

## In defence of the da Vinci robot

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As I write this editorial, the senior officials at the Department of Health (Western Cape) have received a letter from a respected surgeon at the University of Cape Town. This letter claims that the establishment of robotic programmes at the Groote Schuur and Tygerberg hospitals represents a “fruitless and wasteful” expenditure. Is there any basis for this assertion? What is the background to this? And should the state sector in South Africa have robotic surgical programmes? This editorial aims to address these questions.

I recently had the privilege of visiting the Duomo Cathedral in Milan, Italy. Close by, the Ambrosian Library museum houses the *Codex Atlanticus* – a huge book of sketches by the Italian Renaissance polymath Leonardo da Vinci (1452-1519). The sketches depict many ingenious inventions including various *automata*, such as Leonardo’s robotic knight, which was designed to stand, sit, cross its arms, turn its head, and lift its visor (Figure 1). In 2002, a NASA scientist faithfully built Leonardo’s design and the robot was found to be fully functional. Joseph Lister, the nineteenth-century pioneer of antiseptic surgery, with his introduction of carbolic soap handwashing, famously said: “These are exciting times to be a surgeon.” But what could be more interesting than to live in the age that da Vinci envisioned?

In 2014, the first South African radical prostatectomy was performed with the latter-day da Vinci robot, of which there are now nine in the private sector in South Africa. Greg Boustead, as proctor to many colleagues, pioneered robotic surgery in South Africa. At the Groote Schuur Hospital, we purchased a first-generation robot from Australia in 2016. We performed a small number of cases, but struggled to obtain the older disposables and the machine became a teaching tool only.

Thereafter we had a fortuitous meeting with Mark Slack, an ex-South African gynaecologist and pioneer of the Cambridge surgical robot, the Versius – recently approved for sale in South Africa. The meeting with Mark and senior hospital managers began to shift the institutional resistance to acquiring a surgical robot.

In October 2021, following some years of multidisciplinary lobbying at the Groote Schuur and Tygerberg hospitals, each acquired the da

Vinci Xi system for R 38 million per robot, via a national grant from a COVID-related underspend. Since the acquisition in 2021, 240 and 260 surgeries (from various disciplines) have been performed at the Groote Schuur and Tygerberg hospitals respectively.

The path to establishing the programme locally has been made easier by my fellow urology consultant, Dr. Samkele Salukazana, who chairs the hospitals’ robotic committee. We have received ample structured training support from Intuitive via Medhold.



Figure 1: Leonardo da Vinci's robotic knight (1494); inset shows the fully functional model (2002) of da Vinci's sketches

Dr. Conray Moolman, a private urologist, proctored our first case series. Dr. Malcolm Dewar, a part-time and private colleague as well as South Africa's only United States board-certified uro-oncologist, has been key to ensuring the safe and ongoing establishment of robotic urology surgery at the Groote Schuur Hospital.

But should there be a robotic programme in the public sector in South Africa? Given the costs involved, this is a legitimate question. Recently, I co-wrote an editorial in the South African Journal of Surgery advocating for such a programme.<sup>1</sup> Our editorial (for) elicited an invited comment (against) under the provocative title: "Implementing robotic surgery in South African training institutions: fiddling while Rome burns."<sup>2</sup> I think it helpful to quote at length from the paper's concluding remarks: "The gold standard of care is not cutting-edge care as defined in high-income countries, but it is delivering optimal, cost-effective, time-efficient, and affordable care with the available resources. While the da Vinci robot, no doubt, represents excellent technology, robotic surgery is currently inappropriate technology for public hospitals in South Africa given its high purchase price and running costs, the financial crisis in our country, and because it does not contribute to addressing our significant unmet and competing medical and surgical needs."<sup>2</sup>

Is there a counterargument to this well-intentioned and well-reasoned challenge? I'd like to outline four potential arguments in favour of robotic surgery in the state.

**1. Individual rights versus distributive justice.** Respect for autonomy, beneficence, non-maleficence, and justice are referred to as the four pillars of medical ethics. In South Africa, there is a critical need for greater distributive justice (i.e. socially just allocation of resources). Yet, as doctors, beneficence demands that we also use our expertise to give each patient the best treatment possible. Navigating between these two, at times competing imperatives, is a challenge we face daily. Remove one pillar and the building that is medical ethics falls. I believe it's about striking a balance – we need both.

**2. Training.** Our department has collaborated on several operative outreach efforts with IVUmed, an American urology outreach organisation. Their motto is: "Teach one, reach many". I think this summarises the critical role of academic medicine. Manifestly, our role is to prepare, inspire and mentor the urological surgeons of tomorrow. In South Africa, this role feels particularly acute given

the great unmet need for healthcare. We need to be training for the future and robotic surgery should, in my view, be part of our training offering nationally.

**3. Men's health.** Up to one in six men will be diagnosed with prostate cancer in their lifetime. Services for prostate cancer and men's health are generally more disproportionately underdeveloped in the state sector. We have worked hard to establish secondary-level urology care outside of Groote Schuur Hospital in the Western Cape. Additionally, we established a non-profit project (Project Peacock) to support prostate cancer care, specifically by funding our LDR brachytherapy offering. Robotic surgery is the evidence-based standard of care for several urological procedures. Along with improved secondary-level care and brachytherapy, robotic surgery should be a part of a holistic attempt to manage prostate cancer and thereby promote men's health nationally.

**4. Cost containment.** Robotic surgery is expensive, but so are other medical offerings by the state; consider transplantation and orthopaedic implants for example. At Groote Schuur Hospital, the robotic committee under the leadership of Dr. Samkele Salukazana has fostered an appreciation of the costs involved. The committee has crucially engaged with the hospital's finance leaders to define the parameters of spending on robotic surgery (and made surgical discipline allocations of a maximum number of cases per annum). This measure will deal with the potential for excessive costs transparently and equitably. Moreover, we are considering public-private partnerships to support the state sector's programme.

The establishment and maintenance of robotic surgical programmes should be part of the training and service offerings of tertiary state hospitals in South Africa. It is not, in my view, a "fruitless and wasteful" expenditure. Time will tell how these debates play out.

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