

Board of Directors Meeting: Thursday 29 January 2009

BD2009.4

Subject	Robotic Surgery
---------	-----------------

Purpose of paper	To advise the Board of Directors of the proposal to purchase a Da Vinci Surgical System. The business case outlines the benefits of minimally invasive surgery and this initiative has been supported as part of the appointment of the professor of surgery who will lead on the evaluation of this innovative technique at Oxford.
Board Lead(s)	CEO/Ms Moira Logie, Director of Operations, Division A
Background papers (if any)	Business case for Da Vinci Surgical System Financial appraisal of the purchase lease costs including revenue and capital

Action/decision required	The Board of Directors is asked to agree the acquisition of the Da Vinci Surgical System			
Key purpose	<u>Strategy</u>	Assurance	Policy	Performance
Strategic Goal(s)	SG1 - to be Hospital of Choice SG2 - to be world leading teaching hospitals and an AHSC			
Strategic Objective(s)	SO2 - to provide high quality, efficient and innovative core services that meet the needs of local patients and the challenges of the local health economy SO3 - to continue to strengthen the Trusts portfolio of specialist services and to consolidate and extend the catchment area from which patients for specialist services are drawn SO5 - to identify, evaluate, prioritise and nurture emerging services SO6 - to provide demonstrably excellent clinical outcomes and indicators of patient safety SO7 - to improve the overall patient experience by offering excellent customer care SO8 - to develop the Trust's role as an academic health sciences centre of international standing			

Links to: Board Assurance Framework/ Trust Key Risks/Annual Health Check element(s)	
Also considered by	Divisional Boards, A, B and C Planning committee; 19 th November and 10 th December
Resource and financial impact	<p>The capital cost of this proposal is £1.5 million however due to limited NHS capital the system would be leased under an operating lease. There will be small capital costs incurred in setting up the system of around £20,000.</p> <p>Robotic surgery is currently not covered by a separate tariff and the costs exceed that of an open procedure.</p> <p>Excluding the leasing and maintenance costs, a robot-assisted prostatectomy costs approximately £2074 more than the current technique.</p> <p>In addition to implementation of the surgical system to urological procedures, the DVSS used on private patients will be dependant upon pricing strategy and will in turn yield income to cover costs.</p> <p>Patients treated through the clinical trial Protect II will have consumable costs funded by <i>Intuitive</i> as agreed in December 2008.</p> <p>The proposal to acquire the system is through a lease option. Sources of fund raising have committed £700,000 towards this development, with £250,000 pending, which will be used to fund the revenue costs during the first 2 years - this minimises the financial risk to the Trust.</p>
Consideration of legal/equality/diversity/engagement issues	
Acronyms and abbreviations used	dVSS - Da Vinci Surgical System
Authors	Freddie Hamdy, Anna Bjorkstrand, Chris Taylor, Sandra Harding-Brown

The Nuffield Department of Surgery and Clinical Services at Oxford –

Business case for Da Vinci® *Surgical System (dVSS)*



Authors:

Anna Bjorkstrand, Renal Directorate Manager
Freddie Hamdy, Nuffield Professor of Surgery
Sandra Harding Brown, Renal Deputy Directorate Manager
Chris Taylor, Finance Manager

Contributions:

Ailsa White, Deputy Corporate Planning Manager
David Cranston, Consultant Senior Lecturer in Urology
Neil Mortensen, Professor of Colorectal Surgery
Tipu Aziz, Professor of Neurosurgery
Peter Friend, Professor of Transplantation
Nick Maynard, Consultant Surgeon

Synopsis

Contribution to Trust's Strategic Objectives

This business case outlines the proposal to purchase a da Vinci Robotic Surgical System (dVSS) from April 2009. This initiative, driven by Professor Hamdy, the new Nuffield Professor of Surgery at Oxford who commenced his post on 1st October 2008, forms part of key joint strategic developments between the ORH Trust and the University of Oxford. In collaboration with colleagues from both institutions, the aim is to develop a '**Centre for Evaluation of Minimally Invasive Surgery**' at Oxford, including robot-assisted laparoscopic techniques, High Intensity Focused Ultrasound treatment of cancer, and Natural Orifice Transluminal Endoscopic Surgery. Acquisition of the dVSS is a major component for this development. Whilst Urology has been the predominant user of robotic techniques in pelvic oncology (prostate and bladder cancer), utilisation is being expanded to other surgical specialties including colorectal, upper GI surgery, Neurosurgery, Vascular and Paediatric Surgery, and a number of surgeons from these specialties have expressed interest in developing robotic surgical techniques. The overarching purpose of the new Centre and acquisition of the da Vinci Robot is threefold:

1. to perform systematic evaluations of the technology and its application through well funded clinical trials led from Oxford, in order to inform policy making by government bodies including NICE; to date there has been no randomised trial of this technology worldwide.
2. to collaborate with the Departments of Bioengineering and Engineering at the University of Oxford to innovate and improve existing technology; and
3. To offer Oxford patients a comprehensive portfolio of treatments available as well as recruiting them to large - scale clinical trials conducted and co-ordinated from Oxford. This fits overall with the main strategy of the imminent Oxford bid for recognition as an Academic Sciences Health Centre.

Introduction of this technology will not only attract patients to the hospital but will also aid the recruitment and retention of healthcare professionals, including top surgical talent as activity increases. The dVSS is widely used in the United States and it is of importance to note that it has been purchased by other centres within the UK, including centres of excellence for the treatment of cancer, candidates for academic health science centre status and Trusts with neighbouring catchments areas.

Why should Oxford invest in this technology now?

- Timing for acquiring this development at Oxford is crucial. This technology has been available since 2002, and in 2007, over 60% of the radical prostatectomies performed in the US used the Da Vinci® robot. Despite this, appropriate evaluation has not been conducted in a systematic prospective manner in comparison with open or laparoscopic techniques, and UK government organisations such as NICE have not been able to make appropriate recommendations regarding its comparative treatment and cost - effectiveness.
- Professor Hamdy has been Lead Investigator of the ProtecT (Prostate testing for cancer and Treatment) since 1999 in collaboration with the Universities of Bristol and

Cambridge. This is the largest randomised controlled trial (RCT) of treatment effectiveness in men with localised prostate cancer worldwide, which closes to recruitment this year, having tested over 110,000 men and randomised 1800 patients with prostate cancer to a 3 - arm study of intervention, with an investment to date from HTA NIHR of £34 million towards this study alone.

<http://www.nccta.org/project/1230.asp>

A preliminary outline has been submitted to HTA NIHR to fund a new ambitious prostate cancer programme of research based on previous track record (see Appendix ProtecT II - study flow chart). This includes a large case - finding programme in 12 clinical centres in the UK, and evaluation of the various forms of radical prostatectomy including robotic - assisted procedures in centres which have the facility, with Professor Hamdy as the Lead Applicant. The new research programme if successful is expected to attract funding in the order of £20 million over 5 years, coordinated from Oxford jointly between the Clinical Trials Support Unit CTSU (Richard Gray and Richard Peto) and Nuffield Department of Surgery (NDS). Whilst 3 of the other centres participating in the trial have robotic surgery available in their institution (Cambridge, Manchester, Leeds), it is therefore crucial for Oxford to acquire the facility for two reasons: 1] To **qualify as lead** in conducting and coordinating the programme; and 2] To have a minimum number of centres offering the technique within the partnership and to **set the evaluation model** in collaboration with other centres.

- The development of an Oxford Centre for Evaluation of Minimally Invasive Interventions forms a **key component of the Vision Strategy** of the Academic Health Sciences Centre application, and fits well with the overall joint strategic developments of ORHT and the University.
- As the technology undergoes formal evaluation, it is likely that the majority of Oxfordshire patients will request to receive such treatments from neighbouring Trusts. Despite the recent statement made by local PCTs, the new financial case suggests the viability of the procedure compared with HRG tariff, and this will therefore result in a net loss of patients, expertise and income for ORHT.

Why should Oxford invest in technology which is no longer perceived as 'leading edge'?

There are a number of important justifications for acquiring the technology at Oxford, despite the fact that a number of Health Providers across the UK have already invested and developed robotic surgery, including neighbouring Trusts.

- **Research & Development:** Whilst the technology continues to evolve, it has a number of limitations, and its current usage is relatively narrow. Two key Academic Department within the University of Oxford have expressed a strong interest in collaborating in order to develop and innovate existing technology, not least Professor Sir Mike Brady from the Department of Engineering who had contributed to the original design of the dVSS (see attached letter), and Professor Lionel Tarassenko, Director of Institute of Biomedical Engineering (see attached e-mail message).

- Other Surgical Specialties and Novel Applications: The driving specialty for using the technology worldwide has been Urology and in particular its application to radical prostatectomy. Other surgical specialties are still at the development stage to use the technology for other pathologies and procedures, and a number of surgeons at ORH have expressed interest in performing common difficult procedures, particularly in the pelvis using the dVSS.
- Innovative Combined Techniques: The ORH specialists in Colorectal Surgery are now developing 'leading edge' surgical techniques with Natural Orifice Transluminal Endoscopic Surgery (NOTES), and the use of adjunct robotic-assisted laparoscopic techniques for the laparoscopic component of the procedures (such as magnet utilisation) would be considerably innovative and would potentially enhance the general applicability of NOTES in the future. An expert fellow in this area (Mr Ronan Cahill) is currently in post at ORH, and discussions are underway to retain his skills through a joint substantive appointment with the NDS.
- To consolidate and advance the international status of the Trust's defining services: The proposal will increase the profile of Oxford as a major Cancer Centre offering a broad portfolio of treatment options
- To evaluate the clinical/quality implications for patients, including the perceived benefits of faster recovery, less pain and scarring, shorter hospital stay, quicker return to normal activities claimed by the technology.

Capital Implications

The capital cost of this proposal is £1.5 million but due to limited NHS capital the system would be leased under an operating lease. There would be some small capital costs incurred in setting up the system around £20k.

Revenue Implications

The model for revenue implications is based on Urology and radical prostatectomy, where most of the information and expertise lies at present. Excluding the leasing and maintenance costs, a robot - assisted laparoscopic prostatectomy costs approximately £2074 more than the current technique of open surgery whilst surgeons acquire the expertise, for a limited number of cases in the first year (30 patients). With increasing numbers of patients treated, and in particular other specialties joining utilisation of the equipment, the costs can be reduced further. The dVSS on private patients will increase costs due to the surgical and anaesthetic consultant contributions - however, dependent upon the pricing strategy, it will in turn yield significantly more income, which will compensate for the reduced surplus income compared with open procedures and increase revenue in the medium to long-term.

The higher costs of robotic surgery are not currently covered by a separate tariff, but existing tariff figures for prostatectomy exceed the cost of the procedure performed robotically. The financial implication is therefore concerned with the extra costs of leasing and maintaining the equipment and all the costs are shown in Table 2. The initial additional cost implication has to be put in perspective, because of the strong likelihood of patients choosing to be treated elsewhere because of robotic surgery availability.

The interim position of the Thames Valley Priorities Committees (Oxfordshire PCT) is that there is insufficient evidence to demonstrate that it offers benefits over non robotic laparoscopic prostatectomy that merit the funding of its higher costs and it should therefore only be used in the context of a fully funded clinical trial. Such a trial is planned and an outline application was submitted to HTA NIHR (please see Appendix B) by Professor Hamdy. The study will be co - ordinated from Oxford, and generate substantial revenue, including covering excess cost of using the dVSS for radical prostatectomy. This case assumes £785k funds would be received in the first 4 years.

It is recognised that this technology requires a large financial investment from the capital side. It will be possible to reduce revenue cost considerably with increase usage, clinical trials and private patient income, with the added benefit of attracting patients and providing a comprehensive portfolio of cancer services at Oxford. This will ensure the Trust has a competitive advantage in a potentially fragile marketplace in the future.

Staffing Implications

The proposal does not require the recruitment any additional staff from ORHT. Professor Hamdy was able to secure £50k from the Hanson Charitable fund in London towards the employment of a Senior Clinical Research Fellow in robotic surgery to help with the initial development and surgical learning curve.

Financial, legal and risk impact

Appendix A highlights the main financial issues related to the initiative. The higher cost of the robotic procedure plus the cost of leasing and maintaining the equipment would be covered in the first two years by charitable funds, BRC funding. Longer-term it is hoped that an increased NBS tariff would cover the cost. The proposal assumes HTA research funds would contribute £784k in the first 4 years.

Business Case for:	The purchase of a da Vinci® Surgical System (dVSS)
Proposed date that revenue spend will begin:	April 2009
Proposed date that capital spend will begin:	April 2009
Review Date:	July 2009

1. STRATEGIC DRIVERS

i) Links to the University and BRC

It is anticipated that this new technology will fit well with the research and development strategy at Oxford as well as innovation in surgical technique for a range of procedures, with a view to:

- promote cutting edge translational and clinical research, particularly evaluation of the new technology
- promote high quality evidence - based and innovative clinical practice to inform government bodies such as NICE
- integrate with NHS Departments/colleagues and contribute to the delivery of specialised high quality services to Oxford and its region, as part of the imminent Academic Health Sciences Centre bid
- foster and train future clinical academics and ORHT specialists, and to provide a stimulating research environment for trainees and students, and promote academic career structure as well specialist fellowship training

Apart from the generic objectives stated above, the acquisition of the robotic equipment will allow Oxford to lead on its evaluation in randomised clinical trials in a number of areas, in particular Urology in the first instance, followed by other specialties such as colorectal, upper GI, Transplantation and Neurosurgery. It is anticipated that the BRC will also be a major contributor to the capital investment to purchase the Da Vinci® system.

ii) Protect II Study

Professor Hamdy has been Lead Investigator of the ProtecT (Prostate testing for cancer and Treatment) since 1999 in collaboration with the Universities of Bristol and Cambridge, and an investment to date from HTA NIHR of £34 million towards this study alone. An outline application has been submitted to HTA to fund a new ambitious prostate cancer programme of research based on previous track record (see Appendix B ProtecT II – study flow chart).

This includes a large case - finding programme in 12 clinical centres in the UK, and evaluation of the various forms of radical prostatectomy including robotic - assisted procedures in centres which have the facility, with Professor Hamdy as the Lead Applicant. The new research programme if successful is expected to attract funding in the

order of £20 million over 5 years, coordinated from Oxford. In addition, the manufacturers Intuitive® have committed to supply excess consumables for all study cases free of charge.

iii) Centre for the Evaluation of Minimally Invasive Interventions in Surgery

Over the past two decades, the field of surgery has seen a considerable expansion in the development of minimally invasive techniques. The shift towards laparoscopic, otherwise known as 'key - hole' procedures aims to improve outcomes of surgery including reducing blood loss and post - operative pain, smaller incisions, shorter hospital stays and faster recovery. Laparoscopy however requires considerable investment in training, with a steep learning curve. Robotic surgery is a new advanced form of laparoscopic surgery which is reported to be potentially the most effective, least invasive surgical approach to prostate cancer treatment available today. This new technology combines superior 3D visualisation with greatly enhanced dexterity, precision and control in an intuitive, ergonomic interface with breakthrough surgical capabilities. This gives surgeons better visualisation, dexterity, precision and control than with open surgery allowing more accurate tissue identification and tissue layer differentiation, delicate tissue handling and dissection, avoiding trauma to surrounding structures and tissues. It also reduces the learning curve compared to laparoscopy, and reduces hand tremors and fatigue as the surgeon operates from a console.

As part of a joint ORHT/University of Oxford strategy, the aim is to develop a Centre for Evaluation of Minimally Invasive Surgery. This will include the existing High Intensity Focused Ultrasound equipment which was established at Oxford some years ago, the evolving minimally invasive techniques in laparoscopy, including NOTES (Natural Orifice Transluminal Endoscopic Surgery) and robotic surgery. This development will place Oxford in an optimal position to be commissioned by government organisations and funding bodies to undertake systematic evaluation of new and emerging technology in Surgery.

What are the potential benefits of introducing the technology?

Patient Benefits

Potential benefits over open surgery include:

- Shorter hospital stay (reduced from 5 - 7 days to 23 hours for radical prostatectomy)
- Less blood loss and fewer transfusions
- Less pain and scarring, and faster post - operative recovery
- Quicker return to normal activities

Benefits to Surgeon

This new technology claims to provide surgeons with better visualisation, dexterity, precision and control than with open surgery which allows for more accurate tissue identification and tissue layer differentiation, and enables the surgeon to perform delicate tissue handling and dissection, avoiding trauma to surrounding structures and tissues.

Economic Benefits

Efficiency savings include:

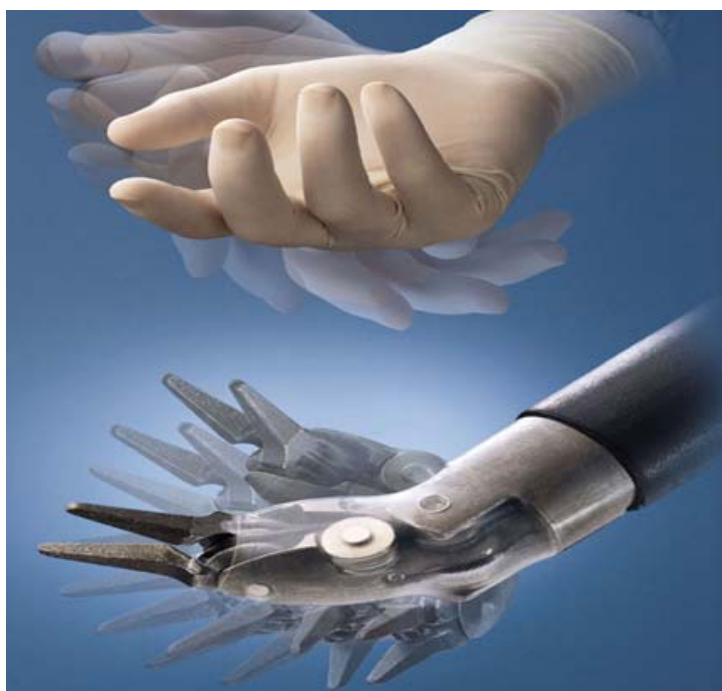
- Decreased length of stay in hospital
- Decreased complications
- Decreased blood transfusions and post - op pain management
- Decreased nursing staff ratios

Market Analysis

At present, there are ten centres in the UK who have acquired the da Vinci technology for use on NHS patients with two purchases for private practice.

It is notable that the NHS providers include:

- Trusts who are known to be part of proposed Academic Health Science Centres
- Notable centres of excellence for the treatment of cancer
- Trusts whose catchments areas neighbour the ORH's (North Bristol to the South West and the Royal Berks to the East).



- Reduced hand tremors and fatigue as the surgeon is seated at the console, which is beneficial for long procedures
- Reduced learning curve as complex minimally invasive surgery procedures feel more like open surgery and is easier to master than laparoscopic surgery
- The Human hand has 6 degrees of Freedom
- Da Vinci Endowrist System has 6 degrees of Freedom
- Laparoscopic Surgery has 4 degrees of Freedom

Economic Benefits

Efficiency savings include:

- Decreased length of stay in hospital
- Decreased complications
- Decreased blood transfusions and post - op pain management
- Decreased nursing staff ratios

Market Analysis

At present, there are ten centres in the UK who have acquired the da Vinci technology for use on NHS patients with two purchases for private practice.

It is notable that the NHS providers include:

- Trusts who are known to be part of proposed Academic Health Science Centres
- Notable centres of excellence for the treatment of cancer
- Trusts whose catchments areas neighbour the ORH's (North Bristol to the South West and the Royal Berks to the East).

Evidence is building that patients do choose to have their procedures done with the dVSS due to the benefits compared to open or laparoscopic surgery. Experience from Addenbrooke's at Cambridge showed that after the initial 30 cases in the first year, more than 300 cases have now been performed, with an exponential increase in the number of referral from other centres in the UK.

Table 1: Provision of da Vinci Robot NHS and the Private Sector

<i>NHS Trusts offering robotic surgery</i>	<i>Private Institutions offering robotic surgery</i>
Guy's and St Thomas' NHS Foundation Trust, London	The London Prostate Centre
St Mary's, Imperial College Healthcare NHS Trust, London	The Princess Grace Hospital
Royal Marsden NHS Foundation Trust, London	
St George's Healthcare NHS Trust, London	
Addenbrooke's, Cambridge University Hospitals NHS Foundation Trust	
Southmead Hospital, North Bristol NHS Trust	
The Christie, NHS Foundation Trust, Manchester	
St James's Hospital, The Leeds Teaching Hospitals NHS Trust	
Heatherwood & Wexham Park NHS Foundation Trust, Berkshire	
Royal Berkshire NHS Foundation Trust, Berkshire	

2. FINANCIAL APPRAISAL

2.1 Capital Implications

Capital Investment Costs

£000

Potential cost for old Theatre refurbishment if Robot is not located at the Cancer Centre plus cost of ultrasonic washer 20

No allocation has been made for space as the robot can be accommodated within an existing theatre. Discussion is ongoing to determine its ideal location, which the surgeons believe should be in the new Cancer Centre because of its proposed usage. Due to the limited NHS capital it is planned to lease the elements of the system under operating leases. However an ultrasonic washer (10k) will be needed which cannot be leased and it is assumed there may be costs of installing and adapting the building for the installation. It is estimated that the total of NHS capital will be £20k.

Table 2: Proposed Contributions to Revenue Costs

The Revenue costs in the first 4 years are shown below in Table 2

£,000	Year 0	Year 1	Year 2	Year 3	Year 4	Total
	2008/09	2009/10	2010/11	2011/12	2012/13	
	£,000	£,000	£,000	£,000	£,000	£,000
Income						
NHS	165	165	166	166	166	828
Trial Income			196	261	327	784
PP			84	168	252	504
	165	165	446	595	745	2116
Costs						
Direct procedure costs	-71	-89	-213	-272	-332	-977
Lease costs	-91	-362	-362	-362	-362	-1539
Maintenance and other costs	-5	-55	-119	-119	-119	-417
	-167	-506	-694	-753	-813	-2933
Contribution (-ve = adverse)	-2	-341	-248	-158	-68	-817
Change in contribution from contribution of open procedure (£95kpa) (ve = adverse)	-97	-436	-343	-253	-163	-1292
Offset by Charitable & BRC Funds	97	436	367			900
Revenue impact	0	0	24	-253	-163	-392
Revenue impact (cumulative)		0	24	-229	-392	

Table 2, above, shows the increased costs after 4 years are £1.29m. This is expected to be offset by BRC and charitable funds of £900k. So after 4 years the adverse impact on ORH revenue will be £392k.

The BRC and charitable fund contributions are shown below in table 3.

Table 3: Revenue Contributions from Charitable Sources and BRC

Table 3 - Funding	Totals (£)
BRC , Bioengineering Theme	400,000
University (John Fell Fund)	150,000
Research Charitable funds (Allison Foundation)	100,000
Research Charitable funds (Hanson Trust - for staff)	50,000
University (Medical Research Fund - pending)	50,000
ORH Trust Charitable sources (pending)	200,000
Total	£950,000

2.2 Revenue Costs for use in Urology

The revenue implications of using the robot will depend on its utilisation. The case illustrated for detailed financial implications concerns Urology and Radical Prostatectomy, as this is where most experience of using the dVSS lies. Prostate cancer treatment will model other surgical specialty interest at ORHT. The table below shows the comparative revenue costs of carrying out both prostatectomies using different surgical techniques:

- With open surgery – currently being offered by the Oxford Urology service with radical prostatectomies led by Mr Simon Brewster.
- Robot - assisted laparoscopic surgery

Table 4: Cost comparison using prostatectomy as an example

	Open	Robotic NHS	Robotic (PP)
Procedure time (average)	3.5 hrs	4.5 hrs (learning curve – reduces to average 2 hours operating)	
Consumables per patient	£250	£2,850	
Sterilisation		£274	
Theatre costs @ £150 per hour	£525	£675	
Surgeon and anaesthetic costs per case	£200	£200 (Professor Hamdy is cost neutral for ORHT)	£2500
Bed day costs (£250 per day)	£1000	£250 (optimised to 23h in patient stay)	
Total costs	£1975	£4049	£6549
After learning curve	£1975	£3874	£6174

Each PP provides a surplus income of at least 8k per case. Additional costs include £481k per annum for leasing, maintenance, repair and equipment validation costs as detailed in Appendix A. This will vary and alter revenue cost per case performed depending on the purchasing formula adopted and volume of cases.

This indicates that carrying out a prostatectomy by robotically assisted laparoscopy costs initially £2074 more than the current technique of open surgery, without taking into account maintenance costs and capital charges. The dVSS on private patients will increase costs due to the surgical and anaesthetic consultant contributions – however, dependant upon the pricing strategy, it will in turn yield significantly more income. This range of cost figures is still under the national tariff for radical prostatectomy (£4,604) which means that the impact of robotic surgery initially will be a reduced surplus from tariff contribution.

Potential savings

The savings to be achieved include

- reduction of blood transfusion to none from an average 2 units with the open procedure nationally;
- reduction of in - patient stay from an average of 5 - 7 days nationally for open procedures to 23 hours for robotic prostatectomy
- the fact that Professor Hamdy is currently cost - neutral for ORHT, until such time that other surgeons at the Department of Urology become fully trained
- any patients recruited through fully funded clinical trials will have all excess costs covered by the research grant supporting the trial, and will therefore become cost neutral to ORH

2.3 Income

The costs of robotically assisted laparoscopic surgery, whilst higher than open procedures initially, are covered by the existing tariff, although this may improve in the future. The impact of this with the cost of leasing the equipment and maintenance costs are shown in table 2. Table 2 shows that the impact will be a loss of contribution to the trust of £1.29m

after 4 years. However this will be offset by the £900k charitable and BRC funding. The business case assumes that excess treatment cost from the Clinical Trial application to the NHS HTA programme of approximately £784k over 4 years but represents a risk as the funding for the trial has not been approved yet.

Commissioner Position

Some providers in other parts of the country have successfully negotiated a higher tariff with their local commissioners. However, the Thames Valley Priorities Committees (Oxfordshire PCT) have issued an interim policy statement regarding da Vinci Robotic Prostatectomy, dated October 2007. This states that:

“The Thames Valley Priorities Committees have reviewed the evidence for the da Vinci Robotic

Prostatectomy for the treatment of localised prostate cancer and consider its use to be a low priority. There was only limited evidence of clinical effectiveness from a small number of uncontrolled studies for the robotic procedure and no evidence of cost effectiveness. This preliminary evidence suggests that robotic prostatectomy may have similar effectiveness and safety to conventional laparoscopic prostatectomy, being quicker than open surgery with less loss of blood and shorter length of inpatient stay. However the evidence is not reliable enough to support any firm conclusions and given the high costs and apparent lack of any superiority to more conventional surgery, the da Vinci Robotic prostatectomy should only be used in the context of a fully funded clinical trial.”

The Oxfordshire Priorities Forum does support non - robotically assisted laparoscopic prostatectomies as a treatment option with the proviso that the contribution would be comparable with open surgery.

Table 5: Predicted activity figures

		09/10	10/11	11/12	12/13
L25	Prostatectomy	36	40	44	46
L68	Cystectomy	12	12	12	12

These numbers will increase by an approximate 30 cases/annum if the ProtecT II trial is successful, and excess costs will be covered by the research grant.

Experience from Addenbrooke's at Cambridge show that after the initial 30 cases, more than 300 procedures were performed in Cambridge with referral from outside Cambridge.

It is reasonable to anticipate that 'predicted' activity will reduce if robotic surgery is not offered at Oxford because patients may choose to receive their treatment wherever the technology is available in neighbouring Trusts.

Private Practice

Robotically assisted laparoscopic procedures could be marketed to private patients. Other centres have already demonstrated that there is a significant private market. The table below is a cautious estimate of potential activity levels.

		09/10	10/11	11/12	12/13
L25	Radical Prostatectomy	0	12	18	24

As there will be a reduction in surplus income generated by Tariff for prostatectomy after introduction of robotic surgery, it is anticipated that private patient income will compensate for this shortfall, and potentially increase overall income for ORHT in the medium to longer term.

2.4 Assessment of relevant Urology Market

There is a risk that if the Trust does not invest in robotic technology referrals and associated income for prostatectomies and cystectomies will be lost to other Trusts who have already invested in this technology. To date at least three patients have been lost from Oxford to the London/Cambridge dVSSs. These patients had discovered themselves that the dVSS technology exists in these locations. Within the local economy Heatherwood and Wexham Park and Royal Berkshire Trusts could attract the Oxfordshire-based NHS and private prostatectomy patients by making GPs aware of their robotic services and through local media campaigns. This would considerably damage our credibility as the region's "premier" cancer centre.

3. OTHER APPLICATIONS

There will be other applications for robotic surgery within the Trust. The following services within the Trust have expressed an interest in using the new technology within their service. These are shown in the table below and offer for example, the possibility of developing the Trust as a centre of excellence for minimally invasive pelvic cancer work.

Service	Types of procedures
Urology	Prostatectomy and cystectomy
Lower GI	Rectal and lower anterior resections. Right and Left Hemicolectomy, NOTES (Natural Orifice Transluminal Endoscopic Surgery)
Upper GI	Fundoplication or gastric stapling for obesity
Gynaecology	Radical/Wertheims hysterectomies
Renal	Partial nephrectomy and Live related donor transplantation
Neurology	Brain tumour ablation

There is little world wide experience with robotics in colorectal surgery and the current Trust service is still evolving through the use of laparoscopic techniques and the utility of the dVSS for right and left hemicolectomy is yet to be demonstrated. However of the 100 rectal cancers operated each year it is anticipated that 30 of these could be done using the dVSS. Discussions are ongoing with other specialties to develop their business cases and utilisation of the robot to determine the financial impact of using the new technology on their NHS and private patients.

4. IMPLEMENTATION PLAN

It is intended that Professor Hamdy and his academic team will be trained initially in the new technology for the first 6 months, assisted by external mentors including a senior research fellow in robotic surgery for whom funding has been secured, and through hands-on experience in other centres, followed by implementation within the following 6 months to complete the first 30 procedures. There will then be a phase of development for standard techniques and practices for the Oxford Urology service, with the two other pelvic urological surgeons, Mr Brewster and Mr Crew undertaking full training. Other

surgeons from different specialties will develop their own training programmes and expand utilisation in parallel with Urology.

Marketing Plan

The successful implementation of the dVSS will be dependant on a successful market plan. The two key areas of focus will be the flexibility of the technology to be used for a wide range of minimally invasive procedures and the publicity of the services on offer by leading consultants. This will require marketing investment to minimise the impact of neighbouring Trusts competing for the same patients.

5. RECRUITMENT ISSUES

The implementation of the da Vinci Robotic Surgical System will be extremely advantageous to any future clinical appointments within the Trust demonstrating strategic and forward looking planning. It is anticipated that the NDS Professorial team will increase the non - Oxfordshire activity referrals, private patient activity in the new Cancer Centre, and lead the way for robotic technology within the Trust.

6. ASSESSMENT OF RISKS OF IMPLEMENTATION OF PROPOSAL

The main risk of implementing the proposal is that expenditure is incurred (capital and revenue cost) and the evaluation of the dVSS demonstrates no significant benefits over more conventional treatment options. This needs to be set against the risk of not investing in the technology which may result in loss of referrals to other centres as well as damage to the reputation of the Trust as a leading centre of excellence in translational research, teaching and training, and state - of - the - art treatment of cancer.

7. WHEN WILL THE IMPACT BE REVIEWED AND REPORTED ON?

The impact of purchasing the dVSS will be reviewed at each stage of the implementation plan to ensure training is being delivered and activity is as planned. Reports on utilisation will be presented three - monthly at directorate board and six - monthly at the planning committee for the first year. Implementation within other specialties will follow the same reporting mechanism and will be considered independently. The clinical evaluation of this technology will be realised once the clinical trials have closed and results are reported.

8. RECOMMENDATION TO EB

The Board of Directors is requested to:

1. Approve the lease of a da Vinci® Robotic Surgical System (dVSS) and the related equipment and small capital costs of installation (£20k max)
2. Agree to develop a robotic surgical programme at ORHT for exploitation by all relevant surgical specialties
3. Authorise financial support from the Trust's revenue funds to complement other sources of funding from charities, BRC and the University of Oxford.