Supplementary Materials

Complete list of proposed statements and results of the consensus survey

Technology as an equalizer in surgical training

1. Artificial Intelligence (AI) can provide some valuable help in fighting the bias still documented in surgery, and mainly affecting women and racial/ethnic minorities.

Yes: 88.24% (45)

No: 11.76% (6)

2. The possibility to objectively assess the psychomotor performances of surgical residents can provide them with a bias-free evaluation, ultimately enhancing their training and career opportunities and improving their mental health.

Yes: 96.08% (49)

No: 3.92% (2)

2. Remote telepresence and surgical simulation can represent a valuable tool in order to provide trainees residing in low- and middle-income countries with top-level training opportunities; nevertheless, the choice of investing relevant budgets in training technologies should be weighted against the unmet need for medical and surgical care of low-income countries populations.

Yes: 96.08% (49)

No: 3.92% (2)

4. Caution should be used in considering AI the only means to evaluate trainees' performances, since it doesn't account for some relevant psychological characteristics which can ultimately affect patients' outcome, including empathy and the ability to work under stressful conditions.

Yes: 98.03% (50)

No: 1.97% (1)

Reliability of robot and AI systems

5. In the development phase, verification and validation methods need to be in place to evaluate and document the reliability and reproducibility of AI-powered robots.

Yes: 100.0% (51)

No: 0.00% (0)

6. Implementation of AI-powered robots in clinical practice must be assessed rigorously in an evidence-based fashion similar to the introduction of other surgical innovations.

Yes: 96.08% (49)

No: 3.92% (2)

7. A new and higher class of medical device risk needs to be defined to cover AI-powered robots/devices with high levels of autonomy (i.e. autonomous surgery levels 4 and 5).

Yes: 88.24 % (45)

No: 11.76% (6)

8. In Canada this should result in a level of risk of 5, in the European Union and the United States of America this should be level 4.

Yes: 68.62 % (35)

No: 31.38% (16)

9. A new and lower class of medical device risk needs to be designed to cover AI-powered robots/devices with low levels of autonomy (i.e. autonomous surgery levels 2 and 3) to encourage development of smart surgical technology.

Yes: 78.43 % (40)

No: 21.57% (11)

10. In Canada, the European Union and the United States of America this should be level 0.

Yes: 52.94 % (27)

No: 47.06% (24)

Respect for privacy and sensitive data

11. Healthcare data bloom fueled by excessive legacy data replication needs to be addressed as an unnecessary risk factor to Patient Health Information (PHI) privacy violations.

Yes: 76.47% (39)

No: 23.53% (12)

12. AI's role in PHI de-identification with PHI re-identification needs expanded transparency.

Yes: 88.24 % (45)

No: 11.76% (6)

13. The public needs to better understand the tradeoff between having their PHI placed at risk with tangible benefits to their overall healthcare outcomes.

Yes: 94.12 % (48)

No: 5.88% (3)

Use of complete and representative (i.e. bias free) data

14. An ethical AI system must be explainable and have a positive purpose.

Yes: 92.16 % (47)

No: 7.84% (4)

15. An inclusive AI system is unbiased and works equally well across all spectra of society.

Yes: 80.39 % (41)

No: 19.61 % (10)

16. An AI system that uses data responsibly observes data privacy rights.

Yes: 94.12 % (48)

No: 5.88% (3)

Transparencies and uncertainties in AI

17. In the future we need to make every effort to reduce current opacity in the AI systems in order to increase surgeons and patients trust in situations where AI is used in the decision-making process.

Yes: 98.03% (50)

No: 1.97% (1)

18. In the future we need to make every effort to reduce the current opacity in AI systems, in order to allow surgeons to make an informed decision regarding whether or not they should rely on the system's recommendations.

Yes: 94.12 % (48)

No: 5.88% (3)

19. In the future we need to disclose the use of opaque AI systems when asking for informed consent so that patients may exert full autonomy.

Yes: 88.24% (45)

No: 11.76% (6)

20. In the future we need to share uncertainties and limitations with patients regarding a care pathway supported by AI systems in order to manage possible bad consequences through a transparent approach.

Yes: 96.08% (49)

No: 3.92% (2)

21. In the future we need to share the decision-making process with patients, in order to share responsibility when choosing one care path over another.

Yes: 94.12 % (48)

No: 5.88% (3)

Fairness: are we exacerbating inequities in access to healthcare?

22. AI systems should be based on unbiased data collected through transparent and nondiscriminatory processes.

Yes: 100.0% (51)

No: 0.00% (0)

23. AI systems should be affordable and equally accessible worldwide.

Yes: 90.20% (46)

No: 9.80% (5)

24. Industries and AI developers should consider funding AI systems tailored on developing countries' needs.

Yes: 94.12 % (48)

No: 5.88% (3)