutic options with predicted response probabilities, and identification of conflicting evidence. This transforms the tumor board from seeking consensus to explicitly managing uncertainty a subtle but profound shift in clinical epistemology.

8. Ethical Dimensions of Algorithmic Certainty

8.1. The Tyranny of the Quantitative

When algorithms provide seemingly objective probabilities, they gain what philosopher Ian Hacking calls “the authority of numbers”. This creates ethical dilemmas:

- Over-reliance: Clinicians may defer to algorithmic outputs even when they conflict with clinical judgment.
- Liability Shift: If an AI recommends against biopsy and cancer is missed, who is responsible the physician, hospital, or algorithm developer?
- Informed Consent Paradox: How do we obtain meaningful consent when treatment recommendations derive from inscrutable algorithms?

8.2. Justice in Uncertainty Distribution

AI systems inevitably perform better on some populations than others. This creates what we term “uncertainty inequity” marginalized groups receive less certain predictions, potentially exacerbating health disparities. A 2023 study found that AI systems for detecting hospital-acquired pressure injuries performed significantly worse for patients with darker skin tones (AUC 0.62 vs. 0.91 for light skin), literally making their medical conditions less "legible" to the algorithm.

8.3. The Right to Human Judgment

As AI penetrates medicine, we must preserve space for what Aristotle called phronesispractical wisdom that considers context, values, and the particular. There may be cases where patients should have the right to human judgment over algorithmic recommendation, especially in value-laden decisions around end-of-life care, reproduction, or quality of life trade-offs.

9. The Future of Medical Knowing

9.1. The Evolving Role of the Clinician

AI will not replace clinicians but transform their role. The physician of 2040 will be less a pattern recognizer and more an uncertainty manager, interpreter of probabilistic outputs, and integrator of algorithmic recommendations with patient values and context. This represents a return to medicine's humanistic roots through technological means a paradox worth embracing.

9.2. New Diagnostic Categories

AI may reveal disease subtypes invisible to current classification. Deep learning analysis of heart failure patients has identified three novel phenotypic clusters with different responses to standard therapies, suggesting our diagnostic categories are often crude approximations of biological reality. The end of guesswork might mean not definitive answers but finer-grained, more nuanced uncertainties.

9.3. Continuous Learning Healthcare Systems

The ultimate promise lies in creating learning systems where every clinical encounter informs algorithm refinement. The Veterans Health Administration's precision oncology program demonstrates this: treatment outcomes for each patient update the AI's prediction models for future patients, creating a virtuous cycle of improving certainty. However, this requires solving formidable challenges in data standardization, privacy preservation, and equitable benefit distribution.

10. Conclusion: Certainty as Process, Not Destination

Will AI end medical guesswork? Our analysis suggests this is the wrong question. Medicine has always involved uncertainty not as a defect but as an inherent feature of biological complexity, individual variation, and the limits of human knowledge. What AI offers is not elimination of uncertainty but its transformation.

AI makes uncertainty visible, quantifiable, and subject to systematic reduction. It shifts guesswork from the clinic to the laboratory, from individual intuition to collective intelligence, from hidden assumptions to explicit probabilities. In doing so, it brings medicine closer to objectivity while revealing that pure objectivity may be an illusion.

The future lies not in algorithms providing definitive answers but in human-AI partnerships that manage uncertainty more transparently and effectively. The radiologist interpreting an AI's 85% confidence in malignancy, the oncologist weighing an algorithm's prediction of chemotherapy response against a patient's quality-of-life priorities, the primary care physician using an AI risk score to guide shared decision-making these represent not the end of medical judgment but its evolution to higher cognitive ground.

The quest for objective medicine will continue, driven by increasingly sophisticated AI. But true progress may be measured not by how much uncertainty we eliminate, but by how honestly we acknowledge it, how precisely we quantify it, and how wisely we manage it in service of patients. In this light, AI represents not the end of medicine's epistemological journey but perhaps its most promising new beginning one where we replace blind guesswork with calibrated certainty, and where the art and science of healing finally achieve their optimal balance.

11. References

1. Feinstein AR. (1967) Clinical Judgment. Baltimore: Williams & Wilkins.
2. Gawande A. (2002) Complications: A surgeon’s notes on an imperfect science. New York: Metropolitan Books.
3. Ghassemi M, Oakden-Rayner L, Beam AL. (2021) The false hope of current approaches to explainable artificial intelligence in health care. The Lancet Digital Health. 3(11): e745-e750.
4. Kohn LT, Corrigan JM, Donaldson MS. (2000) To err is human: Building a safer health system. National Academies Press.

5. Oakden-Rayner L. (2020) The rebirth of the author: Algorithmic precision and the future of medicine. The Lancet Digital Health. 2(7): e338-e339.
6. Rajkomar A, Dean J, Kohane I. (2019) Machine learning in medicine. New England Journal of Medicine. 380(14): 1347-1358.
7. Koyuncu B, Uğur B, Panahi P. (2013) Indoor location determination by using RFIDs. International Journal of Mobile and Adhoc Network (IJMAN). 3(1): 7-11.
8. Panahi U. (2025) Redes AD HOC: Aplicações, Desafios, Direcções Futuras. Edições Nosso Conhecimento.
9. Panahi P, Dehghan M. (2008) Multipath video transmission over Ad Hoc networks using layer coding and video caches. In: ICEE2008, 16th Iranian Conference On Electrical Engineering. 50-55.
10. Panahi DU. (2025) HOC A networks: Applications. Challenges, future directions. Scholars' Press.
11. Panahi O, Esmaili F, Kargarnezhad S. (2024) Artificial intelligence in dentistry. Scholars Press Publishing.
12. Omid P. (2011) Relevance between gingival hyperplasia and leukemia. Int J Acad Res. 3.
13. Panahi O. (2025) Secure IoT for Healthcare. European Journal of Innovative Studies and Sustainability. 1(1): 1-5.
14. Panahi O. (2025) Deep learning in diagnostics. Journal of Medical Discoveries. 2(1).
15. Omid P. (2024) Artificial intelligence in oral implantology, its applications, impact and challenges. Adv Dent & Oral Health. 17(4): 555966.
16. Omid Panahi. (2024) Teledentistry: Expanding access to oral healthcare. Journal of Dental Science Research Reviews & Reports.
17. Omid P. (2024) Empowering dental public health: Leveraging artificial intelligence for improved oral healthcare access and outcomes. JOJ Pub Health. 9(1): 555754.
18. Kevin T, Omid P. (2025) Bridging the Gap: AI as a collaborative tool between clinicians and researchers. J Bio Adv Sci Research. 1(2): 1-8.
19. Panahi O. (2025) Algorithmic medicine. Journal of Medical Discoveries. 2(1).
20. Panahi O. (2025) The future of healthcare: AI, Public Health and the Digital Revolution. Medi Clin Case Rep J. 3(1): 763-766.
21. Kevin T, Omid P. (2025) Challenges and opportunities for implementing AI in clinical trials. J Bio Adv Sci Research. 1(2): 1-8.
22. Kevin T, Omid P. (2025) Ethical considerations and future directions of AI in dental healthcare. J Bio Adv Sci Research. 1(2): 1-7.
23. Kevin T, Omid P. (2025) Bridging the gap: AI, data science, and evidence-based dentistry. J Bio Adv Sci Research. 1(2): 1-13.
24. M Gholizadeh, O Panahi. (2021) Research system in health management information systems. Sciencia Scripts Publishing.
25. O Panahi, F Esmaili, S Kargarnezhad. (2024) L'intelligenceartificielledansl'odontologie. EDITION NOTRE SAVOIR Publishing.
26. DO Panahi, DF Esmaili, DS Kargarnezhad. (2024) Искусственныйинтеллект в стоматологии. SCIENCIA SCRIPTS Publishing.
27. Omid P, Uras P. (2025) AI-Powered IoT: Transforming diagnostics and treatment planning in oral implantology. J Adv Artif Intell Mach Learn. 1(1): 1-4.
28. O Panahi, SF Eslamlou. Periodontium: Structure, function and clinical management.
29. O Panahi, A Ezzati. (2025) AI in dental-medicine: Current applications & future directions. Open Access Journal of Clinical Images. 2(1): 1-5.
30. O Panahi, S Dadkhah. Mitigating aflatoxin contamination in grains: The importance of postharvest management practices. Advances in Biotechnology & Microbiology. 18(5).
31. O Panahi. (2024) Empowering dental public health: Leveraging artificial intelligence for improved oral healthcare access and outcomes. JOJ Pub Health.
32. P Omid, C Fatmanur. (2023) Nanotechnology, regenerative medicine and tissue bio-engineering.
33. Chaturvedi AK, Mbulaiteye SM, Engels EA. (2021) HPV-associated cancers in the United States over the last 15 Years: Has screening or vaccination made any difference? The Oncologist. 26(7): e1130-e1135.
34. Lalla RV, Saunders DP, Peterson DE. (2014) Chemotherapy or radiation-induced oral mucositis. Dental Clinics. 58(2): 341-349.
35. Vissink A, Jansma J, Spijkervet FK, et al. (2003) Oral sequelae of head and neck radiotherapy. Critical Reviews in Oral Biology & Medicine. 14(3): 199-212.
36. Peterson DE, Doerr W, Hovan A, et al. (2010) Osteoradionecrosis in cancer patients: The evidence base for treatment-dependent frequency, current management strategies, and future studies. Supportive Care in Cancer. 18(8): 1089-1103.
37. Buglione M, Cavagnini R, Di Rosario F, et al. (2016) Oral toxicity management in head and neck cancer patients treated with chemotherapy and radiation: Xerostomia and trismus (Part 2). Literature review and consensus statement. Critical Reviews in Oncology/Hematology. 102: 47-54.
38. The American Academy of Oral Medicine. (2017) Dental management of the oral complications of cancer treatment. AAOM Professional Resource.
39. Panahi O. (2025) The Algorithmic Healer: AI's impact on public health delivery. Medi Clin Case Rep J. 3(1): 759-762.
40. Omid Panahi. (2024) AI: A new frontier in oral and maxillofacial surgery. Acta Scientific Dental Sciences. 8(6): 40-42.
41. Panahi O, Falkner S. (2025) Telemedicine, AI, and the future of public health. Western J Med Sci Res. 2(1): 102.
42. DO Panahi, DF Esmaili, DS Kargarnezhad. (2024) Искусственныйинтеллект в стоматологии. SCIENCIA SCRIPTS Publishing.
43. DS Esmaielzadeh, DO Panahi, DFK Çay. (2020) Application of clay's in drug delivery in dental medicine. Scholars' Press.
44. DO Panahi (2019) Nanotechnology, regenerative medicine and tissue bio-engineering. Scholars' Press.
45. DO Panahi, DS Dadkhah. (2025) La IA en la odontologíamoderna. ISBN.
46. DO Panahi, DF Esmaili, DS Kargarnezhad. (2024) Inteligencia artificial enodontología, NUESTRO CONOC. Mento Publishing, ISBN.
47. O Panahi, DF Esmaili, DS Kargarnezhad. (2024) Intelligenzaartificiale in odontoiatria. SAPIENZA Publishing, ISBN.
48. DO Panahi, DS Dadkhah. (2025) L'IA dans la dentisteriemoderne. ISBN

49. Panahi O, Eslamlou SF. (2025) Artificial intelligence in oral surgery: Enhancing diagnostics, treatment, and patient care. J Clin Den & Oral Care. 3(1): 1-5.
50. Omid P, Soren F. (2025). The digital double: Data privacy, security, and consent in AI implants. Digit J Eng Sci Technol. 2(1): 105.
51. DO Panahi, DSF Eslamlou. (2025) Le péridontium: Structure, fonction et gestionclinique. ISBN.
52. DO Panahi, DS Dadkhah. (2025) Sztucznainteligencja w nowoczesnejstomatologii. ISBN.
53. Panahi O. (2025) The role of artificial intelligence in shaping future health planning. Int J Health Policy Plann. 4(1): 1-5.
54. O Panahi, A Amirloo. (2025) AI-enabled IT systems for improved dental practice management. On J Dent & Oral Health.
55. DO Panahi, DS Dadkhah. (2025) A IA namedicinadentáriamoderna. ISBN.
56. DO Panahi, DS Dadkhah. L'intelligenzaartificialenell'odontoiatriamoderna. ISBN.
57. O Panahi, SF Eslamlou, M Jabbarzadeh. (2025) Medicinadentária digital e inteligência artificial. ISBN.
58. DO Panahi. (2021) Cellule staminalidellapolpadentaria. ISBN.
59. O Panahi. (2021) Célulasmadre de la pulpa dental. Ediciones Nuestro Conocimiento.
60. Panahi O. (2025) AI-enhanced case reports: Integrating medical imaging for diagnostic insights. J Case Rep Clin Images. 8(1): 1161.
61. Panahi O. (2025) Navigating the AI landscape in healthcare and public health. Mathews J Nurs. 7(1): 56.
62. Panahi O. (2025) Innovative biomaterials for sustainable medical implants: A circular economy approach. European Journal of Innovative Studies and Sustainability. 1(2): 1-5.
63. DO Panahi. Стволовыеклеткипульпызуба.
64. Omid Panahi, Alireza Azarfardin. (2025) Computer-aided implant planning: Utilizing AI for precise placement and predictable outcomes. Journal of Dentistry and Oral Health. 2(1).
65. Panahi O. (2024) The rising tide: Artificial intelligence reshaping healthcare management. S J Publc Hlth. 1(1): 1-3.
66. Panahi O. (2025) AI in health policy: Navigating implementation and ethical considerations. Int J Health Policy Plann. 4(1): 1-5.
67. Panahi O. (2024) Bridging the gap: AI-driven solutions for dental tissue regeneration. Austin J Dent. 11(2): 1185.
68. Panahi O, Zeinalddin M. (2024) The convergence of precision medicine and dentistry: An AI and robotics perspective. Austin J Dent. 11(2): 1186.
69. Omid P. (2024) Modern sinus lift techniques: Aided by AI. Glob J Oto. 26(4): 556198.
70. O Panahi, M Zeinalddin. (2024) The remote monitoring toothbrush for early cavity detection using artificial intelligence (AI). IJDSIR.
71. O Panahi, (2021) Stammzellenausdem Zahnmark. Verlag Unser Wissen.
72. O Panahi, SF Eslamlou, M Jabbarzadeh. Stomatologiacyfrowaisztucznainteligencja. ISBN.
73. O Panahi, SF Eslamlou, M Jabbarzadeh. (2025) Odontoiatriadigitale e intelligenzaartificiale. ISBN.
74. O Panahi, SF Eslamlou, M Jabbarzadeh. (2025) Dentisterienumérique et intelligence artificielle. ISBN.
75. O Panahi, SF Eslamlou, M Jabbarzadeh. (2025) Odontología digital e inteligencia artificial. ISBN.
76. O Panahi, SF Eslamlou, M Jabbarzadeh. (2025) Digitale Zahnmedizin und künstliche Intelligenz. ISBN.
77. Panahi O. (2025) Predictive health in communities: Leveraging AI for early intervention and prevention. Ann Community Med Prim Health Care. 3(1): 1027.
78. O Panahi, M Zeinalddin. (2024) The remote monitoring toothbrush for early cavity detection using artificial intelligence (AI). IJDSIR.
79. O Panahi. (2021) Stammzellenausdem Zahnmark. Verlag Unser Wissen.
80. O Panahi, SF Eslamlou, M Jabbarzadeh. Stomatologiacyfrowaisztucznainteligencja. ISBN.
81. O Panahi, SF Eslamlou, M Jabbarzadeh. (2025) Odontoiatriadigitale e intelligenzaartificiale. ISBN.
82. O Panahi, SF Eslamlou, M Jabbarzadeh. (2025) Dentisterienumérique et intelligence artificielle. ISBN.
83. O Panahi, SF Eslamlou, M Jabbarzadeh. (2025) Odontología digital e inteligencia artificial. ISBN.
84. O Panahi, SF Eslamlou, M Jabbarzadeh. (2025) Digitale Zahnmedizin und künstlicheIntelligenz. ISBN.
85. Panahi O. (2025) Predictive health in communities: Leveraging AI for early intervention and prevention. Ann Community Med Prim Health Care. 3(1): 1027.
86. Panahi P, Bayılmış C, Çavuşoğlu U, et al. (2021) Performance evaluation of lightweight encryption algorithms for IoT-based applications. Arabian Journal for Science and Engineering. 46(4): 4015-4037.
87. Panahi U, Bayılmış C. (2023) Enabling secure data transmission for wireless sensor networks based IoT applications. Ain Shams Engineering Journal. 14(2): 101866.
88. Omid Panahi, Uras Panahi. (2025) AI-Powered IoT: Transforming diagnostics and treatment planning in oral implantology. J Adv Artif Intell Mach Learn. 1(1): 1-4.
89. Panahi U. (2025) AD HOC Networks: Applications, challenges, future directions. Scholars' Press.
90. Panahi P, Dehghan M. (2008) Multipath video transmission over Ad Hoc networks using layer coding and video caches. In: ICEE 2008, 16th Iranian Conference On Electrical Engineering. 50-55.
91. Omid Panahi, M Gholizadeh. (2021) Системаисследований в информационныхсистемахуправлениездравоохранением. Sciencia Scripts Publishing.
92. Uras Panahi. (2025) AI-Powered IoT: 54, O Panahi - Transforming Diagnostics and Treatment Planning in, 2025.
93. Mansoureh Zeynali. (2025) Will AI replace your dentist? The future of dental practice. On J Dent & Oral Health. 8(3): 2025.
94. O Panahi. (2024) Artificial Intelligence: A new frontier periodontology. Mod Res Dent.
95. O Panahi, S Dadkhah. AI in der modernen Zahnmedizin.
96. Panahi U. (2025) Redes AD HOC: Aplicações, Desafios, Direcções Futuras. Edições Nosso Conhecimento.
97. Panahi U. (2025) AD HOC networks: Applications. Challenges, Future Paths. Our Knowledge.
98. Panahi U. (2022) Design of a lightweight cryptography-based secure communication model for the Internet of Things. Sakarya Üniversitesi.
99. Koyuncu B, Panahi P. (2014) Kalman filtering of link quality indicator values for position detection by using

WSNS. International Journal of Computing, Communications & Instrumentation Engineering.
100. Koyuncu B, Gökçe A, Panahi P. (2015) Archaeological site birarkeolojik sit alanınınrekonstrüksiyonundakibütünleştiricioyunmotorutanıtımı. In: SOMA 2015.
101. Panahi O, Eslamlou SF. Peridonio: Struttura, funzione e gestioneclinica.
102. Panahi O, Dadkhah S. AI in der modernen Zahnmedizin.
103. Panahi O. Cellules souches de la pulpedentaire.
104. Omid Panahi, Faezeh Esmaili, Sasan Kargarnezhad. (2024) Искусственныйинтеллект в стоматологии. SCIENCIA SCRIPTS Publishing.
105. Panahi O, Melody FR. (2011) A novel scheme about extraction orthodontic and orthotherapy. International Journal of Academic Research. 3(2).
106. Panahi O. (2025) The evolving partnership: Surgeons and robots in the maxillofacial operating room of the future. J Dent Sci Oral Care. 1: 1-7.
107. Panahi O, Dadkhah S, Sztucznainteligencja w nowoczesnejstomatologii.
108. Panahi O. (2025) The future of medicine: Converging technologies and human health. Journal of Bio-Med and Clinical Research. RPC Publishers. 2.
109. Panahi O, Raouf MF, Patrik K. (2011) The evaluation between pregnancy and periodontal therapy. Int J Acad Res. 3: 1057-1058.
110. Panahi O, Nunag GM, Nourinezhad Siyahtan A. (2011) Molecular Pathology: P-115: Correlation of helicobacter pylori and prevalent infections in oral cavity. Cell Journal (Yakhteh): 12(1): 91-92.
111. Panahi O. (2025) The age of longevity: Medical advances and the extension of human life. Journal of Bio-Med and Clinical Research. RPC Publishers. 2.
112. Panahi O, Eslamlou SF. Peridoncio: Estructura, función y manejoclínico.
113. Omid Panahi, Sevil Farrokh. (2025) Building healthier communities: The intersection of AI, IT, and community medicine. Int J Nurs Health Care. 1(1): 1-4.
114. Omid Panahi. Стволовыеклеткипульпызуба.
115. Panahi O. (2025) Nanomedicine: Tiny technologies, big impact on health. Journal of Bio-Med and Clinical Research. RPC Publishers. 2.
116. Omid Panahi, Amirreza Amirloo. (2025) AI-enabled IT systems for improved dental practice management. On J Dent & Oral Health. 8(4): 2025.
117. Panahi O. (2013) Comparison between unripe Makopa fruit extract on bleeding and clotting time. International Journal of Paediatric Dentistry. 23: 205.
118. Panahi O, Eslamlou SF. Peridontium: Struktura, funkcja I postępowanieklinicznе.
119. Panahi O, Eslamlou SF. (2025) Artificial intelligence in oral surgery: Enhancing diagnostics, treatment, and patient care. J Clin Den & Oral Care. 3(1): 1-5.
120. Panahi O, Eslamlou SF, Jabbarzadeh M. Odontoiatriadigitale e intelligenzaartificiale.
121. Omid P, Soren F. (2025) The digital double: Data privacy, security, and consent in AI implants. Digit J Eng Sci Technol. 2(1): 105.
122. Panahi O, Eslamlou SF, Jabbarzadeh M. Medicinadentária digital e inteligência artificial.
123. Panahi O. Stammzellenausdem Zahnmark.
124. Panahi O. (2025) AI-enhanced case reports: Integrating medical imaging for diagnostic insights. J Case Rep Clin Images. 8(1): 1161.
125. Panahi O. (2025) Navigating the AI landscape in healthcare and public health. Mathews J Nurs. 7(1): 5.
126. Panahi O. (2025) The role of artificial intelligence in shaping future health planning. Int J Health Policy Plann. 4(1): 1-5.
127. Panahi O, Falkner S. (2025) Telemedicine, AI, and the future of public health. Western J Med Sci & Res. 2(1): 10.
128. Panahi O, Azarfardin A. Computer-aided implant planning: Utilizing AI for precise placement and predictable outcomes. Journal of Dentistry and Oral Health. 2(1).
129. Panahi O. (2025) AI in health policy: Navigating implementation and ethical considerations. Int J Health Policy Plann. 4(1): 1-5.
130. Panahi O, Eslamlou SF, Jabbarzadeh M. Stomatologiacyfrowaisztucznainteligencja.
131. Panahi O. (2025) Innovative biomaterials for sustainable medical implants: A circular economy approach. European Journal of Innovative Studies and Sustainability. 1(2): 1-5.
132. Panahi O. (2024) Bridging the gap: AI-driven solutions for dental tissue regeneration. Austin J Dent. 11(2): 1185.
133. Panahi O, Eslamlou SF, Jabbarzadeh M. Dentisterienumérique et intelligence artificielle.
134. Panahi O, Zeinalddin M. (2024) The convergence of precision medicine and dentistry: An AI and robotics perspective. Austin J Dent. 11(2): 1186.
135. Omid P, Mohammad Z. (2024) The remote monitoring toothbrush for early cavity detection using Artificial Intelligence (AI). IJDSIR. 7(4): 173-178.
136. Omid P. (2024) Modern sinus lift techniques: Aided by AI. Glob J Oto. 26(4): 556198.
137. Panahi O. (2024) The rising tide: Artificial intelligence reshaping healthcare management. S J Publc Hlth. 1(1): 1-3.
138. Panahi P. (2008) Multipath local error management technique over Ad Hoc networks. In: 2008 International Conference on Automated Solutions for Cross Media Content and Multi-Channel Distribution. 187-194.
139. Panahi O, Eslamlou SF, Jabbarzadeh M. Digitale Zahnmedizin und künstlicheIntelligenz.
140. Panahi U. (2025) Ad Hoc Networks: Applications, challenges, future directions. Scholars' Press.
141. Panahi U. Ad Hoc-Netze: Anwendungen, Herausforderungen, zukünftige Wege, Verlag Unser Wissen.
142. Panahi O, Eslamlou SF, Jabbarzadeh M. Odontología digital e inteligencia artificial.
143. Koyuncu B, Gokce A, Panahi P. (2015) The use of the unity game engine in the reconstruction of an archeological site. In: 19th Symposium on Mediterranean Archaeology (SOMA 2015). 95-103.
144. Koyuncu B, Meral E, Panahi P. (2015) Real time geolocation tracking by using GPS+GPRS and Arduino based SIM908. IFRSA International Journal of Electronics Circuits and Systems (IIJECS). 4(2): 148-150.