

Robotics on the rise - NICE's role in robotic-assisted surgery evaluation

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NICE is transforming

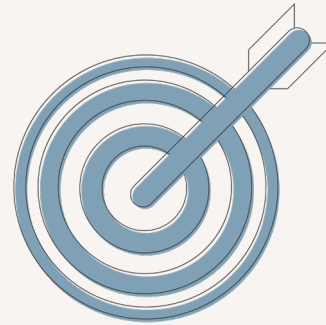
While preserving our core principles of transparency, rigour and independence, we're focussed on developing guidance that is...

**More timely and
easy to use**



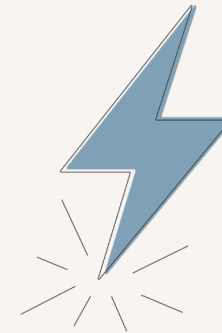
...by providing timely and useable advice.

More relevant



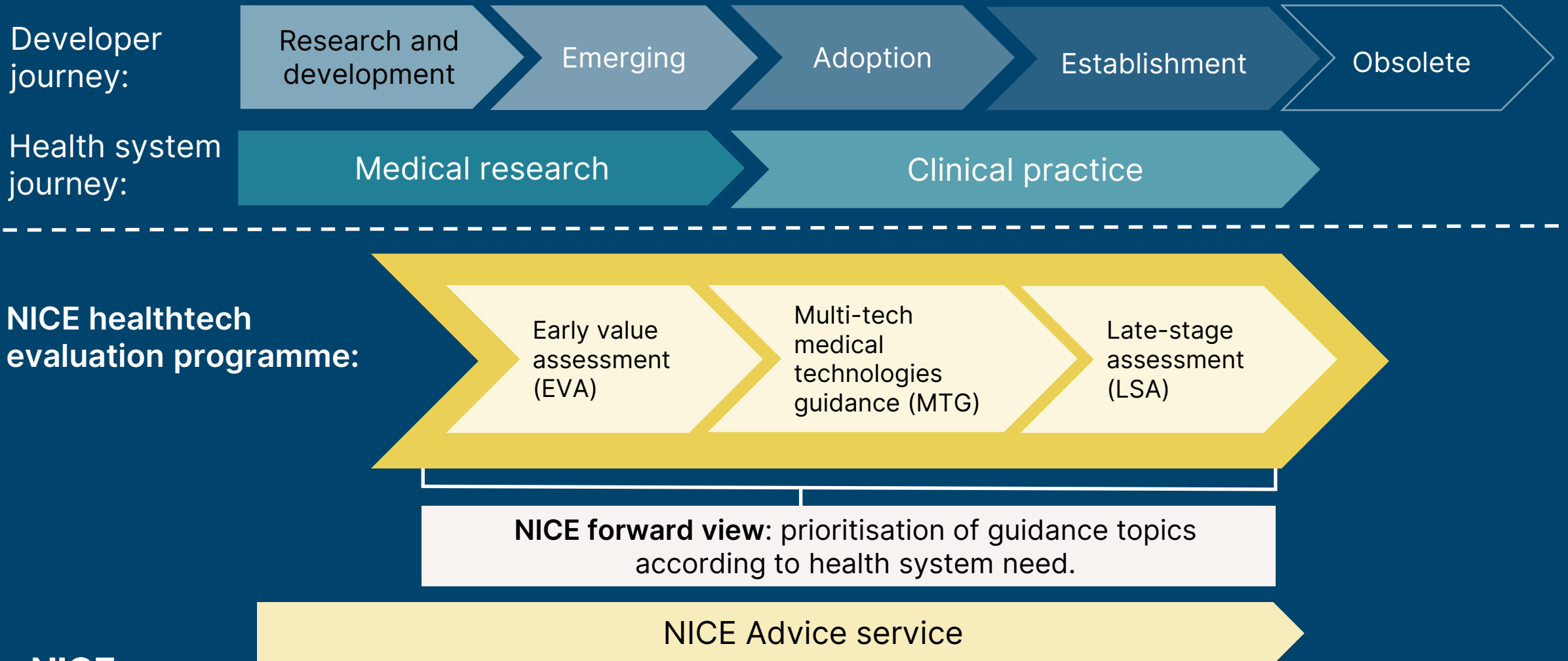
...by focusing on what matters most.

**Greater
demonstrable impact**



...by learning from data and implementation.

A healthtech evaluation programme following a lifecycle approach



Key consideration for a RAS evaluation



1. Single-procedure HTAs vs multi-procedure HTAs.



2. Impact on hospital ecosystem:

i. Single-technology assessments vs a system/platform approach.

ii. National-level HTAs vs Hospital-Based HTAs.

iv. Role of ergonomics



3. Type of evidence for consideration (RCT v RWE).

i. How to best capture the complexity of assessing clinical and cost-effectiveness with RAS?



4. How to most effectively model the economic impact of robotics and digital systems?

i. Various time-horizons

ii. Multi-technology and multi-procedure considerations (systems-based approaches)

iii. Cost of space in hospitals

iv. Impact on surgeon outcomes



5. How can recommendations be future proof given the rapid pace of innovation and increasing expansion of indication for use?

Past economic evaluations of RAS: challenges and opportunities

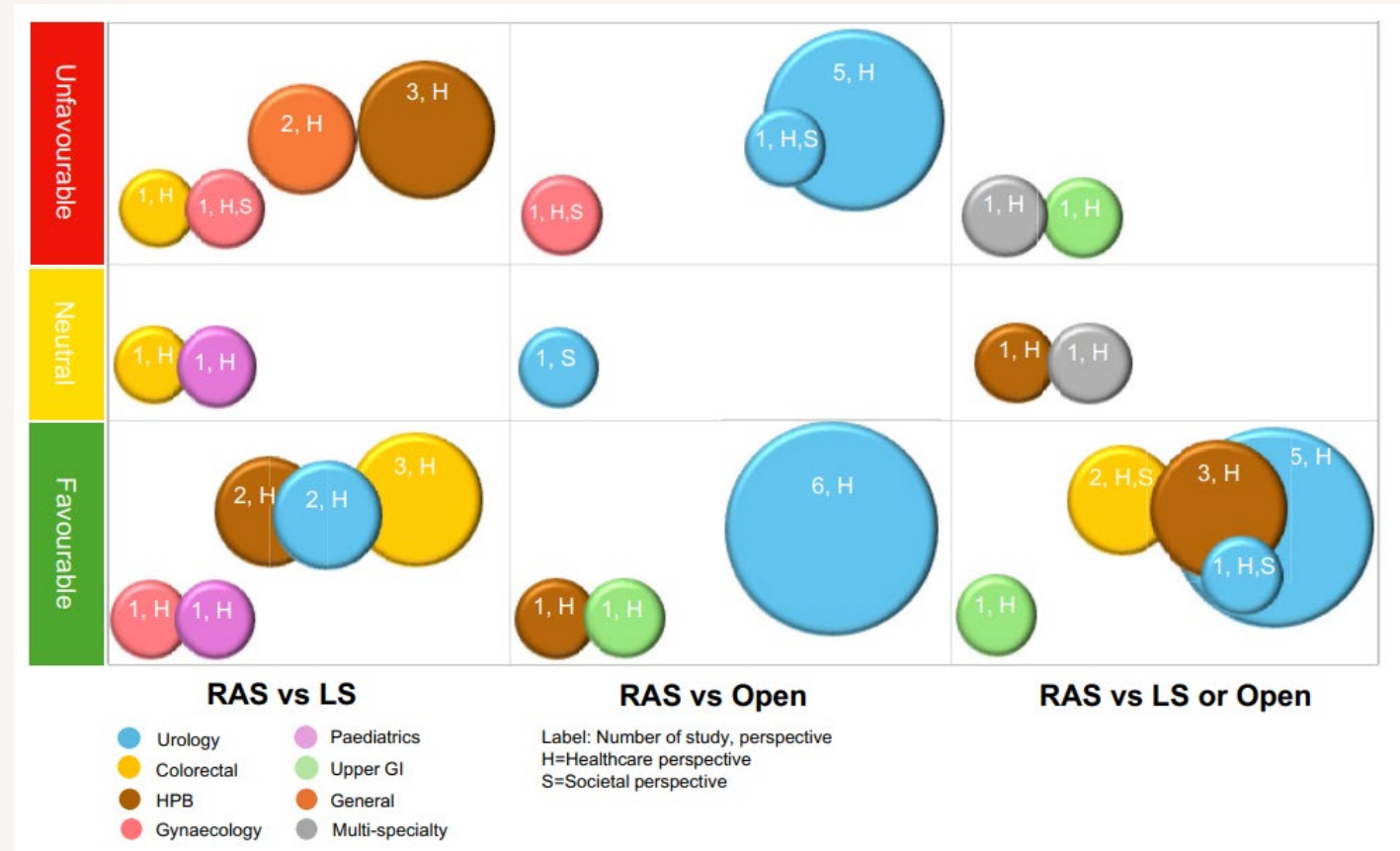
- **Scoping review** from 2015 to 2023, identified a total of 50 economic evaluations of RAS.
- **Most common approaches:** cost-utility analysis (46%) and cost-consequence analysis (32%).
- **Distinctive features of RAS underrepresented:** Learning curve and organisational impact considered in only 40% of studies, very little consideration for surgeon-related outcomes
- **Clinical specialties most studied:** Urology (42%), hepato-pancreato-biliary (20%), colorectal (14%).
- **Perspective:** 88% of studies use healthcare system perspective.
- **Time horizon varies:** Both short-term (perioperative) and long-term evaluations needed.

DOI: [10.1007/s40258-024-00920-1](https://doi.org/10.1007/s40258-024-00920-1)

DOI: <https://doi.org/10.1017/S0266462323000314>

Evidence of cost-effectiveness

Evidence of cost-effectiveness remains mixed: 58% of studies favour RAS, 32% unfavourable, 10% neutral.



Key NICE considerations for RAS evaluation

- Extensive pre-scoping work engaging with multiple stakeholders to understand the key decision issues and how to best approach the evaluation.
- Scoping work showed that use cases for RAS were broad, spanning soft tissue and orthopaedic procedures, and subspecialties of RAS were at varying degrees of maturity in NHS usage and level of evidence.
- Useful and usable: NICE guidance could most helpfully contribute to the wider NHSE programme of work by signalling evidence gaps and helping establish the evaluation requirements for further expansion of RAS in the NHS.
- 2 EVAs topics were selected by NICE's Prioritisation Board for evaluation focusing on RAS platforms covering multiple indications for soft tissue and orthopaedics procedures.

Why early value assessment for RAS?

Why other evaluation approaches may not be fit for purpose?

- **Evidence is mixed and evolving:** 58% of studies favour RAS, 32% unfavourable, 10% neutral.
- **Critical features under-addressed:** Learning curve and organisational impact missing in 60% of studies, little consideration of surgeon benefits.
- **Traditional approaches risk delay:** 'Standard' Health Technology Assessment guidance potentially not suitable for technologies that are rapidly evolving, NHS requiring timely access, while building evidence.

Why EVA is a better approach?

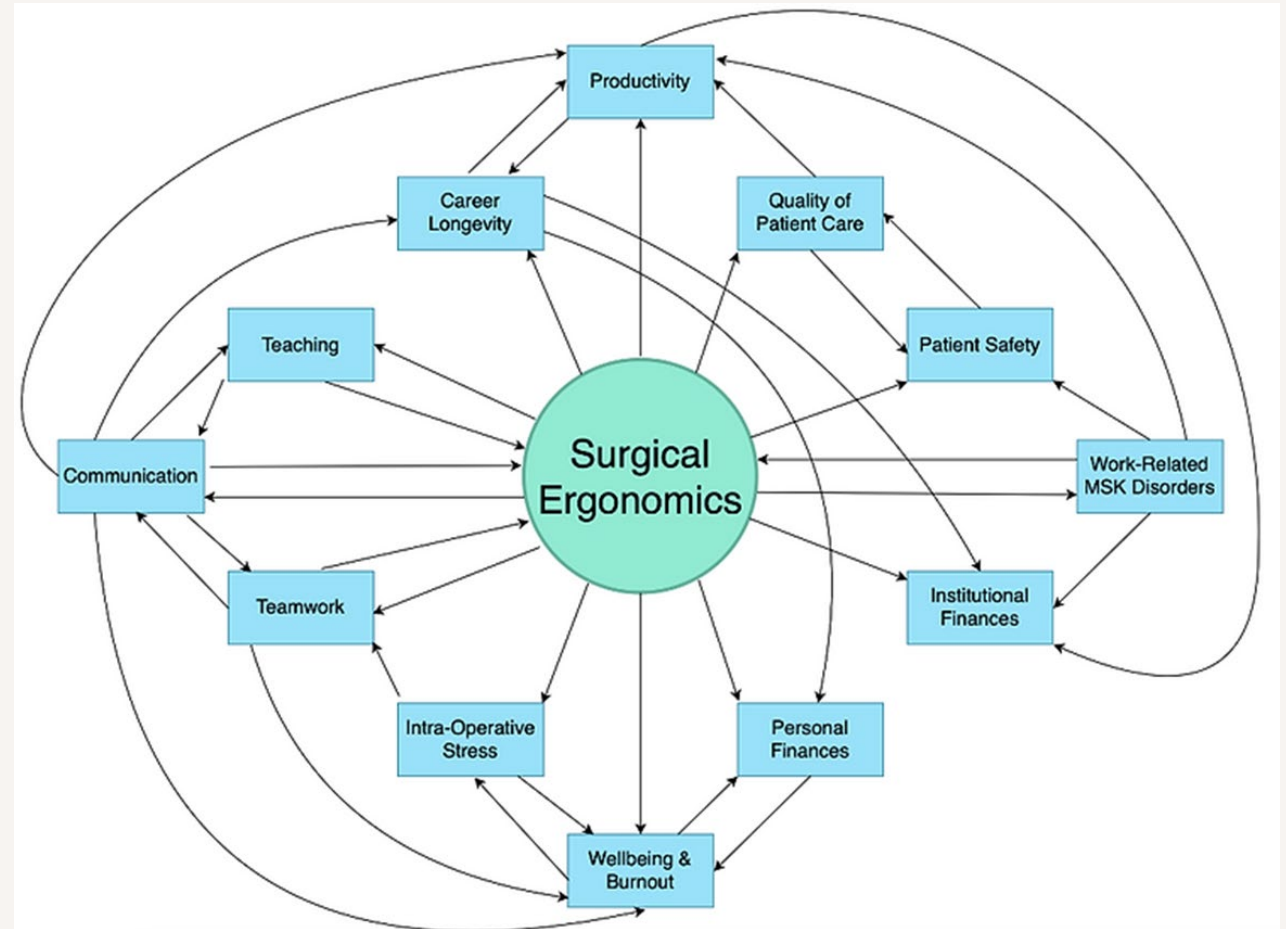
- **Balances innovation with evidence needs:** Enables conditional approval while evidence develops.
- **Addresses real-world implementation:** Captures cross-specialty impacts and potential system-level benefits.
- **Supports timely access:** Enables NHS to maximise benefits by streamlining adoption without waiting for 'perfect' evidence.
- **Allows for active learning:** Creates structured framework to collect appropriate outcomes data.

Early value assessment: bridging innovation and evidence gaps

- NICE launched in 2024 2 early value assessments (EVAs) for robotic-assisted surgery:
 - Multitech and multi-indication evaluations.
 - One EVA focusing on soft tissue procedures.
 - One EVA on orthopaedic procedures.
- Key considerations for the value proposition of RAS for soft-tissue were that:
 - RAS can make minimally invasive surgery an option for some procedures and for people who did not have this option before.
 - These technologies aim to improve recovery times, reduce complications, and help the NHS streamline access to minimally invasive techniques.
 - Improved ergonomics with robot assistance makes it easier for surgeons to do technically challenging surgery.

Surgeon-related outcomes in RAS

The Society of Surgical Ergonomics is a non-profit organisation founded in October 2020 to address the professional needs of surgeons and proceduralists in their interactions with their procedural environments (ergonomics) to improve their well-being, quality of life, and career longevity.



<https://www.societyofsurgicalergonomics.org/about>

The evaluation approach

- Balancing innovation with an earlier indication of which technologies meet high priority needs:
 - Reviews of clinical effectiveness.
 - Cost-effectiveness modelling focusing on the NHS context.
 - Patient and clinician input on experience and workflow impacts.
 - Recognition of both direct clinical outcomes and indirect system and surgeon benefits
- NICE guidance has identified promising benefits with RAS based on published evidence and expert and patient views while acknowledging evidence gaps.
- Draft recommendations have signalled conditional approval, marking a step forward to streamline timely access to RAS in the NHS.

Managing the risks associated with RAS

- Early economic modelling suggests that RAS for soft tissue procedures could be cost-effective in the long term, especially when replacing open surgery. However, there are significant initial costs for purchasing and maintaining the technology and evidentiary uncertainty about long-term outcomes.
- Different costing structures may affect cost-effectiveness and feasibility.
- Minimally invasive surgery is less common in deprived NHS areas. Lower uptake of robot-assisted surgery in some parts of England, with most high-volume centers around London, could worsen equality issues.



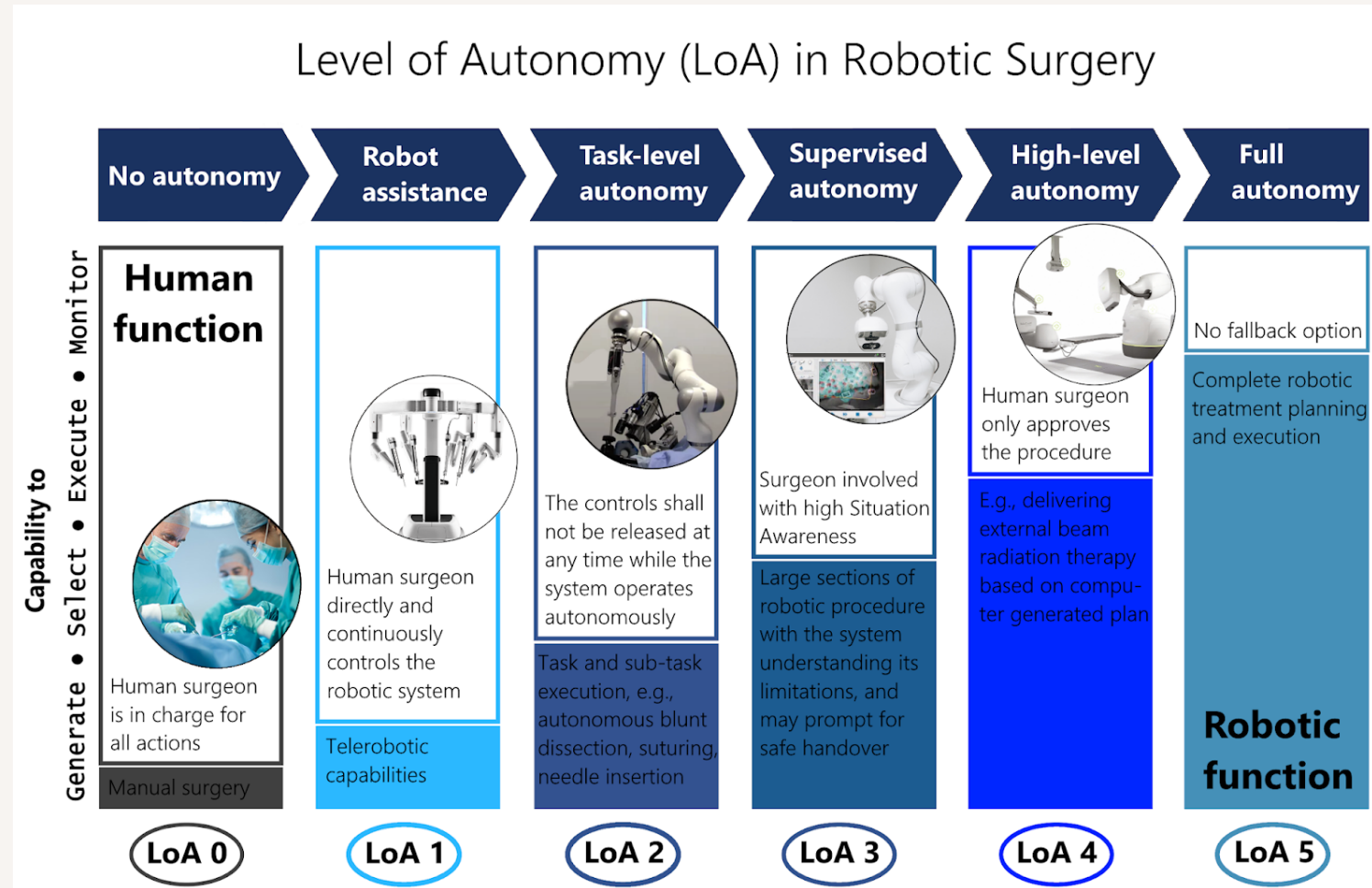
NICE's evidence generation and monitoring approach

- Conditional approval means ongoing data collection is required.
- Initial 3-year evaluation period with annual monitoring of progress.
- NICE can withdraw approval if evidence generation conditions not met.
- We've established specific outcomes measures for NHS trusts to report:
 - Clinical outcomes (for example complication rates, length of stay, functional recovery).
 - Resource utilisation (theatre efficiency, staffing requirements).
 - Patient experience outcomes.
 - Learning curve data for surgical teams.

Guidance that is useful and usable

- Multi-indication evaluation at the platform level reflecting real world usage.
- Holistic approach to value proposition acknowledging the modelling challenges.
- Clearly identifying main drivers of cost and giving commissioners more tools to understand budget impact.
- Setting key outcomes for continuous evidence generation from NHS usage.
- Setting expectations for usage to be linked to evidence generation and a post-guidance mechanism to monitor that.
- One of our best examples in HealthTech of working proactively with system partners to achieve guidance that is timely, usable, relevant and with the greatest impact.

A glance into the future



[Project information | Robot-assisted surgery for soft-tissue procedures: early value assessment | Guidance | NICE](#)

[Project information | Robot-assisted surgery for orthopaedic procedures: early value assessment | Guidance | NICE](#)

