REUE | Special article

AI in emergency medicine: technological threat or clinical ally?

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AI is transforming clinical practice across many disciplines, and emergency medicine is no exception. This special article critically reviews the historical evolution of AI, from its theoretical foundations to its current application in real-world health care settings. It discusses the different types of logical reasoning used by algorithms, the main technological tools available, and real-world examples of their implementation in emergency departments. Furthermore, the ethical, training, and environmental challenges associated with its adoption are analyzed. Finally, the article reflects on the complementary role AI can play in clinical decision-making, highlighting the need for close collaboration between technology and healthcare professionals to improve patient safety and care efficiency.

Keywords: Artificial intelligence. AI. Emergency Medicine. Natural Language Processing. Computer-Assisted Diagnosis. Machine Learning. Clinical Decision-Making.

Inteligencia artificial en medicina de urgencias y emergencias: ¿amenaza tecnológica o aliado clínico?

La inteligencia artificial (IA) está transformando la práctica clínica en múltiples disciplinas, y la medicina de urgencias no es una excepción. Este artículo revisa de forma crítica la evolución histórica de la IA, desde sus fundamentos teóricos hasta su aplicación actual en contextos asistenciales reales. Se abordan los distintos tipos de razonamiento lógico utilizados por los algoritmos, las principales herramientas tecnológicas disponibles y ejemplos reales de implementación en servicios de urgencias. Asimismo, se analizan los retos éticos, formativos y medioambientales que acompañan a su adopción. Finalmente, se reflexiona sobre el papel complementario que puede desempeñar la IA en la toma de decisiones clínicas, resaltando la necesidad de una colaboración estrecha entre tecnología y profesional sanitario para mejorar la seguridad y la eficiencia asistencial.

Palabras clave: Inteligencia artificial. Medicina de Urgencias. Procesamiento del Lenguaje Natural. Diagnóstico Asistido por Computadora. Aprendizaje automático. Toma de Decisiones Clínicas.

Introduction

Over recent decades, artificial intelligence (AI) has evolved from a theoretical concept into a functional tool across multiple fields of medicine. Its ability to analyze large volumes of data, identify patterns, and provide support for clinical decision-making has generated growing interest in its application in high-pressure care settings, such as emergency departments (EDs).

Emergency medicine (EM), characterized by the need for rapid decision-making, efficient resource prioritization, and management of complex case reports, represents an ideal—yet challenging—environment for the integration of intelligent systems. Currently, machine-learning algorithms, natural language processing platforms, and virtual assistants are beginning to be employed in processes such as self-triage, early sepsis detection, automated interpretation of diagnostic images, and clinical workflow management.

This article aims to critically review the historical development of AI, its logical foundations, its current and future applications in EM, as well as the ethical and operational challenges posed by its implementation. It also reflects on its true role: are we facing a disruptive technological revolution or threat, a new tool to support clinical judgment, or all of the above? We will find out.

History of AI: from the syllogism to the clinical revolution

The development of AI in medicine cannot be understood without reviewing its historical evolution, which spans from early philosophical-mathematical foundations to current systems applied in clinical practice.

1. Theoretical origins and early developments (1950–1997)

In 1950, Alan Turing posed the foundational question of AI in his famous article "Computing Machinery and In-

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telligence": Can machines think? He introduced the so-called Turing Test as an operational criterion to evaluate whether a machine could simulate human thought.[1]

The formal definition of artificial intelligence emerged at the 1956 Dartmouth Conference, organized by John McCarthy, Marvin Minsky, and others, who proposed that every aspect of intelligence could be simulated by a machine if properly instructed.[2]

During the 1960s and 1970s, the first expert systems appeared. ELIZA, a chatbot developed by Joseph Weizenbaum, simulated conversation with a psychotherapist using basic language-processing rules. Although rudimentary, it represented a milestone by demonstrating that machines could generate apparently human interactions.[3]

In 1997, IBM's supercomputer Deep Blue defeated world chess champion Garry Kasparov. This event marked a turning point by demonstrating that algorithms could process enormous numbers of possible combinations and make strategic decisions with human-like response times.[4]

2. Transition toward machine learning (1997–2011)

During this period, AI experienced a paradigm shift: from rule-based expert systems to models capable of learning directly from large volumes of clinical and operational data, much of it generated in emergency and prehospital settings. Although less visible to the public than earlier milestones, this phase was crucial in laying the groundwork for later deep learning. In 2001, Geoffrey Hinton and colleagues began developing deep neural network models.[5] In 2006, Hinton introduced the concept of deep learning and layer-wise pretraining, overcoming technical limitations that had hindered the training of complex models.[5] Techniques such as support vector machines, decision trees, and Bayesian models became widely used in bioinformatics, clinical decision-support systems, and biomedical data classification. In 2008–2009, ImageNet—a massive labeled image database—was created, providing the foundation for future advances in medical computer vision.[6]

3. Consolidation of deep learning (2011–2015)

In 2011, IBM's Watson defeated human champions on the quiz show Jeopardy!, interpreting natural-language questions and retrieving precise answers from large unstructured databases.[7]

From 2012 onward, major advances in deep neural networks occurred. The AlexNet model, trained on the ImageNet dataset, revolutionized image recognition by dramatically reducing classification error,[8] with direct implications for medical applications such as automated reading of radiographs and CT scans.

In 2015, DeepMind's AlphaGo defeated the world champion in the game of Go, using deep neural networks combined with reinforcement learning, achieving an adaptive strategy superior to human intuition.[9]

4. From theory to clinical practice (2020–Present)

Since 2020, AI has begun to be actively integrated into clinical tools. In emergency settings, several studies have documented its use in coordination centers to predict hospital admission trends and in intensive care units during the COVID-19 pandemic.[10] In EM, major applications include self-triage systems that prioritize patients,[11] predictive models for early sepsis detection[12] and other life-threatening emergencies, virtual assistants based on natural language processing,[13] and automated medical imaging systems that interpret radiographs or CT scans in real time.[14,15]

Similarly, generative language models such as ChatGPT have expanded their role as assistants in clinical documentation, guideline consultation, and decision-support. These tools are also being explored in disaster response systems and mass-casualty incidents, with the potential to optimize real-time resource management and prioritization.[16]

5. Historical reflection

From symbolic reasoning to today's adaptive systems, the history of AI in medicine reflects a progressive movement toward collaboration between humans and machines. This is not about replacing physicians, but about extending their capabilities through tools that process massive amounts of data with efficiency and precision.

Current applications of AI in Emergency Medicine

The implementation of AI in EDs is in a phase of expansion, with increasingly tangible practical applications throughout the care process. Far from being futuristic technology, AI is already impacting key areas such as triage, detection of time-dependent conditions, medical imaging processing, and resource management.[17,18] In addition, AI has demonstrated potential usefulness in other high-pressure clinical scenarios: pandemics, mass-casualty incidents (MCIs), and natural disasters, where prioritization, prediction of care demand, and management of critical resources require immediate data-driven decisions. It also assists emergency physicians in clinical toxicology through generative language systems.[19]

1. Self-triage and clinical prioritization

One of the most immediate uses of AI in emergency care is the development of assisted self-triage systems, in which patients, through mobile devices or terminals in the waiting room, enter their symptoms. Algorithms trained on thousands of clinical records classify the level of priority, suggest possible diagnoses, and generate automatic alerts for health care personnel.[11,20]

These systems can accelerate the identification of critical patients and reduce bias in initial assessment. Several studies have demonstrated moderate agreement with conventional triage systems and the ability to detect high-priority cases earlier than traditional manual processes. These tools could play a crucial role in MCIs,[21] enabling real-time automated triage and severity-based prioritization, particularly in prehospital settings or during system overloads.

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2. Early detection of sepsis and critical events

Sepsis represents one of the leading causes of preventable mortality in emergency departments. AI models based on machine learning have proven useful in early sepsis detection by identifying subtle patterns of clinical deterioration from vital signs, laboratory results, and contextual variables.[10,12,22]

Tools such as InSight, Sepsis Watch, or custom-developed hospital algorithms have been able to anticipate sepsis diagnoses by up to 6 hours earlier than conventional clinical methods, improving antibiotic administration times and reducing mortality. These systems may become key components in future epidemics and complex health emergencies by detecting population-level patterns in real time.

3. Automated interpretation of diagnostic imaging

Computer vision systems trained with convolutional neural networks have achieved accuracy levels comparable to radiologists in the interpretation of chest radiographs, cranial CT scans, and abdominal ultrasounds.[8,14,15]

In emergency care, this translates into faster diagnosis of conditions such as pneumothorax, intracranial hemorrhage, or obstructive urolithiasis, especially in centers with limited access to imaging specialists. Furthermore, these algorithms can act as automatic second readers, alerting clinicians to critical findings.

4. Optimization of clinical workflow and resource management

AI is also being used to predict healthcare demand, estimate waiting times, and guide the allocation of beds, equipment, and staff according to evolving patient flow. Real-time predictive models allow emergency managers to anticipate overcrowding and reorganize resources in advance.[13]

This capacity to transform operational data into logistical decisions is particularly relevant in high-pressure care contexts, such as epidemics, high-volume days, or mass-casualty events. During epidemics and disasters, predictive algorithms can anticipate the need for beds, personnel, or ventilators, with preliminary evidence published during the SARS-CoV-2 crisis in Spain.[10]

5. Assistance in clinical documentation

Natural language models such as ChatGPT or Med-PaLM are beginning to be explored as assistants in medical documentation. Their ability to draft clinical reports, suggest differential diagnoses, or complete texts from brief inputs may save time in high administrative-burden environments, although thorough physician oversight remains essential.

Ethical, technical, and environmental challenges in the use of artificial intelligence in EM

Despite the enormous potential of AI in EM, its implementation presents a series of challenges that must be carefully addressed before full integration into clinical practice. These challenges extend beyond technical aspects and encompass ethical, legal, educational, and environmental dimensions.

1. Privacy and security of clinical data

The use of AI algorithms requires large volumes of clinical data for training and validation. This raises significant concerns regarding personal data protection and patient confidentiality. Data anonymization, compliance with regulations such as the General Data Protection Regulation (GDPR), and traceability of data access are essential to preserve patient rights and trust in these systems.[23]

Additionally, many models require connectivity with external or cloud-based servers, introducing potential vulnerabilities to cyberattacks or unauthorized access.

2. Transparency and explainability of algorithms

Many current models, especially those based on deep neural networks, are considered "black boxes": they can produce accurate results but cannot clearly explain the underlying reasoning. This lack of explainability complicates acceptance by clinicians, particularly in contexts where decisions must be justified to patients, families, or courts.[24]

Techniques for explainable AI are being developed to improve algorithm transparency, but they remain in early stages of adoption.

3. Medical oversight and legal responsibility

A fundamental principle in medicine is that clinical responsibility cannot be delegated. Therefore, even if an AI system proposes a diagnosis or management plan, final judgment rests with the healthcare professional. This raises legal questions regarding the limits of AI use: can a physician be held responsible for an error made by an algorithm? What happens if an AI recommendation is followed and proves incorrect?

Currently, legislation does not provide clear answers,[25] and it is recommended that AI tools be considered decision-support systems rather than replacements for clinical judgment. This debate has gained special relevance following the recent approval of the European Artificial Intelligence Regulation (2021/0106/COD),[26] which establishes a harmonized legal framework for the development, use, and supervision of AI systems in the European Union.

This regulation classifies healthcare-related AI systems as "high risk," obligating developers to ensure traceability, meaningful human oversight, transparency, and continuous evaluation of algorithmic performance.

The impact of this regulation on emergency and prehospital emergency services is expected to be significant, particularly for triage systems, clinical alerts, and risk prediction tools.

4. Training Gap and resistance to change

The adoption of AI in EDs requires a minimum level of digital literacy among health care professionals, as well as an open attitude toward new technologies. In many clinical environments, lack of specific training or the perception

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that AI threatens medical autonomy generates resistance to change.[25]

Incorporating AI competencies into undergraduate and postgraduate EM training programs is essential to facilitate a safe and efficient transition.

5. Sustainability and environmental impact

The training and continuous use of large-scale models such as ChatGPT, BERT, and similar systems involve high energy consumption. It is estimated that language models like ChatGPT may generate more than 260 tons of CO_2 per month, equivalent to hundreds of transatlantic flights.

This forces consideration of AI's ecological cost, particularly in healthcare systems seeking sustainability and efficiency. Solutions under exploration include data centers powered by renewable energy, algorithm optimization, and awareness of responsible AI use.

Myths and realities of AI in EM

The rapid expansion of AI in clinical practice has been accompanied by numerous perceptions, some evidence-based and others rooted in unfounded expectations. In emergency medicine—where clinical pressure and uncertainty are constant—it is crucial to distinguish facts from myths to promote informed and responsible implementation[27,28] (Table 1).

These myths are often amplified by lack of knowledge or technophobic narratives. For effective implementation, discussions must be grounded in evidence, real clinical outcomes, and robust regulatory frameworks.[29]

Table 1. Common myths about artificial intelligence in Emergency Medicine and Emergency Care

Myth	Reality
"AI will replace emergency physicians."	AI is designed to assist health care professionals, not to replace them. Its role is to support clinical judgment, not to substitute it.
"AI systems are infallible."	AI can reduce errors, but it still depends on data quality and human supervision. It makes different errors, not fewer.
"Implementing AI is costly and complex."	Scalable and low-cost solutions exist, and many tools are open-source or adaptable to clinical environments.
"AI is only useful in large or cutting-edge hospitals."	AI can be especially beneficial in resource-limited centers, providing expert support where it is otherwise unavailable.
"Using AI in emergency care compromises confidentiality."	When applied under regulations such as the GDPR, AI can be safe in terms of data handling.
"The more AI we use, the less we will need to think."	Uncritical implementation can lead to loss of clinical skills. AI must be used with active supervision and critical thinking.

AI: artificial intelligence; GDPR: General Data Protection Regulation.

Future opportunities and innovation with AI in EM

AI has ceased to be a distant promise and has become an emerging reality in clinical care. However, its evolution is still far from having reached its ceiling. The combination of more advanced algorithms, higher-quality clinical data, and increasingly digitalized healthcare environments opens multiple lines of development for the coming years, particularly in the field of emergency care.

1. Real-time clinical assistants

The immediate future foresees the presence of intelligent virtual assistants integrated into electronic health record systems, capable of providing diagnostic recommendations based on risk algorithms, suggesting complementary tests according to clinical pactice guidelines and patient context, and alerting to pharmacological contraindications or interactions.[13,27]

These tools will act as a second pair of eyes, especially useful in situations of high care demand or rapid decision-making.[29]

2. Longitudinal predictive analysis

More sophisticated AI models will allow the prediction of future complications based on historical, clinical, and contextual patient data.[11,12] For example: estimating the risk of hospital admission after emergency discharge; predicting decompensation in chronic patients; anticipating the need for critical care or early re-consultation.

These predictions may facilitate resource planning, proactive follow-up, and the prevention of adverse events.

3. Voice recognition and task automation

The use of clinical voice recognition technology will allow automatic recording of medical notes, generation of structured reports, and facilitation of diagnostic coding. This innovation will reduce time devoted to administrative tasks, enabling physicians to focus on direct patient care.[25]

4. Therapeutic personalization

Through algorithms integrating genetics, comorbidities, previous treatment response, and real-time data, emergency medicine will move toward personalized care.[24] This will allow treatment to be tailored not only to the disease but also to the specific profile of each patient.

5. Connectivity with wearable devices and home hospitalization

The expansion of connected wearable devices—such as heart rate monitors, oxygen saturation sensors, continuous ECG, and real-time glucose monitoring—opens the door to a new model of post-emergency care: early discharge with remote monitoring, enabling active management of low-risk patients; intelligent home hospitalization, in which device-generated data are integrated with AI algorithms to generate clinical alerts and therapeutic recommendations;[14,23] and reduced bed time in emergency departments, optimizing patient turnover and freeing space for more critical cases.

This transformation will allow many patients to continue being clinically monitored outside the hospital with safety levels comparable to conventional hospitalization, while significantly improving patient experience and system efficiency.

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6. Human–machine collaboration

Beyond automation, the future of emergency care points toward a hybrid model in which human clinical judgment is complemented by intelligent systems capable of auditing, proposing, and optimizing clinical decisions in real time.[30]

Conclusions

AI represents one of the most significant technological transformations in contemporary medicine, with especially important implications in high-complexity care environments such as hospital emergency departments and Emergency Medical Services (EMS), particularly their Health Coordination Centers.[31] Its capacity to process large volumes of data in real time, recognize clinical patterns, and support decision-making makes it a potential ally for improving safety, efficiency, and personalization of care.

However, its implementation requires a strategic and balanced approach. The progressive delegation of clinical tasks to automated systems carries the risk of erosion of clinical judgment, particularly in future generations. Active preservation of medical competencies will be essential to avoid technological dependence that undermines professional autonomy.

EDs have always been characterized by their adaptability, their ability to respond to all types of situations—from health crises such as the COVID-19 pandemic[32] to natural disasters or sustained increases in healthcare demand with no foreseeable inflection point.[33] In this context, it is essential to begin integrating tools that can objectively improve our daily work. There is no doubt that AI will become a major ally for emergency professionals in the coming years, not only in terms of clinical support, but also as an attractive element for new medical generations, who will find in our specialty an innovative, dynamic, and deeply human future project. In fact, the integration of AI-related competencies into undergraduate and postgraduate EM training programs has already begun to materialize in some national academic settings.[32]

Nevertheless, its implementation is not without challenges. Issues related to data privacy, algorithm transparency, professional training, and environmental impact must be addressed responsibly and rigorously. Moreover, it is essential to maintain a critical perspective, avoiding both naive techno-optimism and unfounded rejection.

Far from replacing healthcare professionals, AI should be conceived as a complementary tool that amplifies human capabilities and allows clinicians to focus on what technology cannot yet replace: empathy, comprehensive clinical judgment, and decision-making under uncertainty.[35]

After all, in emergency and emergency medicine, the things you fear must be faced—there is nowhere to hide; they will find you…

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REFERENCES

1. Turing A. Computing Machinery and Intelligence. Mind. 1950;59:433-60.
2. McCarthy J, Minsky M, Rochester N, Shannon C. A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence. [Internet]. 1955. (Accessed 30 March 2025). Available at: http://www formal.stanford.edu/jmc/history/dartmouth/dartmouth.html. [Consulta: 8 febrero 2025].
3. Weizenbaum J. ELIZA—A computer program for the study of natural language communication between man and machine. Commun ACM. 1966;9:36-45.
4. Campbell M, Hoane AJ, Hsu F hsiung. Deep Blue. Artif Intell. 2002;134:57-83.
5. Hinton GE, Osindero S, Teh YW. A fast learning algorithm for deep belief nets. Neural Comput. 2006;18:1527-54.
6. Deng J, Dong W, Socher R, Li LJ, Li K, Fei-Fei L. ImageNet: A large-scale hierarchical image database. In: Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition. Miami, FL: IEEE; 2009. p. 248-55.
7. Ferrucci D. Introduction to "This is Watson". IBM J Res Dev. 2012;56:1-15.
8. Krizhevsky A, Sutskever I, Hinton GE. ImageNet classification with deep convolutional neural networks. In: Advances in Neural Information Processing Systems. 2012;25:1097–105.
9. Silver D, Huang A, Maddison CJ, Guez A, Sifre L, van den Driessche G, et al. Mastering the game of Go with deep neural networks and tree search. Nature. 2016;529:484-9.
10. Castro Delgado R, Delgado Sánchez R, Duque del Río MC, Arcos González P. Capacidad potencial de un centro coordinador de urgencias/emergencias para predecir ingresos hospitalarios y en unidades de cuidados intensivos por COVID-19. Emergencias. 2021;33:369-74.
11. Shamout FE, Shen Y, Wu N. An artificial intelligence system for predicting the deterioration of COVID-19 patients in the emergency department. 2020. (Accessed 22 February 2025). Available at: https://arxiv.org/abs/2008.01774.
12. Ivanov O, Wolf L, Brecher D. Improving Emergency Department ESI Acuity Assignment Using Machine Learning and Clinical Natural Language Processing. 2020. (Accessed 18 March 2025). Available at: https://arxiv.org/abs/2004.05184.
13. Sun L, Agarwal A, Kornblith A. ED-Copilot: Reduce Emergency Department Wait Time with Language Model Diagnostic Assistance [Internet]. 2024. (Accessed 18 March 2025). Available at: https://arxiv.org/abs/2402.13448.
14. Cadena SER. El Hospital Doctor Balmis de

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Alicante, pionero en la aplicación de IA en las radiografías de tórax y hueso [Internet]. 2025. (Accessed 18 March 2025). Available at: https://cadenaser.com/comunitat-valenciana/2025/02/21/el-hospital-doctor-balmis-de-alicante-pionero-en-la-aplicacion-de-ia-en-las-radiografias-de-torax-y-hueso-radio-alicante/
15. Cadena SER. Hospital Universitario de A Coruña. La Inteligencia Artificial revoluciona el radiodiagnóstico en el CHUAC. 2024. (Accessed 18 March 2025).Available at: https://cadenaser.com/galicia/2024/11/26/la-inteligencia-artificial-revoluciona-el-radiodiagnostico-en-el-chuac-radio-coruna/.
16. Reichstein M, Benson V, Blunk J, Camps-Valls G, Creutzig F, Fearnley CJ, et al. Early warning of complex climate risk with integrated artificial intelligence. Nat Commun. 2025;16:2564.
17. El País. La IA ya salva vidas en un hospital de Mallorca con un algoritmo que pronto se extenderá a otros [Internet]. 2024. (Accessed 18 March 2025). Available at: https://elpais.com/sociedad/2024-09-01/la-ia-ya-salva-vidas-en-un-hospital-de-mallorca-con-un-algoritmo-que-pronto-se-extendera-a-otros.html.
18. Piliuk K, Tomforde S. Artificial intelligence in emergency medicine: a systematic literature review. Int J Med Inform. 2023;180:105274.
19. Nogué-Xarau S, Amigó-Tadín M, Ríos-Guillermo J. ¿Puede la inteligencia artificial ayudar al urgenciólogo en el diagnóstico de las intoxicaciones? Emergencias. 2024;36:153-6.
20. Kirubarajan A, Taher A, Khan S, Masood S. Artificial intelligence in emergency medicine: a scoping review. J Am Coll Emerg Physicians Open. 2020;1:1691-702.
21. Romero Olóriz C. Inteligencia artificial en incidentes con múltiples víctimas: estado actual y perspectivas. Emergencias. 2025;37:159-60.
22. Cadena SER. Un «doctor IA» reduce un 25 % las muertes súbitas en urgencias [Internet]. 2024. (Accessed 18 March 2025). Available at: https://cadenaser.com/nacional/2024/09/16/un-doctor-ia-reduce-un-25-las-muertes-subitas-en-urgencias-cadena-ser/
23. Cadena SER. La cara oculta de la IA del Hospital Clínico de Valladolid para detectar la endocarditis infecciosa [Internet]. 2025. (Accessed 18 March 2025).Available at: https://cadenaser.com/castillayleon/2025/02/14/reportaje-la-cara-oculta-de-la-ia-del-hospital-clinico-de-valladolid-para-detectar-la-endocarditis-infecciosa-radio-medina/
24. El País. Natalia Trayanova, biofísica que crea corazones virtuales: «Nos enfrentamos al mayor asesino conocido» [Internet]. 2025. (Accessed 18 March 2025). Available at: https://elpais.com/ciencia/2025-03-25/natalia-trayanova-biofisica-que-crea-corazones-virtuales-nos-enfrentamos-al-mayor-asesino-conocido.html
25. Martínez-Pérez B, de la Torre-Díez I, López-Coronado M, Sainz-De-Abajo B, Robles M, García-Gómez JM. Mobile clinical decision support systems and applications: a literature and commercial review. J Med Internet Res. 2014;16:e214.
26. Consejo de la Unión Europea. Consejo de la Unión Europea. Reglamento de Inteligencia Artificial (2021/0106/COD). [Internet]. Consejo de la Unión Europea; 2022. Report No.: ST-14954-2022-INIT. (Accessed 5 May 2025). Available at: https://data.consilium.europa.eu/doc/document/ST-14954-2022-INIT/es/pdf.
27. Cadena SER. Un asistente virtual en emergencias basado en inteligencia artificial, Premio Fundación Unicaja de Innovación en Biomedicina [Internet]. 2025. (Accessed 22 March 2025). Available at: https://cadenaser.com/andalucia/2025/02/11/un-asistente-virtual-en-emergencias-basado-en-inteligencia-artificial-premio-unicaja-de-innovacion-en-biomedicina-ser-malaga/
28. Gordo-Vidal F, Gordo-Herrera N. Inteligencia artificial y sistemas de aprendizaje automático: fascinación versus realidad. Emergencias. 2025;37:3-4.
29. Sáenz-Abad D, Sachi Martínez-Mihara M, Lahoza-Pérez M. La inteligencia artificial como herramienta de apoyo diagnóstico en urgencias. Emergencias. 2025;37:78-9.
30. Topol EJ. High-performance medicine: the convergence of human and artificial intelligence. Nat Med. 2019;25:44-56.
31. González-Martínez F, Garrido N, Mateo J. Inteligencia artificial en la práctica clínica de urgencias: más realidad que fascinación. Emergencias. 2025;37:159-60.
32. Julián-Jiménez A. Hacia la normalización en la atención a los pacientes con COVID-19 en urgencias. Emergencias. 2023;35:321-2.
33. Carballo Cardona C. Servicios de urgencias en situación crítica: hacia un marco de identificación y actuación estructural. Emergencias. 2025;37:301-3.
34. Dueñas-Ruiz A, Castro Villamor M, Martín-Rodríguez F. Simulación clínica, realidad virtual e inteligencia artificial en la formación clínica. Rev Esp Urg Emerg. 2025;4:59-60.
35. Davenport T, Kalakota R. The potential for artificial intelligence in healthcare. Future Heal J. 2019;6:94-8.

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