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XXIX IFSO World Congress

1-4 September 2026 | Toronto, Canada

TELESURGERY: A BRIEF HISTORY, CURRENT STATUS AND FUTURE IMPLICATIONS

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The Future of Obesity Management:
From Weight Loss to Health Gain

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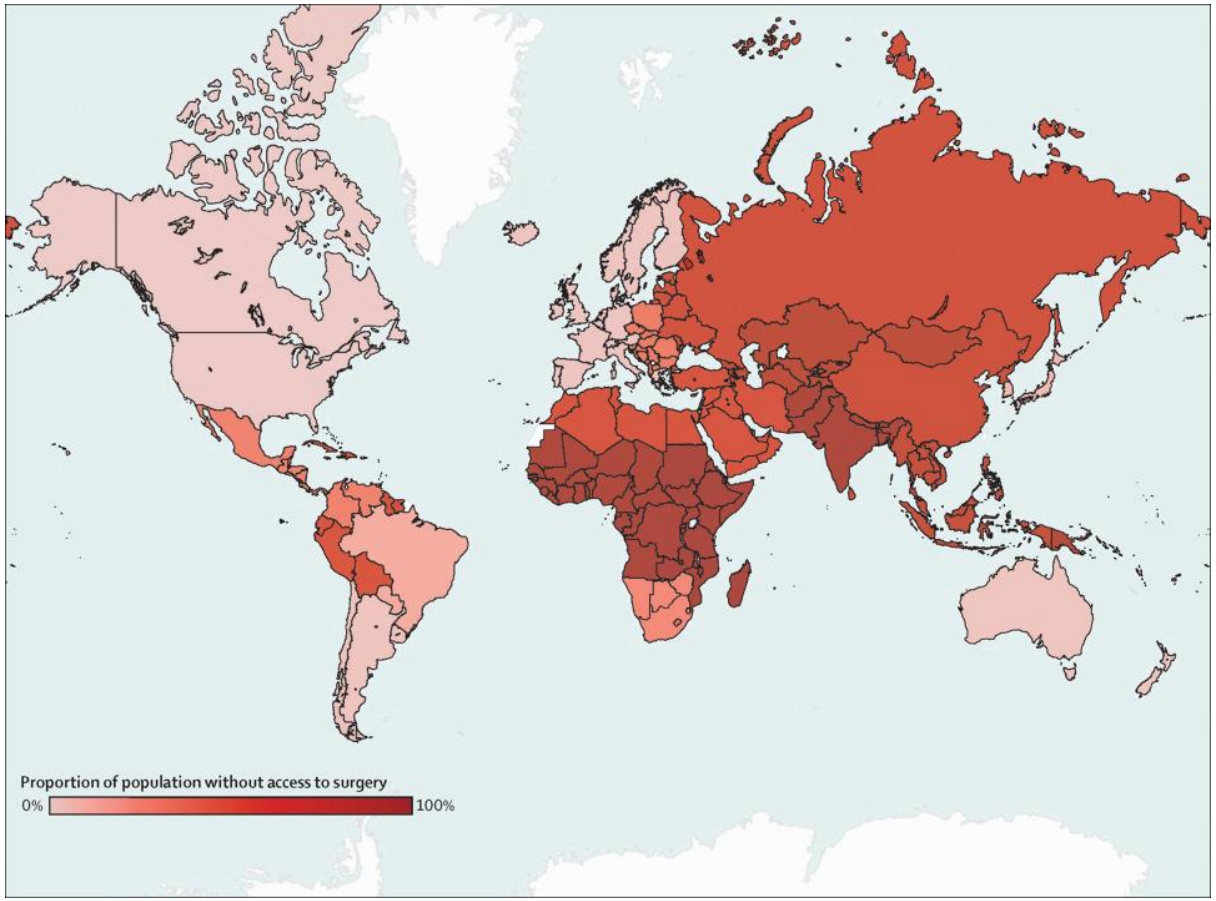
INEQUITIES IN SURGICAL CARE ACCESS

Access to specialized surgical care remains uneven worldwide due to:

- Geographic barriers in rural and remote regions
- Limited availability of specialized surgeons in low-resource settings
- Delayed surgical response during disasters and humanitarian crises



WHO / Lancet Commission on Global Surgery

THE GLOBAL SURGERY ACCESS GAP

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- 313 million surgical operations are performed each year
  - Only 6% take place in the poorest countries, home to over a third of the world's people
  - 143 million additional surgical procedures are needed in low- and middle-income countries every year to save lives and prevent disability
- Case-fatality stays high for treatable conditions (i.e. appendicitis, hernia, fractures, obstructed labour, and congenital anomalies)

THE HUMAN TOLL

16.9 million

Deaths a year from conditions needing surgery — a third of all deaths worldwide, more than HIV, TB, and malaria combined.

Where you are born still decides whether surgical care is within reach

Sources: Lancet Commission on Global Surgery, Global Surgery 2030 (2015); Alkire et al., Lancet Global Health (2015); World Bank.

PROBLEM: Access to Healthcare for Rural Canadians

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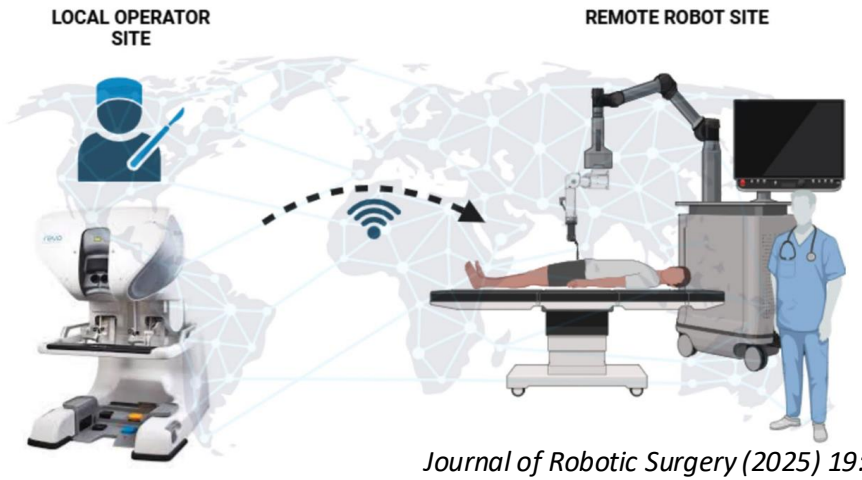
Potential to transform access to surgical care worldwide by overcoming geographic and resource limitations.



Journal of Robotic Surgery (2025) 19:153

- **Reduce Geographic Disparities**
  Helps bridge gaps between urban centers and rural or underserved communities, improving equity in surgical care delivery
- **Remote Surgical Expertise**
  Enables specialist surgeons to provide real-time surgical care, mentorship and training to hospitals in underserved or remote regions
- **Expanded Access to Specialized Procedures**
  Allows patients in regions without advanced surgical capabilities to access complex and highly specialized treatments

OPERATION LINDBERGH

- September 2001
- Professor Jacques Marescaux
- Surgeon located in New York
- Patient in Strasbourg, France
- Fiber optic connection
- Mean latency ≈155 milliseconds
- Successful laparoscopic cholecystectomy

TELESURGERY: HAMILTON TO NORTH BAY

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- February 2003
- World's first telerobotic remote surgical service was established
- Advanced laparoscopic surgery in a remote community
- 21 complex telesurgeries performed

Anvari, M., McKinley, C., & Stein, H. (2005). Establishment of the world's first telerobotic remote surgical service: for provision of advanced laparoscopic surgery in a rural community. *Annals of surgery*, *241*(3), 460–464. doi:10.1097/01.sla.0000154456.69815.ee

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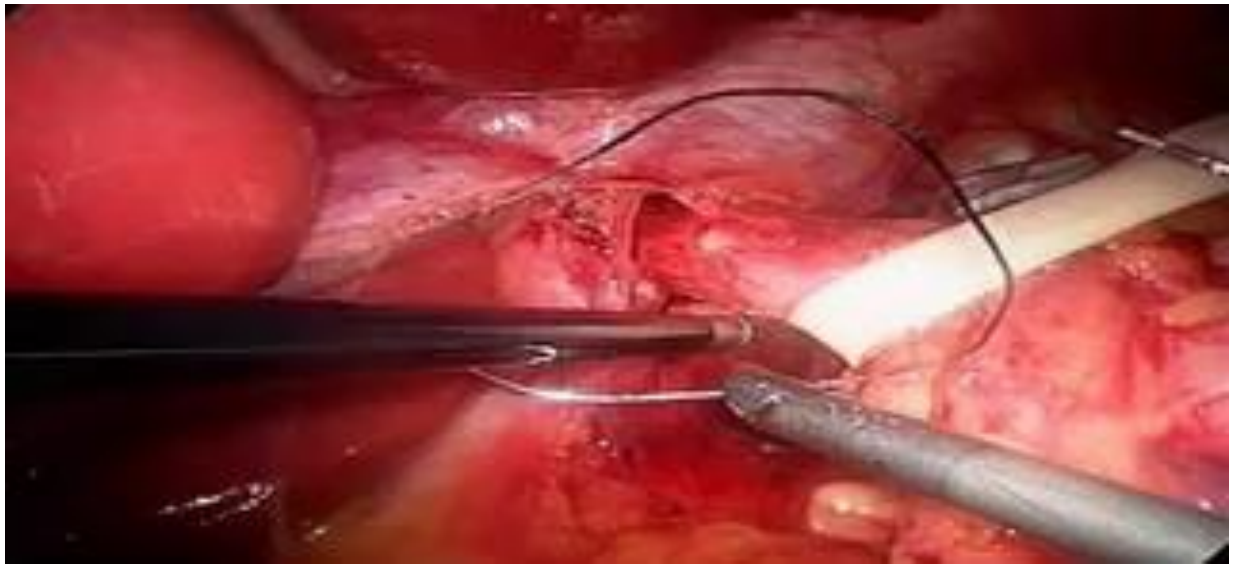

- 21 Complex Surgeries including fundoplication,colectomy, splenectomy
- No haptics
- Latency of 175-200 msec

Lessons Learned: Challenges

- Safe Use of energy devices were investigated in a limited way
  - Bipolar safer than unipolar or harmonic
- Network latency and jitter are important factors
  - High speed internet versus 5G versus 6G
- Limitation with respect to robot size and ease of set up
- Most community hospitals have smaller OR rooms
- Who will set up and dock the robot?
- Cockpit to Bedside vs Cockpit to Cockpit
- Medicolegal and credentialing in each jurisdiction

Telerobotic Surgery:

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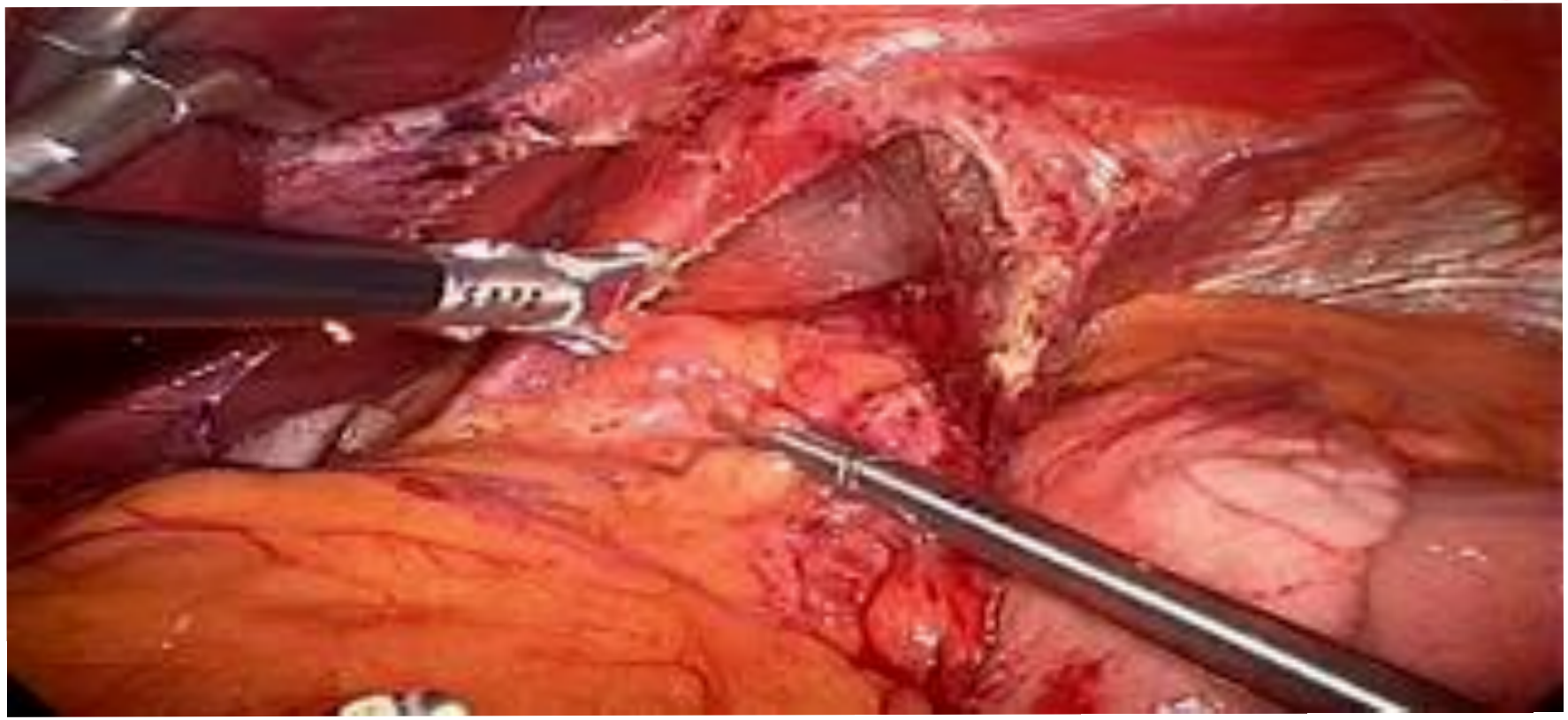
- Feasible
- Effective
- Enabling



But …

- **Not commercially attractive in 2003**
- **May be in 2026!**

TECHNICAL ADVANCEMENTS TO REDUCE LATENCY

5G / 6G Networks/Starlink	High-speed data transfer and ultra-low latency for real-time control and video streaming
Edge Computing	Data is process closer to the robot or operating site: faster extraction, reduced bandwidth use, enhanced privacy
AI & Machine Learning	Predictive algorithms, image recognition, informed surgical decisions, pre-adjustments to account for communication delays
High-Performance Computing	Optimizes data-heavy tasks like imaging and AI processing
Haptic Feedback	Improves tactile perception for the surgeon, reduces delays in force feedback
AR / VR Visualization	Provides 360° field of vision, enhances training and visualization of dynamic anatomy
Redundant Network Paths	Multiple communication channels (fiber + wireless backup), automatic switching prevents disruption

Multiple Robotic Systems with Telesurgical capability on the market since 2022

Several long-distance demonstrations performed between continents but a few clinical networks have been established in China

CONNECTIVITY MODELS

Console-to-Console

Used for remote mentoring, collaborative surgery, and skill transfer

Surgeon Console A ↔ Network ↔ Surgeon Console B → Surgical Robot → Patient

Console-to-Patient

Standard remote surgery operation

Surgeon Console → Network → Surgical Robot → Patient

LEGAL & LIABILITY ISSUES

No unified international legal framework

- **Who is liable in complications?**
  - Remote surgeon
  - Local hospital
  - Technology provider
- **Licensure**
  - Cross-border medical practice
- **Regulatory approval**
- **Insurance coverage**
- **Existing frameworks are not fully adapted to remote surgical care.**

ETHICAL CONSIDERATIONS

Patient autonomy

- Informed consent must include technological risks

Beneficence

- **Telesurgery should provide clear clinical benefit**

Privacy & cybersecurity

- Protection of patient data

Surgeon–patient relationship

- Physical distance may impact trust
- Ethical oversight is essential for responsible adoption.

Value Proposition for Tele-robotic remote surgery

- **Will vary depending local situation in each country**
- Has to be economically viable and provide patient and system benefits
- Possible indications:
  - Addressing surgical needs in remote communities
  - Sharing expertise across a health system
  - Training and access to remote expert
  - Disaster relief and battle field
  - More to come…

CONCLUSION

Telesurgery represents a transformative advancement in surgical care

Adoption depends on:

- Robust digital infrastructure
- Clear legal frameworks
- Ethical governance
- Proper training and certification
- Safe implementation requires collaboration between clinicians, engineers, regulators, and policymakers.

FUTURE DIRECTIONS

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- 6G and ultra-low latency networks
- Advanced robotics
- VR/AR
- AI surgical navigation
- International regulatory frameworks
- Global initiatives aim to expand telesurgery access and reduce disparities

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"Advancing Multimodal Obesity Care"

24-27 August 2027

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IFSO PARIS 2027

See you in

PARIS