

Robots in healthcare

Growth in the global market for healthcare robotics has been driven by rapid **technological advancements**, the **ageing population**, increased volumes of surgery and the pursuit of **high-quality, cost-effective, minimally invasive care**.

The Australian Unity Future of Healthcare Fund (Fund) has positions in listed medical device companies poised to take advantage of these drivers and market shifts.

Company	Portfolio weighting as at 21 Feb 2022
Medtronic (MDT)	2.32%
Zimmer Biomet (ZBH)	2.13%
Intuitive Surgical (ISRG)	0.89%
Total	5.34%

The healthcare robotics market

The global healthcare robotics market is projected to reach USD 22 billion dollars by 2027³. The largest market, robotic surgery, is expected to grow to USD 9.54 billion by 2027⁴.



USD 5.46bn in 2020¹



CAGR of 24.6%²

Intuitive Surgical

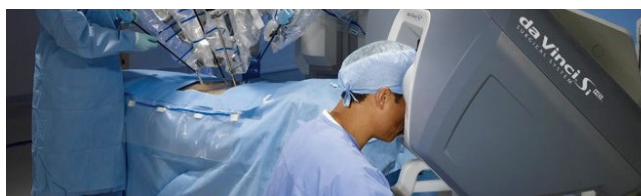
Global leader, Intuitive Surgical, has a series of patents expiring in 2022 bringing wave of innovation and new entrants to what traditionally has been a highly concentrated market. Despite this, the Fund is attracted to Intuitive Surgical's market positioning and substantial cash balance (due to existing customers).

The first mover advantage is significant, with more than 5,000 units placed in hospitals around the world, with many surgical staff already trained on the da Vinci robot. Training time is a significant consideration for hospitals, and this will limit the number of different systems offered in each hospital. This important human factor favours the incumbent.

Types of healthcare robots

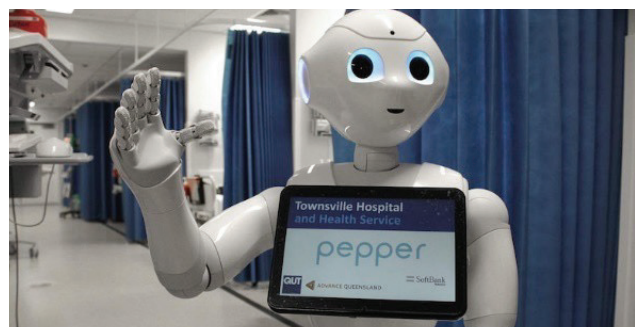
Surgical robots

Robot-assisted surgery refers to the use of computer-controlled robotic "arms" to guide cameras, imaging tools and miniaturised surgical instruments. They may be used for pre-operative planning and/or the actual surgery⁵. During procedures, a surgeon views and directs the robot from a console in the operating theatre, like a video-game. The master-slave robotic system means the robot is exclusively controlled by the surgeon and makes no autonomous movements.



Service robots

Service robots aim to improve operational efficiency by easing pressure on nurses and doctors. They usually complete pre-programmed tasks such as dispensing medications, disinfecting rooms, delivering food or bedding and patient triaging⁶.



A history of robots in hospitals

As early as 1985, researchers were attempting robot-assisted surgery. The first approved was the PUMA 560 robotic surgical arm, used during a **deep brain biopsy** to improve the accuracy of needle insertion.

Over the same period, robots were being investigated for a raft of other hospital applications. Much of the early impetus and funding came from the US Department of Defence, who envisaged deploying surgical robots in combat. They hoped surgeons would be able to treat soldiers at a distance from the battlefield. While this vision has yet to come to fruition, 5G internet makes it a real possibility.

Following early developments, two companies rose to the forefront and dominated sales in the market:

- Computer Motion with **AESOP®**
- Intuitive Surgical with **da Vinci®**

After a lengthy **legal battle over patent infringements**, these two merged in 2003 to become Intuitive Surgical.

Outcomes of robotic surgery

Clinical

Robotic surgery has been purported to enhance the precision, accuracy and capabilities of minimally-invasive surgery.

Across some disciplines such as:



General Surgery



Gynaecology



Urology



Neurosurgery

this has allowed for:

- decreased blood loss
- less scarring compared to open surgery
- reduced surgical complications
- lower risk of infection
- decreased length of hospital stays
- quicker recovery time

However, the field has failed to consistently deliver on the clinical and financial promises, with these being highly dependent on the type of surgical procedure.

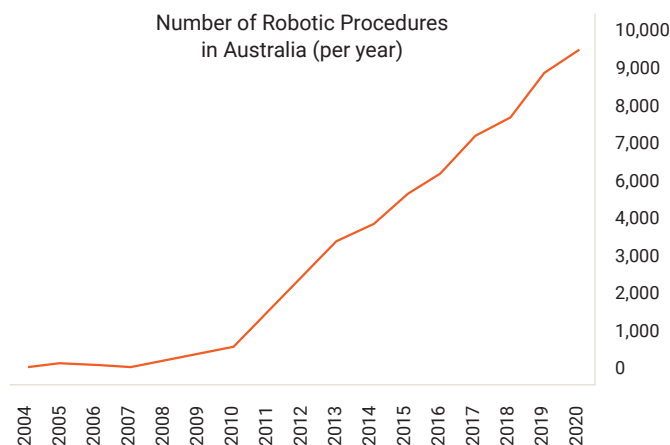
Economic

The Fund is attracted to robotic surgery given the lucrative revenue models. These cover the initial capital expenditure, yearly maintenance fees, operator training and consumables.

Moreover, the significant cost of purchase, installation and training places high barriers to switching on hospitals. Hence, the Fund backs Intuitive Surgical, who have the largest customer base in the market.

Robot-assisted surgery

Robotic surgery is very much a reality in our hospitals today. **Over 60,000 robotic procedures have been performed in Australia alone.**



Spotlight on Intuitive Surgical



AU \$3.9m

cost of a da Vinci® robot



9% of initial cost

cost of maintenance per annum⁷



AU \$2,000

average cost of consumables per case⁸

Large medical device companies have realised the value of robotic surgery, making major acquisitions to diversify their product portfolios and leverage complementary products⁹.



Robot-assisted surgery: Laparoscopy & Neurosurgery

Robotic surgery has had the largest uptake in laparoscopic applications (key hole surgeries through the abdomen). The Fund holds investments in incumbent, Intuitive Surgical and Medtronic.

INTUITIVE

Medtronic

CMR
SURGICAL

Johnson & Johnson
Google

The **daVinci®** robot has afforded Intuitive Surgical a decade-long near-monopoly on the market.

The Fund sees value in Intuitive's profit generation model, where large margins on consumables afford stable, post-purchase cash flows.

Using their cash balance of over USD \$4bn, Intuitive have focused on expanding their product line (lung biopsy robot; **ION**) and enhancing their cloud capabilities (acquisition of Orpheus Medical).

Medtronic's **Hugo™ RAS** system directly challenges the **daVinci®**, vying for a share of its market by offering superior cost per utilisation.

On the neurosurgical front, Medtronic have the **Mazor X Stealth™ Edition**. This pre-operative guidance robot responds to the demand for personalised medicine by incorporating a CT scanner to ensure optimal implant selection and alignment.

Medtronic leverages these robots to generate sales for complementary medical devices such as their spinal implants.

CMR Surgical is a newcomer to the field, focusing on affordability.

Their **Versius®** for general surgery improves the ease of manoeuvring between operating theatres to maximise utility. Uniquely, they've adopted a **subscription revenue model** where robots are leased (inclusive of consumables and instruments).

This model hopes to expand to new markets, capturing smaller hospitals and developing health systems.

J&J have made inroads into the robot-assisted market through a stake in **Verb Surgical**.

Given Google's cloud computing, AI and operating systems capabilities reach far beyond any other healthcare robotics company, this joint venture has garnered significant interest.

However, details of the general surgery robot are yet to be released.

Robot-assisted surgery: Orthopaedics

Orthopaedic surgery is ideally suited to robotic surgery. Pre-operative robots can enhance implant positioning and surgical robots can improve post-operative outcomes.



Leading orthopaedic companies have rapidly added surgical-assistive robots to their portfolios. Stryker offer a joint replacement robotic arm, while Smith & Nephew's have developed a handheld robotic device for knee replacements.



The Fund prefers Zimmer Biomet in the orthopaedics space, with their versatile ROSA® platform spanning brain, spinal, hip and knee surgeries.

Given Zimmer Biomet is heavily focused in orthopaedic products, elective procedure cancellations saw a slump in 2021 fourth quarter sales, down 2.3% over the previous year period.

However, they remain optimistic, placing greater focus on profitable hip and knee devices, while spinning out their dental and spinal offerings (ZimVie).



Towards the future 5G Connectivity

5G internet connection makes remote surgery a realistic possibility. This could be a surgeon operating the robot from a separate 'clean' room, or even from a different hospital.

Having highly-skilled surgeons operate remotely could afford all geographies enhanced standard of care.

However, there are obvious caveats being the potential legal implications, risk of network disruption, and, that any surgery requires a hands-on supporting surgical team.

Get in touch 1300 407 698

Or contact your Regional Account Manager for more information:

Adam Kirk
Head of Intermediated Markets
M 0403 515 401
E akirk@australianunity.com.au

William Orr
Regional Account Manager NSW/ACT
M 0402 620 188
E worr@australianunity.com.au

Aaron Hallifax
Regional Account Manager VIC/TAS/WA
M 0431 615 809
E ahallifax@australianunity.com.au

Dale Robertson
Regional Account Manager QLD/SA
M 0413 503 490
E drobertson@australianunity.com.au

References

1. Global-Surgical-Robotics-Market-Report-2021-Market-Generated-5-46-Billion-in-2020-and-is-Estimated-to-Reach-16-77-Billion-by-2031 2. <https://www.emergenresearch.com/industry-report/surgical-robotics-market> 3. <https://www.emergenresearch.com/industry-report/surgical-robotics-market> 4. Medical-Robotics-Market-Size-Expected-to-Reach-US-22-23-Billion-by-2027 5. <https://onelesscut.com/laparoscopic-surgery/> 6. www.abc.net.au/news/2018-08-24/townsville-hospital-robot-pepper 7. Patterns-of-care and health economic analysis of robot-assisted radical prostatectomy in the Australian public health system 8. Detailed cost of robotic-assisted surgery in the Australian public health sector: from implementation to a multi-specialty caseload. 9. therobotreport.com/largest-robotics-mergers-acquisitions-2019/

Important Information

The Australian Unity Future of Healthcare Fund comprises a stapled security of ordinary units in two managed investment schemes; Australian Unity Future of Healthcare Fund No. 1 and Australian Unity Future of Healthcare Fund No. 2. Units in Australian Unity Future of Healthcare Fund No. 1 and Australian Unity Future of Healthcare Fund No. 2 are issued by Australian Unity Funds Management Limited, ABN 60 071 497 115, AFS Licence No. 234454 ('AUFM'). Information provided here is general information only and current at the time of publication and does not take into account your objectives, financial situation or needs. In deciding whether to acquire, hold or dispose of the product you should obtain a copy of the Information Memorandum and seek professional financial and taxation advice. For more information, please visit australianunity.com.au or call our team on 1300 407 698. This information is intended for recipients in Australia only. This document is confidential and must not be distributed by the recipient in whole or in part to any other person without obtaining the prior written consent of AUFM. Past performance is not a reliable indicator of future performance.