



Letter to Editor

The Role of Artificial Intelligence in Managing Traffic Flow in the General Operating Room

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Dear Editor,

The modern operating room (OR) is a high-stakes environment in which patient safety depends on precision and seamless coordination. Among the most underestimated challenges is excessive foot traffic, which increases contamination risk, disrupts surgical workflows, and impairs staff concentration, elevating hospital-acquired infections (1).

Artificial intelligence (AI) has emerged as a transformative driver in healthcare, offering novel means to manage critical environments, such as the OR. More accurate assessment of movement patterns can be achieved by leveraging AI to analyze spatial data. Moreover, intelligent sensors, advanced image analysis, and predictive modeling enable real-time monitoring of human flow within the OR. This capability is particularly important because even brief, unwarranted entries can interrupt a procedure. Consequently, AI is increasingly serving as an aid to enhance safety and oversight of OR operations (2).

Functionally, AI systems can analyze recorded OR videos to identify and categorize movement patterns. The collected data include counts of entries and exits, duration of personnel presence, staff roles, and the relationship between traffic volume and distinct surgical phases. It is noteworthy that these metrics establish a basis for developing evidence-based protocols to govern movement within the OR. Furthermore, intelligent systems can anticipate the team's potential needs for tools, medications, or specialized staff, thereby reducing unnecessary entries. Moreover, longitudinal data accumulation enables iterative improvements in OR design, optimal equipment placement, and staffing organization (3).

From a systems perspective, AI harmonizes procedural workflows and improves overall output quality. Machine-

learning models, trained on thousands of surgeries, can also identify high-risk zones or traffic buildup and generate smart notifications. These alerts support dynamic staff allocation at critical phases, guide movement pathways during delicate intervals, and optimize workforce scheduling. Additionally, AI-driven management dashboards provide department leaders with real-time visibility into traffic patterns, team efficiency, and protocol compliance (4). [Table 1](#) summarizes the key aspects of AI's role in managing OR traffic flow.

AI extends beyond a supplementary role for traffic regulation; more precisely, it represents a strategic framework for enhancing safety, reducing human error, elevating surgical standards, and expediting clinical workflows. Nonetheless, realizing these benefits requires

Table 1. Key Aspects of AI Role in Managing Traffic Flow in General OR

Aspect	Brief Description
Main issue in OR	Excessive foot traffic increases contamination, disrupts surgery, and reduces focus (1)
AI role in monitoring	Smart sensors, image analysis, predictive models to monitor movement (1)
Data analysis and prediction	Identification of movement patterns: entry/exit counts and staff presence duration (2)
Reducing disruptions	Prediction of team needs (tools, medications, and staff) to reduce unnecessary entries (2)
Improving OR design	Use of data to optimize equipment placement, staffing, and OR design (3)
Preventing errors	Identification of high-risk areas, generating smart alerts during critical phases (3)
Live dashboards	Real-time monitoring of traffic patterns and team efficiency (3)
Improving safety	Human error reduction, surgical standard enhancement, and increased efficiency (4)
Implementation challenges	The need for infrastructure, staff education, and change management (4)

Note. OR: Operating room; AI: Artificial intelligence.



robust infrastructure, comprehensive personnel education, and effective organizational change management (5).

In conclusion, AI is transforming the OR by turning spatial data into actionable insights that reduce unnecessary foot traffic, enhance safety, and streamline workflows. Finally, institutions that embrace these innovations early are likely to achieve better clinical outcomes and safer operating environments.

Authors' Contribution

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Competing Interests

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Ethical Approval

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References

1. Bajwa J, Munir U, Nori A, Williams B. Artificial intelligence in healthcare: transforming the practice of medicine. *Future Healthc J* 2021;8(2): e188-94. doi:[10.7861/fhj.2021-0095](https://doi.org/10.7861/fhj.2021-0095)
2. Aiwerioghene EM, Osuchukwu VC. The role of artificial intelligence in healthcare quality improvement: a scoping review and critical appraisal of operational efficiency, patient outcomes, and implementation challenges. *Hospitals* 2025;2(4):27. doi:[10.3390/hospitals2040027](https://doi.org/10.3390/hospitals2040027)
3. Bellini V, Russo M, Domenichetti T, Panizzi M, Allai S, Bignami EG. Artificial intelligence in operating room management. *J Med Syst* 2024;48(1):19. doi:[10.1007/s10916-024-02038-2](https://doi.org/10.1007/s10916-024-02038-2)
4. Kenig N, Monton Echeverria J, Muntaner Vives A. Artificial intelligence in surgery: a systematic review of use and validation. *J Clin Med* 2024;13(23):7108. doi:[10.3390/jcm13237108](https://doi.org/10.3390/jcm13237108)
5. Paracchini S, Taliento C, Pellecchia G, Tius V, Tavares M, Borghi C, et al. Artificial intelligence in the operating room: a systematic review of AI models for surgical phase, instruments and anatomical structure identification. *Acta Obstet Gynecol Scand* 2025;104(11):2054-64. doi:[10.1111/aogs.70045](https://doi.org/10.1111/aogs.70045)