EHMA 2025
Taking action to improve health for all

Digital transformation and the sustainable and ethical use of Artificial Intelligence in trauma and emergency surgery.

Results from a World Society of Emergency Surgery worldwide investigation

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Artificial Intelligence in Healthcare

- Healthcare is a huge and complex field, encompassing several activities and domains

- Artificial Intelligence (AI) can be useful in several activities – from data collection, analysis, research, …, clinical tasks, up to patient monitoring and telemedicine, and medical education

- AI can mitigate some of the grand challenges of healthcare, concerning an increasing demand for services from an ageing population with chronic conditions, limited budgets, and the need for prevention and early detection of diseases

Artificial Intelligence in Clinical Medicine & Surgery

AI in clinical medicine can enhance clinical decision making – meaning supporting clinicians in their tasks

Concerning clinical activities, AI-based tools can support in:

More precise and accurate diagnosis based on big data – think about rare diseases: most physicians may have seen only a few cases in their entire career – AI can collect them all

Risk management and predictions, for instance, before surgery (see for example the POTTER App)

AI-empowered surgical robots may conduct independent operations, allowed mainly in tough environments, e.g., battlefields and long space flights.

Ethical issues in the use of AI

- In the current scenario, AI-based tools feature several ethical concerns in their use, as they engage more stakeholders taking actions and being accountable: physicians, developers and technology providers, institutions, maintenance teams, …

- The Ethics Guidelines for Trustworthy Artificial Intelligence by the European Commission can provide a valuable framework to understand the main issues and apply them to the clinical domain

Ethical issues in the use of AI
A possible framework (1)

Requirement	Definition	Topics from clinical practice
Human agency and oversight	AI should support human autonomy and decision-making, acting as an enabler to a democratic and equitable society, by supporting the user's agency, fostering fundamental rights, and allowing for human oversight.	Clinical decision-making; optimal human-machine interface; non-technical skills and creativity as human intelligence
Technical robustness and safety	AI should be reliable and developed with a preventive approach to risk caused by the presence of other agents (human and artificial) that may interact with the system in an adversarial manner, ensuring at the same time the physical and mental integrity of humans	Monitoring continual learning AI; explainability of models' performance; optimal integration in clinical workflows; artificial stupidity, cybersecurity and cyber resilience
Privacy and data governance	Data governance should ensure the quality and integrity of the data used, its relevance, its access protocols, and the capability to process data, protecting privacy	Use of sensitive data, consenting and data ownership; business model in data management

Ethical issues in the use of AI
A possible framework (2)

Requirement	Definition	Topics from clinical practice
Transparency	Transparency must be granted to the elements relevant to AI, like the data, the system, and the business models, ensuring traceability, explainability, and communication	Accurate reporting of training data and models performance
Diversity, non discrimination, and fairness	AI should enable inclusion and diversity throughout its entire life cycle, ensuring stakeholders' participation, with equal access through inclusive design processes as well as equal treatment.	Access to diverse and representative surgical data; access to the technology from developing countries; potential rewards of data availability; shared decision-making, co production, and tailored approaches dynamics
Societal and environmental well-being	Stakeholders should be represented throughout the AI's life cycle, encouraging sustainability and ecological responsibility, also according to the SDGs	Clinical education and knowledge transfer; clinical skillset
Accounability	Adequate mechanisms should be put in place to ensure responsibility and accountability for AI and its outcomes, both before and after their development, deployment, and use.	Measurement, liabilities, rewards

Surgeons' perspective on AI in decision-making

- Investigation conducted in 2021-2022 with the World Society of Emergency Surgery

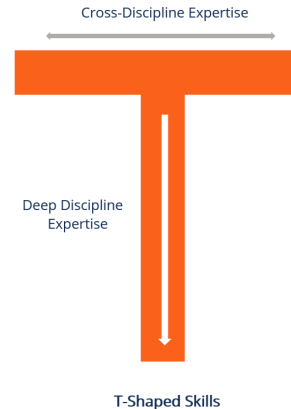- 650 responses from 72 countries

Main results:

- 69% of respondents declared they knew the meaning of AI, but only 17% gave a sound definition;

- Half of the community was enthusiastic and open to AI as a decision-making tool, while the remaining half was skeptical;

- Enthusiasm was more related to country and responsibility held than age;

- Traditional tools were preferred (like training, guidelines, and second opinions

What is next

Technology Acceptance Dynamics

- Performance expectancy
- Effort expectancy
- Social Influence
- Facilitating conditions
- …

A revised t-shaped approach on competencies

Cross-Discipline Expertise

Deep Discipline Expertise

T-Shaped Skills

THANK YOU

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