

A helping hand: The use of robot-assisted surgery in the UK

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Executive summary

In simple terms, robot-assisted surgery refers to a type of surgery where a robot is used to assist the surgeon in performing a procedure. With extensive planning, involving surgical technicians, the robot supports the surgeon, allowing them to make the most of their time and skills.

The robot provides precise movements and enhances the surgeon's capabilities, often allowing for more precision and flexibility in complex surgeries. It's like having a high-tech assistant helping the expert surgeon during the operation.

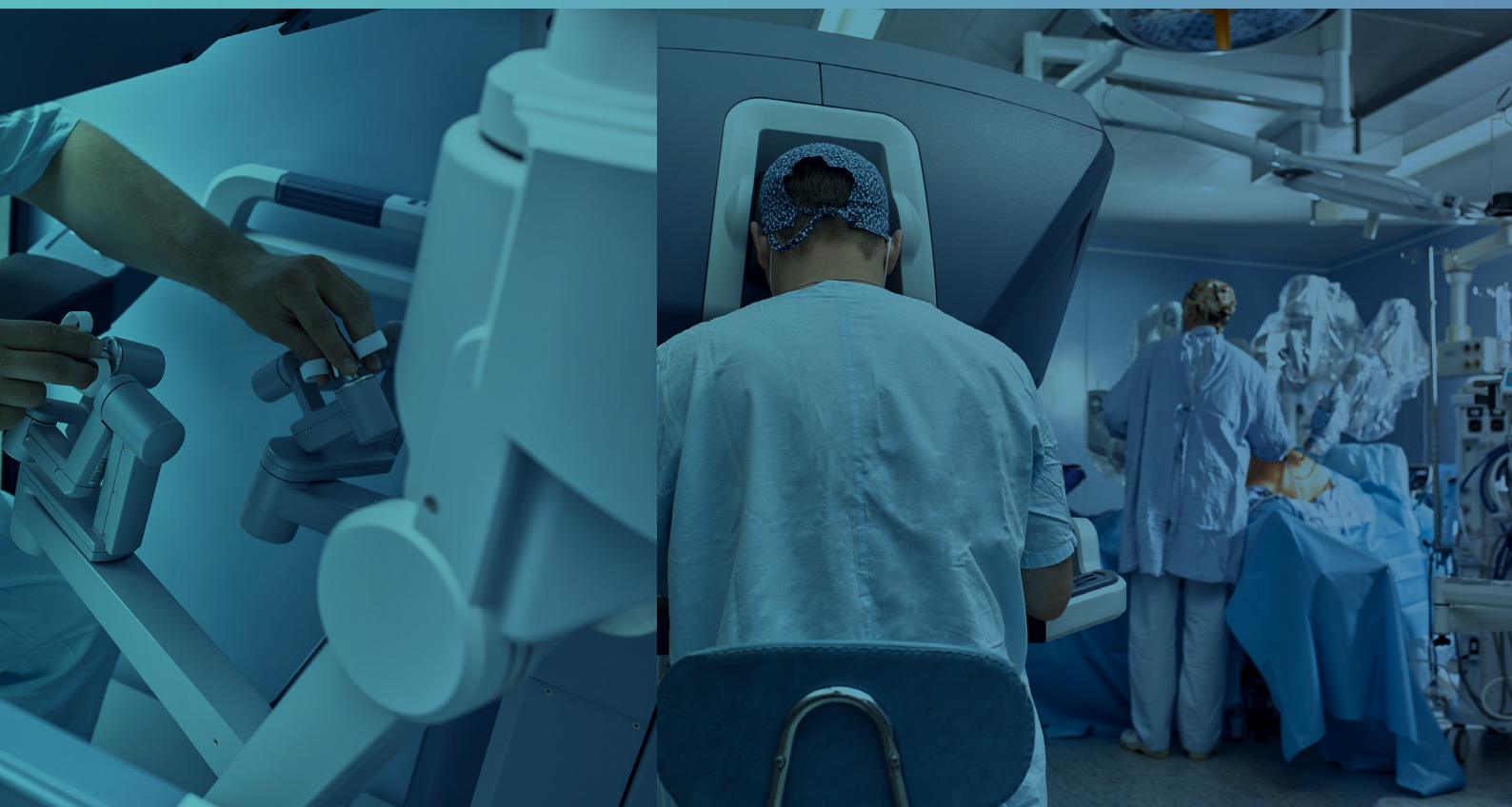
Our data shows that there has been a dramatic rise in the number of robot-assisted surgeries taking place in the UK over the past seven years.

Between 2016 and 2023, there was an overall rise of 524% across the NHS and independent sector in robot-assisted surgeries. However, when the independent sector is looked at on its own, the growth was even more significant at 1,370%.

As well as the overall volume, the variety of procedures using robots for assistance is increasing.

Having robot assistance can aid accuracy meaning less invasive surgical approaches are possible, meaning better outcomes for patients. Our data shows efficiencies with:

- improved recovery rates
- fewer complications
- opportunities to reduce waiting lists.



Robots are most often used on the highest volume procedures, such as hip and knee replacements. Being able to use them to speed up procedures and reduce complications helps surgeons to conduct more of the types of operations most people are waiting for.

Robot-assisted surgery is most commonly used for total excision of prostate and capsule of prostate procedures, and this specialty has done a great deal to advance the use of robotics in surgery.

Looking at the trajectory in the growth of this type of surgery so far, and knowing what is possible, we don't see why there wouldn't continue to be huge increases in the use of robotic assistants. Although they are expensive, private hospitals often have the budgets to purchase them and ensure that as many patients as possible are treated as soon as possible.

Overall, the surgical and economic benefits point toward greater use of robots imminently, especially in orthopaedics and urology. As artificial intelligence develops it can only further assist this valuable new technology.

This report focuses on the complete years 2016 to 2023 to allow appropriate comparison. The final sector contains data on Q1 2023 (the latest available data) to give the most up-to-date view of the situation.

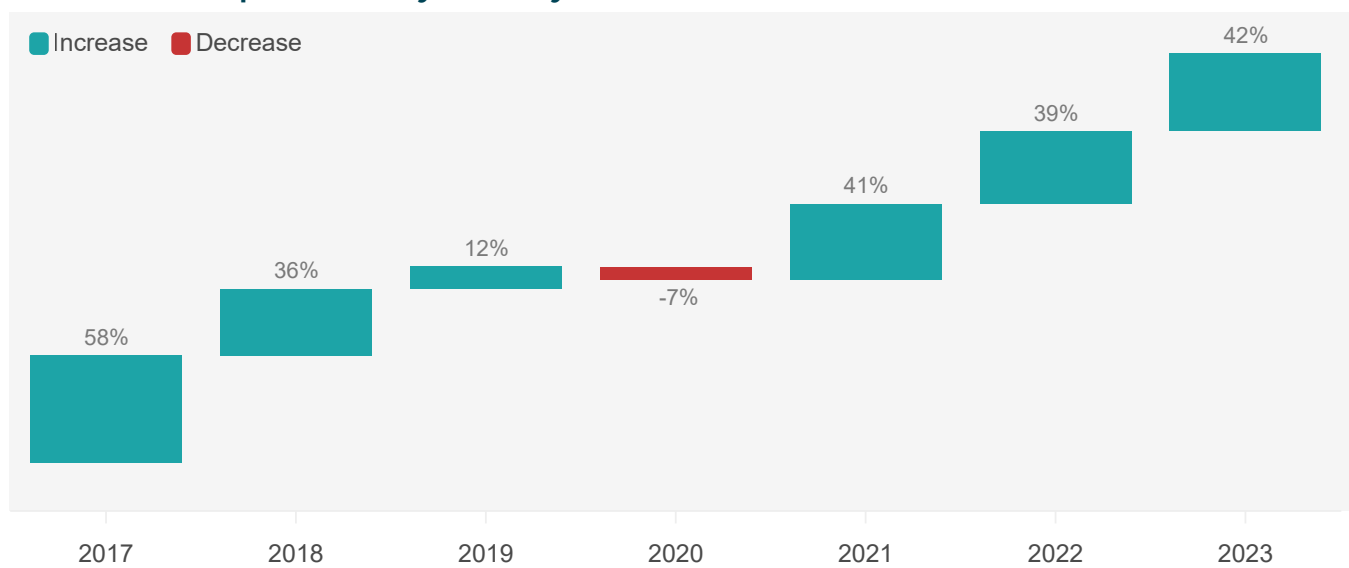
Chapter 1

Procedure volumes

Between 2016 and 2023, there were a total of 259,000 robot-assisted procedures carried out in the NHS and private sector. This represents a 524% increase since 2016 (11,180 procedures) to 2023 (69,795 procedures).

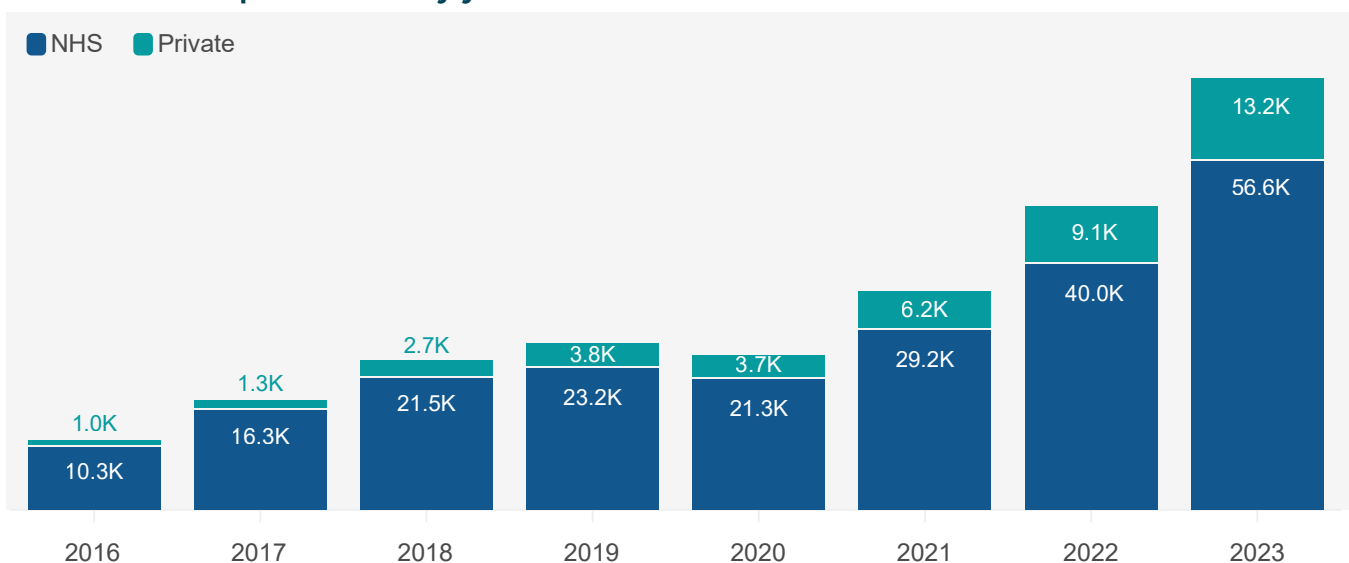
There was an average annual increase in robot-assisted procedures from 2021 to 2023 of 41%.

Robot-assisted procedures year-on-year increase



In terms of procedure volumes, the NHS unsurprisingly led the way with the majority of robot-assisted being conducted in public sector (218k), compared to (41k) in the private sector.

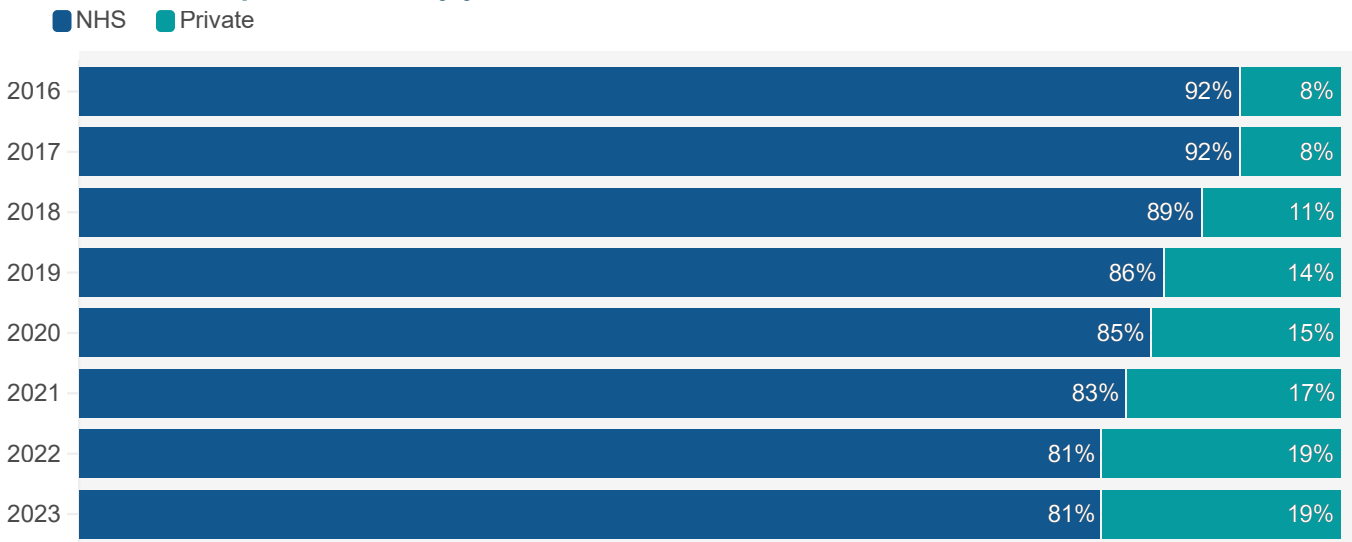
Robot-assisted procedures by year



However, the situation is different in terms of percentage growth, where the private sector saw a 1,370% increase within the same time period.

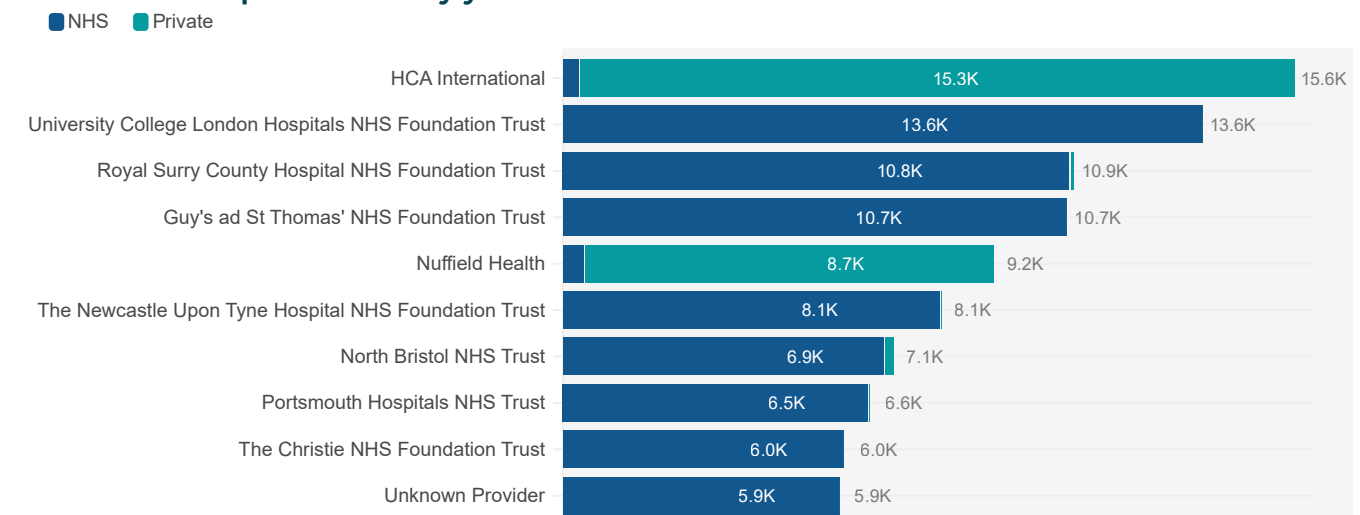
The proportion of procedures being carried out in the private sector also increased every year between 2017 and 2022, rising from 8% to 19%. It remained at 19% in 2023.

Robot-assisted procedures by year



HCA International carried out the most robot-assisted procedures (15,615 from 2016-2023) followed by University College London Hospitals NHS Foundation Trust (13,640) and Royal Surrey County Hospital NHS Foundation Trust (10,900).

Robot-assisted procedures by year



Chapter 2

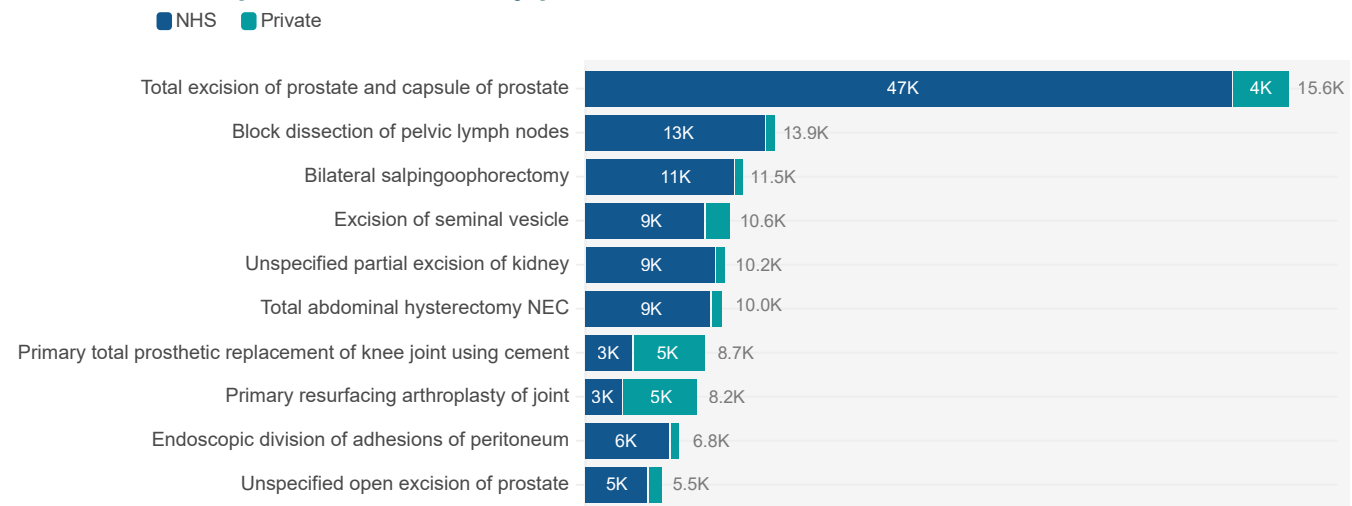
Primary procedures

There were 392 unique procedures done using robot-assisted surgery in 2016. In 2023 that had increased to 1,280 unique procedures, an increase of 227%.

There were 1,130 unique procedures in the NHS and 489 unique procedures in the private sector in 2023.

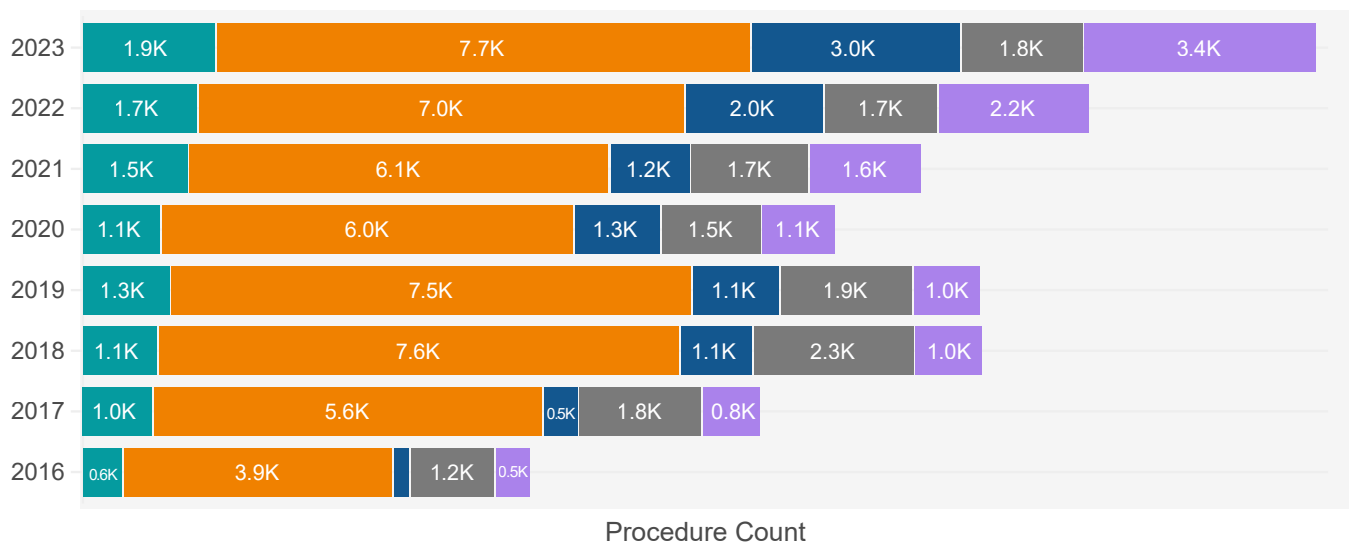
The top 10 procedures are:

Robot-assisted procedure totals by procedure 2016-2023

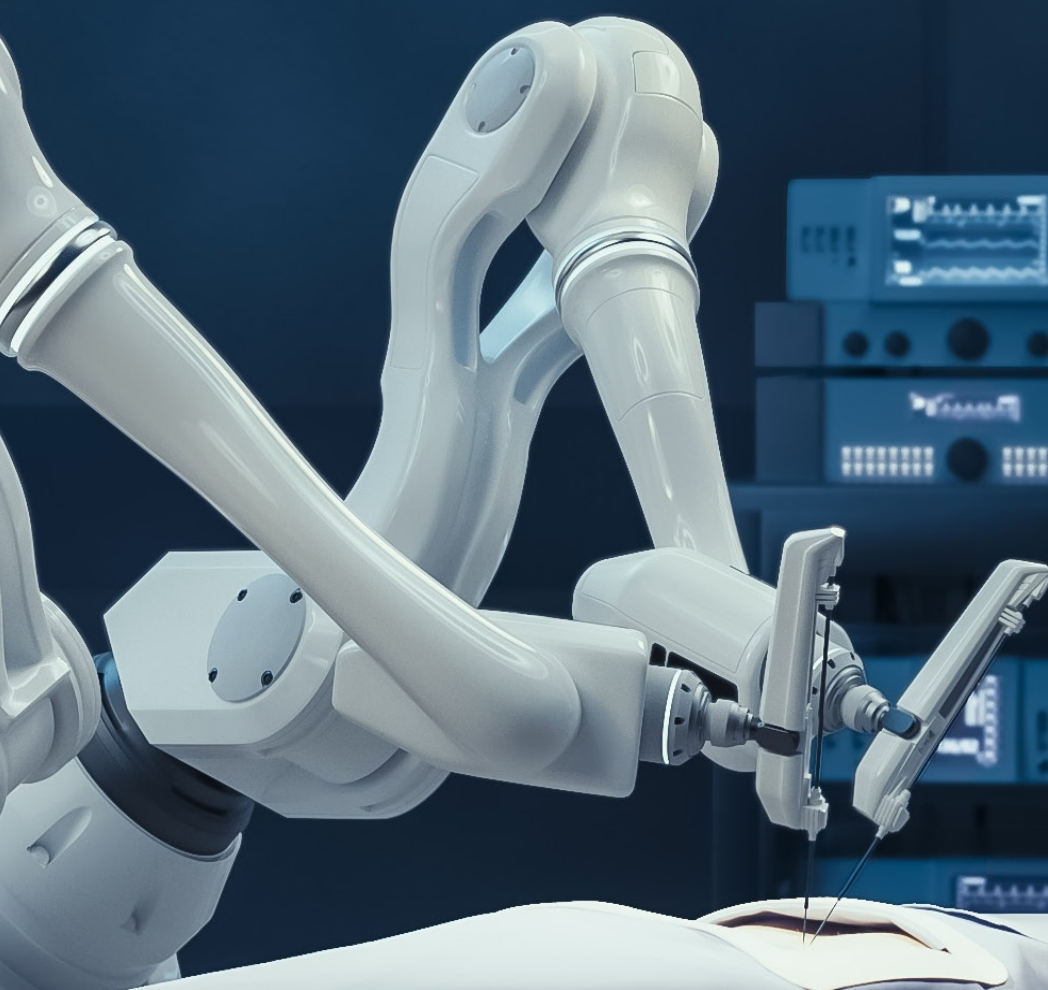


Overall top 5 robot-assisted procedures by year and primary procedure

■ Unspecified partial excision of kidney
 ■ Total excision of prostate and capsule of prostate
 ■ Excision of seminal vesicle
 ■ Block dissection of pelvic lymph nodes
 ■ Bilateral salpingoophorectomy



Procedure Count

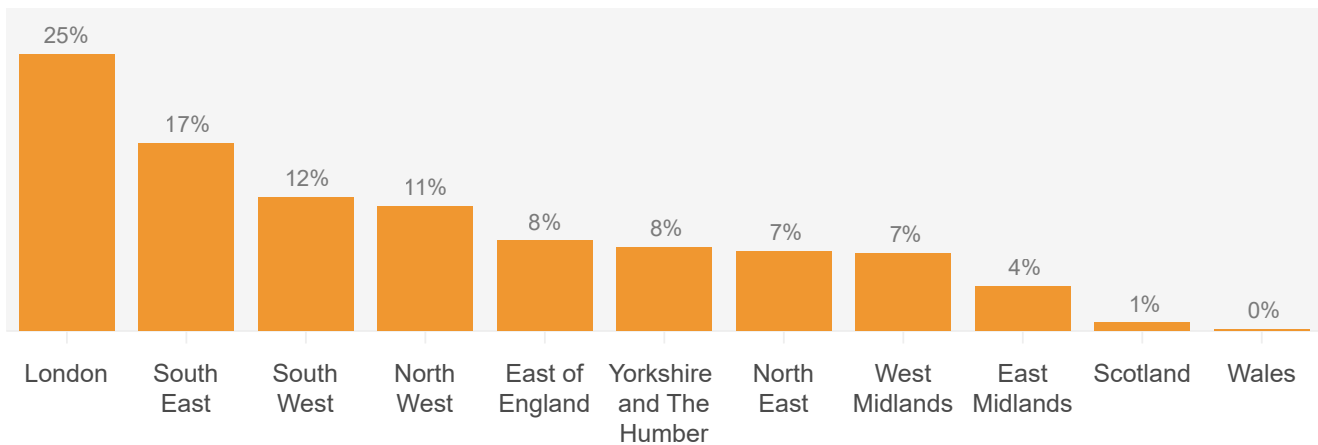


Chapter 3

Where are robotic-assisted procedures being conducted?

London led the way for robot-assisted procedures with a quarter (25%) of all NHS and private sector operations happening in the capital. The next highest regions were the South East (17%) and the South West (12%) and North West (11%).

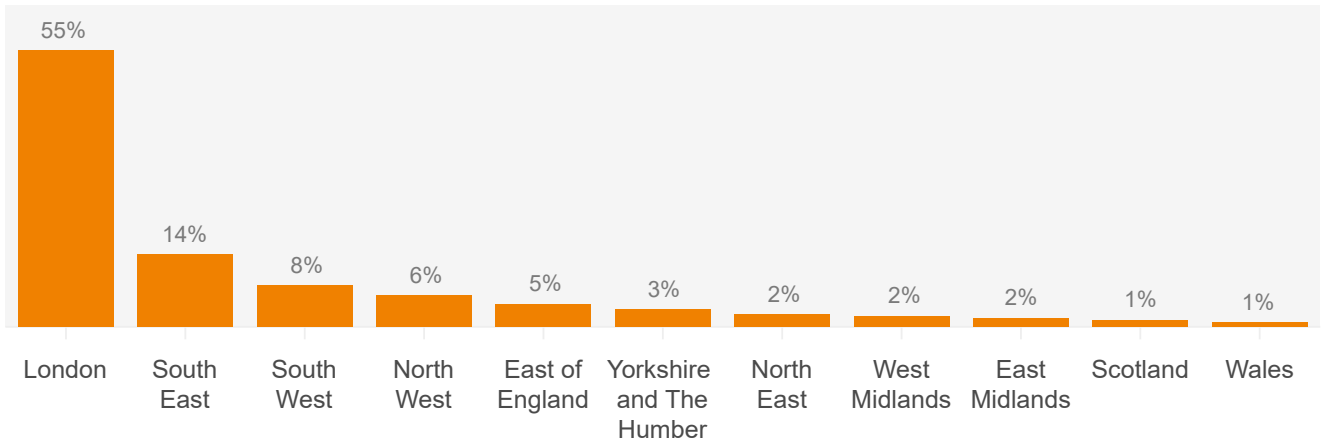
Robot-assisted procedures by region (percentage of total)



For NHS procedures only, most procedures were still carried out in London (joint with the South East), but at a lower percentage (19%) than for the combined sectors. The North West and South West carried out the next highest levels (12%).

In the private sector, a greater percentage of procedures (55%) happened in London with 14% in the South West and just 8% in the South East.

Private robot-assisted procedures by region (percentage of total)



When looking at providers, University College London Hospitals NHS Foundation Trust was responsible for 6.2% of NHS robot-assisted procedures, while HCA International was responsible for 37.3% of private sector robot-assisted procedures.



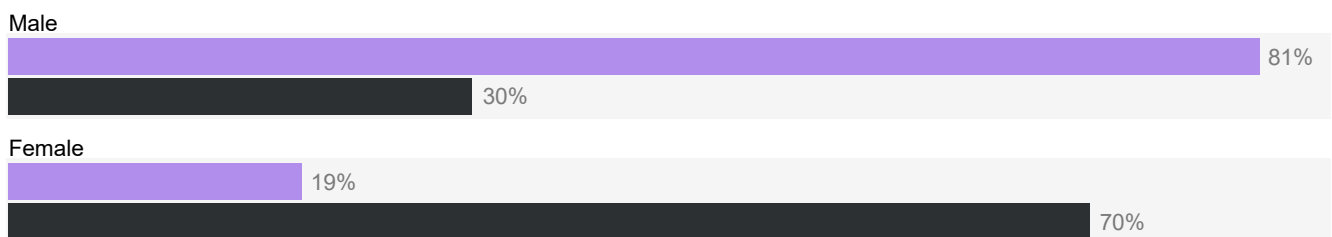
Chapter 4

Who are robotic-assisted procedures being conducted on?

More men than women have robot-assisted surgery in the NHS, which is perhaps unsurprising given the prominence of prostate treatments in this type of operation.

Percentage of procedures by gender

■ % Robot-assisted PercentageSpread ■ % Non Robot-assisted PercentageSpread

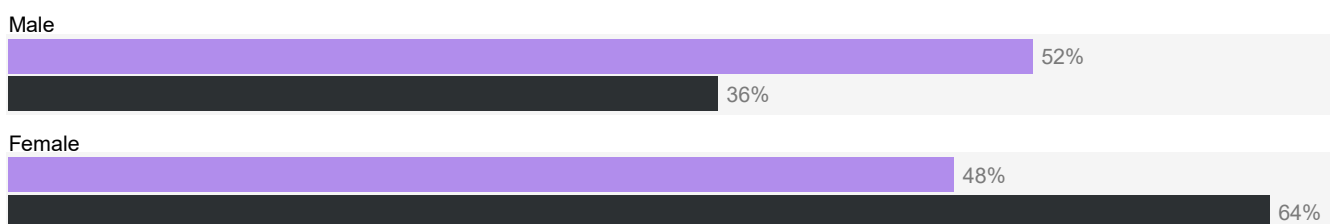


However, even when gender specific procedures are removed, there is still a slightly higher number of male patients (52%) receiving robot-assisted surgery compared to female patients (48%).

In the private sector, once gender specific procedures are removed then the balance between male and female patients is equal.

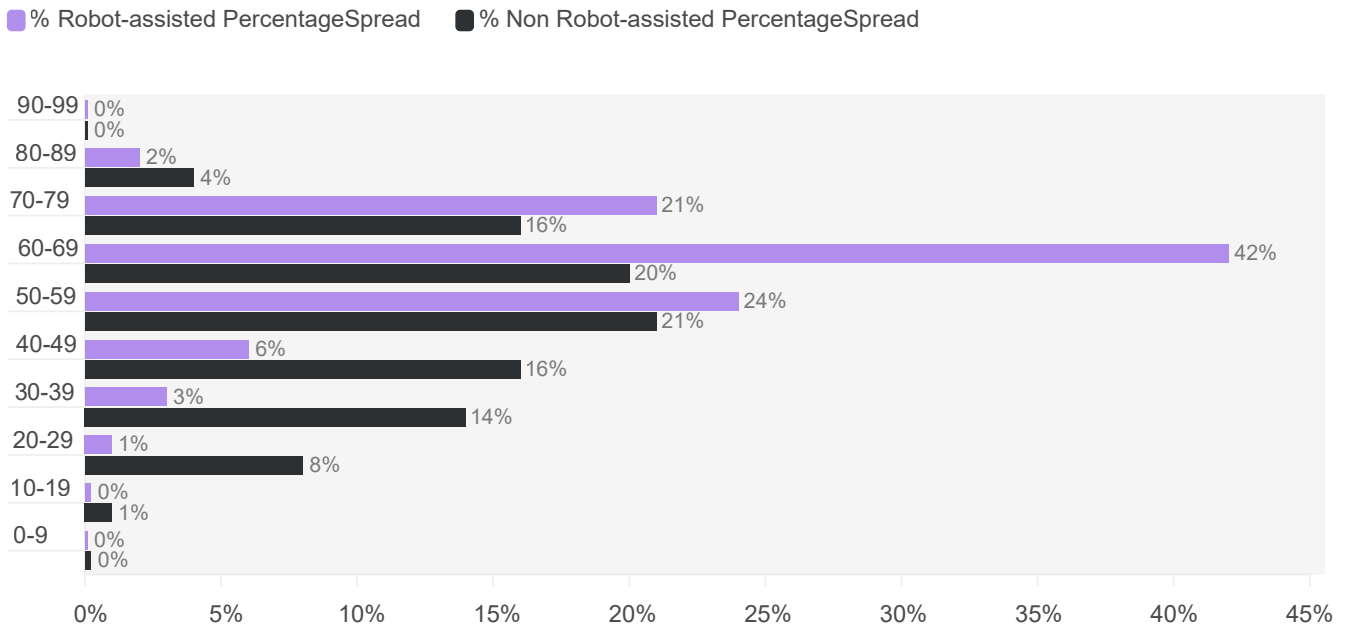
Percentage of procedures without and gender specific procedure

■ % Robot-assisted PercentageSpread ■ % Non Robot-assisted PercentageSpread



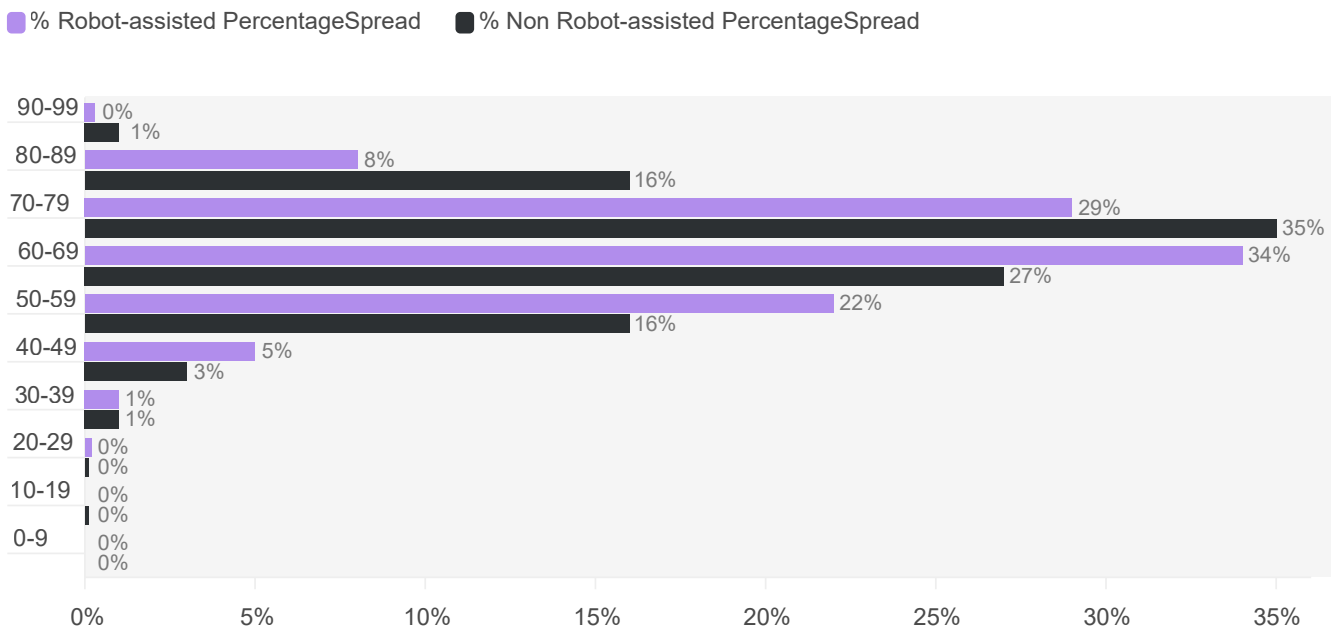
The 60-69 age group received the most (42%) of NHS robot-assisted procedures followed by those aged 50-59 (24%) and 70-79 (21%).

Percentage of NHS procedures by age band



The same age groups were also most frequently operated on with robot assistance in the private sector, with ages 60-69 (34%) followed by ages 70-79 (29%) and 50-59 (22%).

Percentage of private procedures by age band



Chapter 5

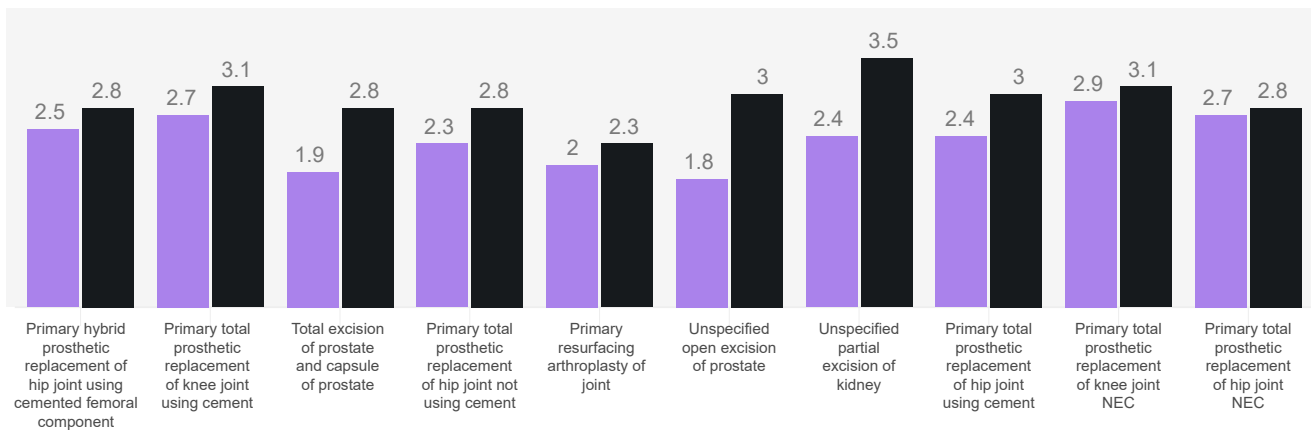
Impact on length of stay

Any new technology needs to offer the potential for a return on investment, and using robots in healthcare is no different. Improvements in patients' length of stay (LoS) is one method of measuring this.

Mean LoS for all Top 10 private procedures are lower when using robot-assisted procedures, sometimes with a difference of more than a day.

Private mean length of stay per primary procedure (robot-assisted vs non robot-assisted)

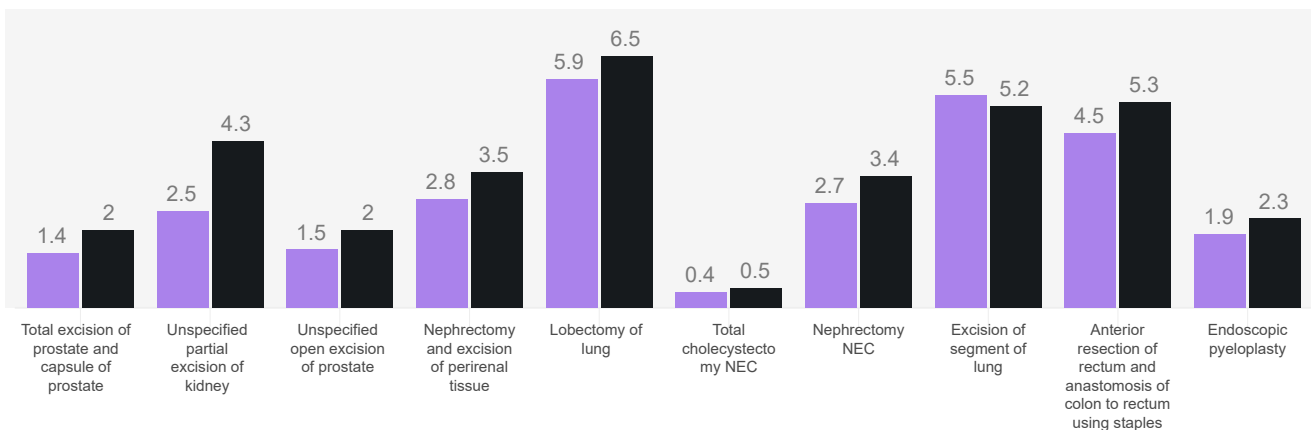
■ % Robot-assisted PercentageSpread ■ % Non Robot-assisted PercentageSpread



The NHS follows a similar pattern, however, mean LoS is higher for one of the Top 10 NHS procedures; 'Excision of segment of lung'. Variations in improvements are likely to be due to the greater range and complexity and volume of procedures using robot-assisted procedures in the NHS, compared to the private sector.

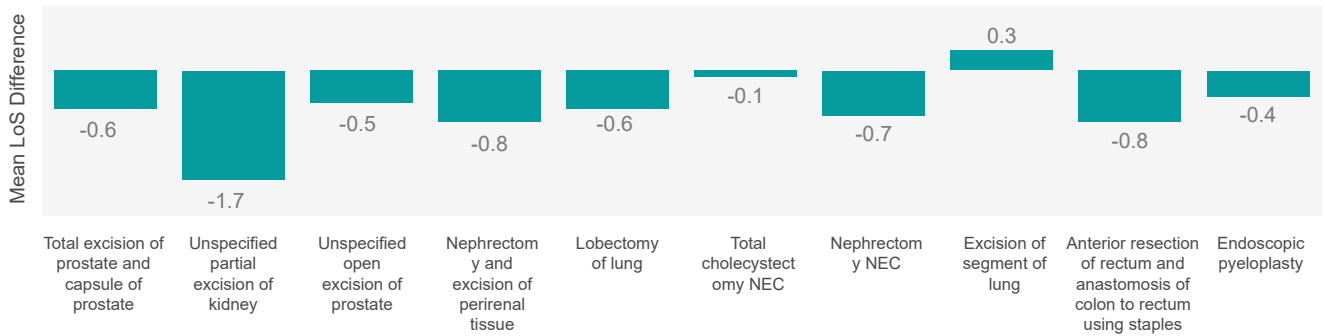
NHS mean length of stay per primary procedure (robot-assisted vs non robot-assisted)

■ % Robot-assisted PercentageSpread ■ % Non Robot-assisted PercentageSpread

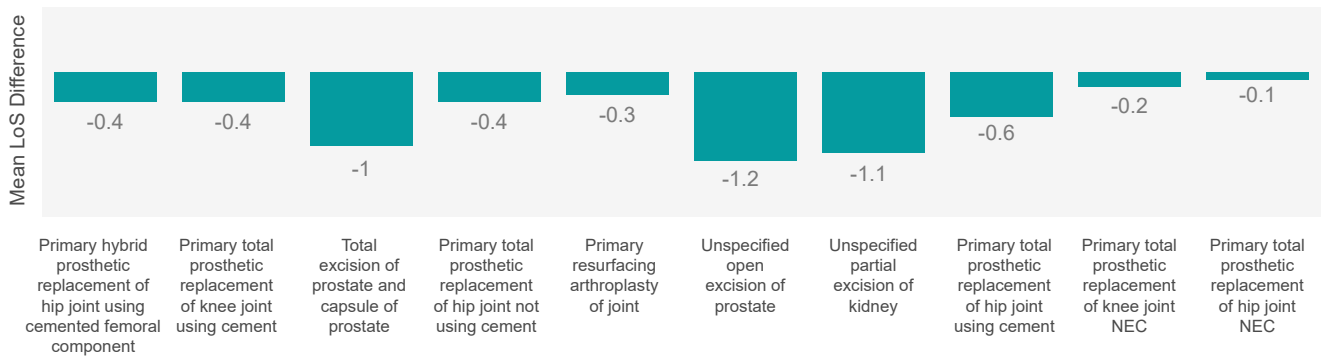


The difference in impact on LoS, for different procedures can be seen if the figure below:

NHS: top 10 robot-assisted by procedures mean length of stay difference (days)



Private: top 10 robot-assisted by procedures mean length of stay difference (days)



The count of Top 10 procedures for robot-assisted procedures still pales in comparison to non-robot assisted procedures that have thousands more for the same procedures in the NHS and private sectors.

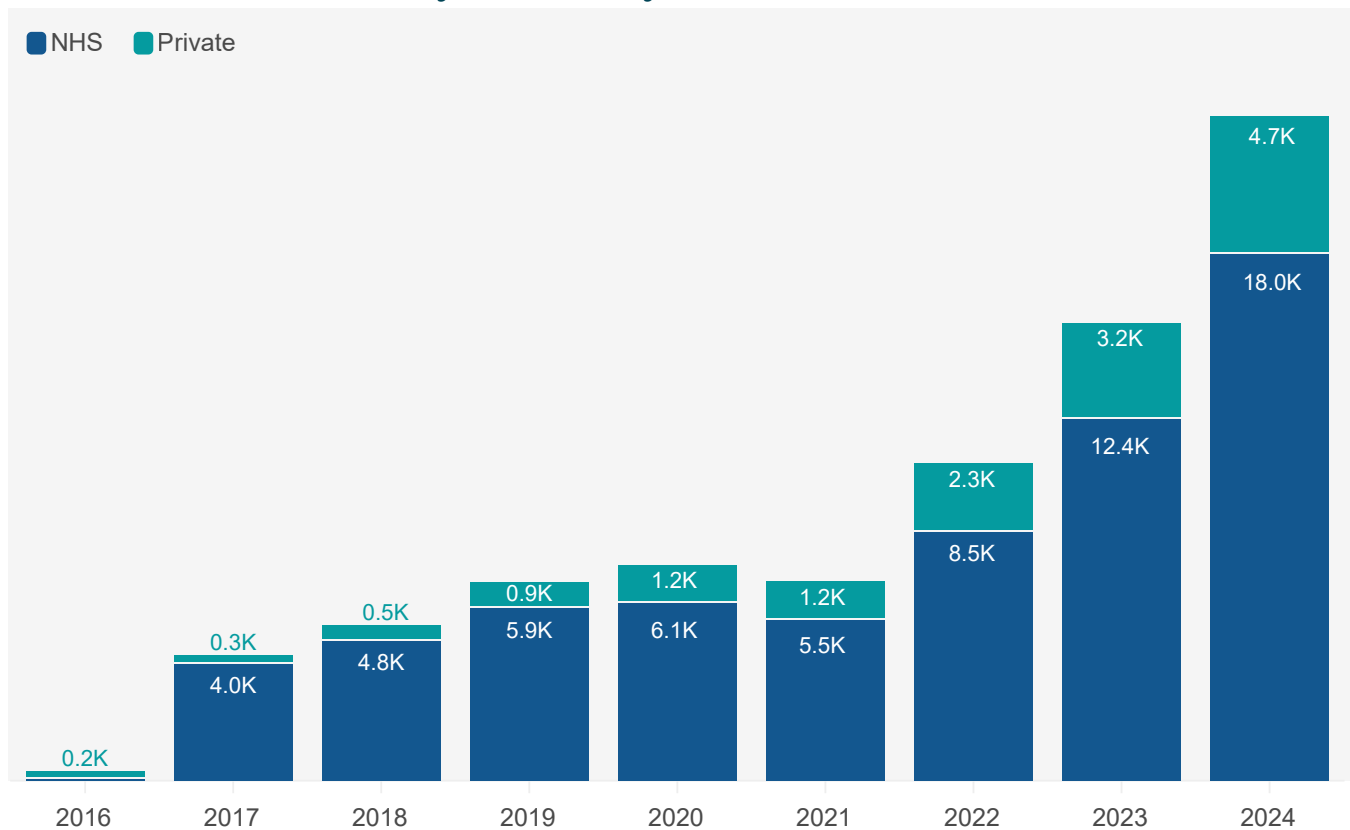
Chapter 6

Latest quarterly trend (Q1 2024)

There were 22,700 robot-assisted procedures conducted in Q1 2024. This represents an increase of 45% for the combined NHS and private sector, when comparing Q1 2024 to the equivalent quarter the previous year (Q1 2023) and a 12% increase on the previous quarter (Q4 2023).

Q1 2024 saw more robot-assisted procedures conducted in both the NHS and private sector than any other quarter since data began being collected (Q1 2016). The growth rate was marginally higher from Q1 2023 to Q1 2024 (45%) than it had been for the same quarters in 2022 to 2023 (44%).

Robot-assisted Procedures by Year (Q1 only)







Chapter 7

Conclusions

The rapid rise in the use of robot-assisted surgery appears to be something to be welcomed in both the NHS and private sector. Although the technology is expensive, there are clear benefits to patients and healthcare providers in terms of outcomes. The less invasive type of surgery means that patients can recover faster, reducing their length of stay, freeing up beds and potentially helping to reduce waiting lists.

The range of procedures using robot-assistance is expanding rapidly, and while it is currently being used for male specific procedures, specifically prostate surgery, this is likely to expand to female specific surgery too.



Chapter 8

What is it like to receive robot-assisted surgery? – a patient's story



Simon from Yorkshire had a problem with his hip which was limiting his mobility. He explained that: “any twisting motion of my hip caused me great pain”. After thorough examination and diagnostic testing, his doctor told him he had osteoarthritis, a degenerative joint disease. Simon wanted to return to his active lifestyle, so decided to look to the private healthcare system to get surgery done quickly and relieve his symptoms. Here we share his story.

Choosing a consultant surgeon for hip surgery

Simon understood that you have a lot of choice in the private sector and researched his options for his hip replacement surgery thoroughly. During this research, he found videos on Nuffield Health's Leeds Hospital YouTube channel featuring Consultant Orthopaedic Surgeon, Mr James Hahnel.

Our research, published in Patient perspectives emphasised the importance patients place on consultants who care, and Simon was struck by Mr Hahnel's warm and approachable demeanour, as well as being impressed with his excellent surgical success rates and patient satisfaction statistics. This type of information is included in the consultant profiles on PHIN's website.

Simon was keen for his consultant to have both remarkable technical skills and a genuine interest in patient well-being, and felt that Mr Hahnel met these criteria and chose him to conduct the hip replacement surgery.

Consultant excellence assisted by robotic precision

Mr Hahnel uses groundbreaking Mako Robotic-Assisted Arm technology to assist his hip replacement surgeries at Nuffield Health Leeds Hospital. One of the most significant benefits of this approach is the precision it offers. By combining Mr Hahnel's expertise with robotic assistance an unparalleled level of accuracy in implant placement can be achieved. Our data on robotic-assisted surgery shows that this can lead to benefits for the patient including a reduced length of stay in hospital.

Preparing for robotic-assisted hip surgery

In the run up to his surgery, Simon engaged in 'prehabilitation' exercises given to him by his healthcare team. These were designed to strengthen the muscles surrounding the hip and maintain his overall physical fitness.

This isn't an easy process, but Simon persevered and despite the pain, remained active, by taking part in Pilates, and going dog walking and cycling. Maintaining or improving physical fitness levels prior to surgery is important as it allows the body the opportunity for a quicker and easier recovery.

The surgery

Following a personalised pre-operative plan created using advanced imaging technology, the hip replacement went as planned, and the implant fit Simon's anatomy perfectly. This optimises long-term functionality and reduces the risk of complications.

After surgery

Post-surgery, Mr Hahnel's approach is to educate his patients about their body and its limitations. By doing this he empowers them to recognise when it's necessary to stop or moderate their activities. He says: "the idea is that the patient can resume normal life quicker and listen to their body. We found that if patients follow this pathway their functional outcome score is better than those who follow precautionary pathways."

Recovering from a hip operation

Simon's journey to recovery began with a few cautious steps after surgery. Helped by his team of dedicated physiotherapists, he then committed to a set of exercises designed to help him regain strength and mobility.

After a while, Simon decided to move onto an exercise bike to ease his hip into the motions of cycling. "I did a minute or two a day on the exercise bike and would build that up day on day, very slowly. Then I was able to increase the resistance on the device so I could push a bit harder" he explained. Within a month of his operation Simon was able to cycle 20 miles.

A pain-free hip

After just six months, Simon's new hip had restored his hip joint's functionality, and he could move and exercise without pain. He can now once again cycle his beloved neighbourhood trails and go trekking through beautiful country sides with his wife.

The fact that Simon has been able to move from a life constrained by hip pain, to the active lifestyle he used to have, is a testament to the remarkable synergy between skilled surgeons like Mr James Hahnel and groundbreaking technologies like the Mako Robotic-Assisted Arm. Harnessing the precision and customisation of technology and with surgical expertise in this way, means patients like Simon can once again embrace life with joy and enthusiasm.

Disclaimer

We are very grateful to Simon and Nuffield Health – one of the UK's major private healthcare provider – for giving us permission to share this story so that other patients better understand what it can be like to be a private patient.

PHIN only provides information, we do not recommend individual hospitals, consultants or funding methods, and recommend you make sure you look into all your options before making your healthcare decisions.

Some patients will base their choice on the price (if they are self-pay) of the procedure, others will follow the recommendations of their private medical insurer. Other patients will focus on the consultant's experience or the potential for a new technology or a new technique to be used.

PHIN's vision:
Everyone can
make confident
choices about
their healthcare
to get the best
outcomes.

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