



## An evaluation of cancer surgery services in the UK

A report for Cancer Research UK by the Health Services Management Centre, University of Birmingham, and ICF-GHK consulting

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## CREDITS AND ACKNOWLEDGEMENTS

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# FOREWORD

I believe we are at an important juncture in the NHS' history.

The financial challenge facing the health service has shone a light on the need to deliver services more effectively and efficiently.

Some of the big debates we are grappling with – around centralising specialist services, providing more dignified care seven days a week, improving the specialist and generalist skills of our workforce, and enhancing transparency around clinical outcomes – apply just as much to cancer services, if not more so, and are thoroughly investigated in this report.

I particularly welcome the focus the authors provide to the debate around centralising surgical services, and the important relationship cancer teams have with other services in a hospital. The Royal College of Surgeons strongly supports centralising complex care where there is clinical evidence to suggest that this improves outcomes.

Yet we also recognise the need for a debate with the public about where care is delivered. Some patients may prefer to be nearer to their family and friends, especially if they are close to the end of their life. I therefore endorse the call for greater research into the potential benefits and risks of centralisation, including the impact this has on other local hospital services which may rely on the skills of cancer teams for other conditions and procedures. The more we understand, the more informed a debate we can have with the public about how best to provide complex cancer care.

The need to fund and encourage surgical research is no less an issue. At present, only a small percentage of UK medical research funding from Government and other research funders goes into surgical areas – approximately less than 5% - even though around one third of hospital admissions involve care under a surgical team. Surgical research charities are concerned that the development of clinical research in surgery has lagged behind that of non-surgical disciplines.

That's why over the last year the College with its partners has helped to set up a network of surgical trial units across the UK. These will enable surgeons to deliver clinical studies to assess new surgical techniques and develop breakthroughs in treatment, including for cancer. This work is being overseen by Sir Michael Rawlins, the former chair of the National Institute for Health and Care Excellence, and the College will continue to do everything it can to facilitate research into cancer surgery.

Surgery is, in many cases, the most effective treatment for solid cancers. Recent innovations in surgery, such as laparoscopic techniques, are helping more and more patients to access successful surgical care. Better team working, through multidisciplinary teams, is also helping to improve decision making and clinical outcomes.

Of course, no-one wants to undergo an operation unnecessarily and we have a duty to do all we can, in the NHS and broader society, to prevent different forms of cancer from occurring in the first place. But at the same time we must not neglect the need to improve our existing surgical cancer services and the outcomes that patients experience.

This report makes a timely contribution to this hugely important area of medical care, highlighting the complexity of present service delivery and the considerable need for a greater understanding of what good cancer surgery looks like.

I urge clinicians, providers, commissioners, and patients to read and embrace its recommendations to help improve the care of all those suffering from cancer.



Norman Williams.

Professor Norman Williams

President, Royal College of Surgeons

# EXECUTIVE SUMMARY

## INTRODUCTION

Surgery is an essential component of the management and treatment of cancer. For many cancer patients it offers the greatest potential for cure, and innovations in areas such as laparoscopic (keyhole) techniques have increased access to surgical care. The availability of improved techniques, combined with demographic trends and projected improvements in early diagnosis, mean that more patients are likely to undergo surgery in the coming years.

But the question remains as to how cancer surgery services can be most effectively organised and delivered in a constrained environment – particularly with increased demand.

For many rarer and more complex cancers, there is a growing evidence base to support the reconfiguration of services into specialist units in order to improve both the quality and outcomes of care. But service centralisation is only one of many possible options for improving surgical care, and the evidence is not compelling in all cases. There are enduring questions about the potential risks of centralisation, and its impact on patients – especially those who have to travel further to access specialist care.

Cancer Research UK's mission is to save more lives by preventing, controlling and curing cancer. A key part of this is to drive the development and uptake of the very best treatment options for patients. Recognising the need to more fully understand the challenges and opportunities in this area, Cancer Research UK commissioned an independent research team from the University of Birmingham's Health Services Management Centre and ICF-GHK Consulting to evaluate cancer surgery services in the UK. The work, which was carried out between March and September 2013, comprised three main elements:

- A review of international literature and evidence;
- Qualitative interviews with stakeholders at a local, national and international level;
- An international survey distributed through networks in the following six countries: UK, Denmark, Sweden, Norway, Australia and Canada.

This report summarises the main findings, as well as outlining a series of recommendations to build on best practice and address challenges currently faced by surgery services.

## SUMMARY OF FINDINGS

### 1. Centralisation and reconfiguration

Despite significant evidence to support centralisation of surgery for particular tumour groups, for example lung and gynaecological cancers, there are gaps in the evidence for many other tumour groups or procedures, and there is debate as to the appropriateness of centralisation in all cases. Amongst the interviews, some strong views were held in favour of centralisation and specialisation within centres, but interviewees were not universally persuaded by the evidence linking high volumes of procedures to better outcomes. The link between competence of individual surgeons and volume was also unclear.

It was acknowledged that further plans to centralise services could radically affect the health system as a whole, changing the nature of elective and emergency surgical provision across the board.

Access to surgery in general is a complex picture, and the effect on access of increasing centralisation in particular is an under-researched area. International survey respondents cited geographical location as the most significant factor affecting access to surgery, due to centralisation of services. Rates of surgery among older people seem to be increasing but the decision whether to operate or not often involves complex considerations of risk. Late presentation also impacts upon access for some patients by limiting surgical options.

## **2. Specialisation and sub-specialisation**

Specialisation and sub-specialisation were seen by interviewees as a positive development given the increasing complexity of treatment. But as with centralisation, concerns were raised about the impact of specialisation on the wider system and about the balance of specialist versus generalist skills across the service. The main issues related to the ability and confidence of surgeons to manage emergency or general surgical procedures that were outside the scope of their specialist area when called upon to do so.

There was a general sense of disillusionment about the current structure of training for junior doctors and the opportunities it offered for engaging with surgical specialities in the earlier stages, and for developing a breadth as well as depth of experience in surgical procedures as training progressed. There was also frustration at delays in recruiting people to fill non-training grade vacancies (i.e. those that are not General Medical Council-approved Deanery training programmes and posts) because of the current financial climate.

## **3. Quality and performance**

Understanding how best to measure quality in surgery has become an issue of increasing interest. This reflects a widespread appetite for more transparent information on clinical outcomes and the growing use of patient-reported measures of quality. In particular, developments in recent years to reduce length of stay in hospital are a response to patients' general preferences for returning home quickly after surgery. Significant time reductions have been achieved, for example, in breast cancer surgery.

Regarding the publication of surgeon-level clinical outcomes data, transparency was widely welcomed by the surgical community. However, concerns were expressed as to the meaningfulness of the data at the level of the individual surgeon, which are now being made public in England – cancer surgery was described as 'a team game', relying on infrastructure, number of people and processes.

There were also concerns that surgeons could potentially become more risk averse given that this data is publicly available and less likely to either perform more complex procedures, or operate on patients with higher clinical risk factors, thus affecting access for some groups of patients. While published data is subject to risk adjustment, this may need to be better communicated to the wider surgical community. The ability to interpret data without contextual information was raised. The view was expressed that more attention should be directed towards longer-term outcomes such as five-year survival rates.

#### **4. Multidisciplinary teams**

There was a widely held view amongst interviewees that indefensible variation of practice has reduced significantly over time, helped by centralisation, specialisation, peer reviews and the spread of the multidisciplinary team (MDT).

The MDT has become a central tenet of the service, empirically demonstrating its positive impact on patient outcomes, and interviewees were generally extremely positive about its role in improving the management of patient care. Survey results showed that MDTs are held in high regard internationally, and especially in the UK. However, there were concerns about capacity and having enough time at MDT meetings to discuss all cases appropriately, and the occasional difficulties in getting the necessary clinical experts to attend, as a result of other work pressures. In addition, there are grounds to focus more attention on patient-related factors, such as patient preferences and values, when determining courses of action.

#### **5. Research and innovation**

Interviewees reported that within cancer surgery services, the appetite for innovation and uptake of new technology was apparent but that capital investment was increasingly problematic in the current climate.

Meanwhile, survey participants gave mixed views on uptake of new techniques and technologies in their countries. Some argued that centralisation would quicken the pace of innovation because having the specialist team in one place would overcome some of the cultural and financial barriers to uptake. Almost half of the survey respondents (45%) thought that there was a strong research culture in their country, yet most respondents cited similar barriers to research such as time, access to funding and 'red tape'. A similar proportion (46%) said that surgical cancer research does not compete effectively for funding compared to other disciplines in their country.

Interviewees in the UK suggested there should be more targeted support from funding bodies for surgical research and recognised the need to change people's perceptions about the nature and contribution of this kind of research.

# RECOMMENDATIONS

The findings in this report present a complex picture. The issues that shape and affect surgery services differ depending on the tumour group, speciality and type of procedure. Cancer surgery does not take place in isolation from other services, and it is clear that changes to cancer surgery services will impact upon the health system as a whole. Our findings suggest that there is considerable scope to improve understanding of what best practice cancer surgery looks like, and to embed this as the norm across all parts of the health system.

## 1. CENTRALISATION AND RECONFIGURATION

- **At a minimum, all proposals to centralise services should include a robust assessment of their likely impact on acute and emergency care in local general hospitals.** A system-wide perspective and strategic leadership are essential to help ensure that decisions which deliver benefits to one group of patients do not disadvantage others. All four UK nations must be clear about how this will be achieved.
- **Where surgical pathways are delivered across specialist units and local general hospitals, structures to specifically support integrated working must be put in place.** Further development and piloting of promising approaches such as shared care arrangements and hub-and-spoke models is needed.
- **Research should be commissioned to examine how centralisation impacts on patients in areas such as care coordination, transportation and out-of-pocket costs.** Currently, far too little is known about the impact of centralisation of cancer surgery on patients' experiences of care.
- **More research is needed to better understand variation in resection rates, in particular variation based on age and geography, as well as amongst certain social groups.** Evidence suggests that considerable variation exists, but it remains unclear whether this is indefensible or whether some variation may be appropriate for clinical reasons.

## 2. SPECIALISATION AND SUB-SPECIALISATION

- **A re-think of medical education and training is needed to ensure a surgical workforce with the right balance of skills to deliver high quality specialist and generalist care.** Our findings here support the conclusions reached by the recent Shape of Training review. Far more emphasis in training on the skills surgeons need to share information and decisions with patients is also needed. This could be coupled with investment to produce patient information tools which would support surgeons to present treatment options in a clear and comprehensible way.
- **In future, the governments of all four UK nations should commit to funding national programmes to train surgeons in innovative techniques where there is evidence of patient benefit.** All patients should have access to effective new surgical techniques. The experience of laparoscopic surgery suggests that this aim is unlikely to be achieved unless training in new techniques is funded and coordinated nationally.

## 3. QUALITY AND PERFORMANCE

- **National health departments should work with the National Cancer Intelligence Network, professional bodies, patient groups and others to develop a comprehensive set of quality indicators for cancer surgery services.** A wider range of

indicators – capturing short and longer-term outcomes, and clinical and patient-reported factors – are needed to make meaningful assessments of performance and drive improvements.

- **NHS England should reconsider the inclusion of certain cancer specialities in its drive to report surgeon-level outcomes.** Cancer surgery is a 'team game' and our findings strongly indicate that performance data are only meaningful when reported at the unit rather than individual level.
- **NHS policy makers should be required to routinely gather patient-reported outcomes, in order to assess the impact that surgical interventions (and other treatments) have on recovery outcomes and patients' quality of life.** This will require further work to develop patient-reported outcome measures to ensure that they are available for all cancer types, and more support for professionals to implement these tools within their practice.

#### 4. MULTIDISCIPLINARY TEAMS

- **Commitments to developing and supporting MDTs are needed within both national and local plans/programmes to develop cancer services.** Organisations must regularly assess whether appropriate and sufficient resources are in place for MDTs to function effectively. This includes staff time to prepare for and attend meetings, which should be recognised in job plans. Given that the demand for cancer services is increasing, the NHS must be prepared to increase these resources to allow staff to participate in longer or more frequent meetings.
- **There is much research and piloting work underway to support the development of telemedicine within the NHS; this could usefully extend its focus to include models of remote clinical teamworking such as vMDTs.** Virtual MDTs (vMDTs) have emerged in response to the logistical challenges of coordinating teams working at different locations, but little is known about the circumstances in which vMDTs are most appropriate and the factors that contribute to their effectiveness.

#### 5. RESEARCH AND INNOVATION

- **Research funders should consider creating dedicated funding streams for research involving surgery (standalone or multi-disciplinary) and programmes to train future research leaders within the profession.** Surgical research is under-represented compared to other clinical areas and more action is needed to help surgical teams access research funding and infrastructure support. Funders and professional bodies should also consider how their communications can help expand the pool of research-active surgeons.
- **Key organisations including Cancer Research UK, the National Institute for Health Research and National Cancer Research Institute (NCRI) should consider establishing a national body to drive forward surgical research equivalent to CTRad (the Clinical and Translation Radiotherapy Research Working Group).** Such a group could support implementation of the detailed recommendations to support and develop surgical research that have already been made by the NCRI and the Royal College of Surgeons.
- **Indicators of research performance should be incorporated into data reporting requirements for cancer surgery to allow research activity to be benchmarked and tracked over time.** These should be gathered at unit level and might include, for example, the number of trials that the unit is participating in and the proportion of patients recruited to take part.

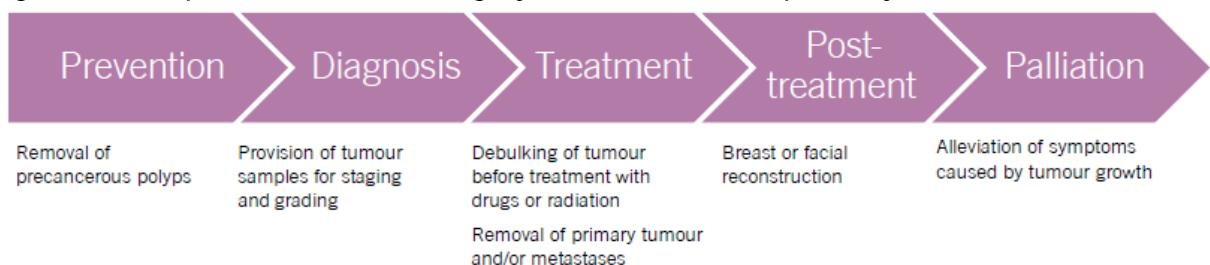
# INTRODUCTION

## THE ROLE OF SURGERY IN CANCER CARE

Surgery is a fundamental component of good cancer care. As a treatment, it is estimated that surgical intervention overall contributes to 49% of cases where cancer is cured (Price and Sikora 2008). For several cancers, surgery is currently the only treatment that affords the possibility of cure. Yet surgery is not only important in the *treatment* of cancer. It has a role to play at all stages of the pathway, including in prevention and diagnosis, post-treatment reconstruction and managing the complications of advanced disease (Figure 1). As the National Cancer Intelligence Network has observed:

*Surgery is the treatment that has the greatest impact on long term survival in most types of cancer. It can also serve the purpose of significantly improving symptoms, even in situations where long term survival is unrealistic. (National Cancer Intelligence Network 2011)*

**Figure 1. Examples of the role of surgery across the cancer pathway**



Source: National Cancer Research Institute 2012

The last decade has seen significant technological advances, many of which are increasing the number of people who stand to benefit from surgical intervention. This includes advances in the use of robotics and minimally-invasive techniques, which potentially result in faster recovery times, fewer complications and less distressing side effects for patients (e.g. Reza et al 2006; Ramsay et al 2012). Understanding of how surgery can be combined with other therapies to improve outcomes is also growing. This includes ongoing developments in the field of neoadjuvant chemotherapy, looking at the role that drug treatment can play when administered prior to surgery. While such research is at a relatively early stage, there is emerging evidence for some cancers that neoadjuvant chemotherapy can shrink the size of a tumour, enabling more effective and less radical surgery to be undertaken (e.g. Liu et al 2010).

Other trends are also set to increase the demand for cancer surgery. As the population ages and risk factors such as obesity increase, so the incidence of cancer continues to rise. By 2030, it is estimated that the lifetime risk of being diagnosed with cancer will be 44% for women and more than 50% for men. There is a growing recognition that more upstream investment in prevention and detection is needed. Alongside national screening programmes for breast, bowel and cervical cancer, recent national campaigns have sought to improve public awareness of cancer symptoms and encourage people to seek medical advice sooner. As the Cancer Outcomes Strategy notes, "The hoped for improvements in early diagnosis, combined with the impact of rising incidence, mean that demands for surgical oncology are likely to increase and this needs to be planned for" (Department of Health 2011).

## KEY ISSUES IN CANCER SURGERY SERVICES

In all four nations of the UK, the issue of reconfiguration is foremost in current debates about the organisation and delivery of all surgery services, including cancer. In cancer specifically, efforts to centralise surgery services for more complex and rarer cancers into specialist units are longstanding. But these have taken on an added impetus in the current financial context where the case for fundamental system redesign is increasingly made on both clinical and financial grounds. A key driver of centralisation has been the growing evidence base suggesting that, for certain procedures, specialist surgeons practising in high volume hospitals produce better outcomes for patients (Archampong et al 2012; Nuttall et al 2004). Further centralisation of cancer surgery can be expected, but questions remain about how this will impact on the quality of patient care and the provision of general surgical services at 'periphery' hospitals.

Centralisation also has implications for access to care. Patients may accept the need to travel further to receive surgery in specialist centres, but currently this is assumed rather than proven. Recent studies have consistently shown that centralisation of cancer services increases the cost of accessing care for patients and their carers (Ke et al 2012). Therefore, this issue is not only about whether patients will travel for their care, but also their ability to bear the out-of-pocket costs that arise from this.

There is also significant variation in access to surgery. Analysis by the National Cancer Intelligence Network (2011) of data for 13 cancer sites found that surgery rates declined with age, with the drop off for some cancers starting as early as age 50. Some evidence of a 'deprivation gap' was also reported, although the actual differences between rates for more affluent and deprived areas were relatively small. The extent to which these variations are accounted for by clinical factors which affect fitness for surgery, such as co-morbidities and frailty, is unclear. As the NCIN notes, their findings are cause for further investigation, not necessarily for concern.

Surgery rates vary geographically too. For example, the proportion of patients diagnosed with lung cancer who are treated surgically has been found to be as low as 6% in some hospitals and as high as 35% in others (Health and Social Care Information Centre 2012). The overall surgery rate for lung cancer in Britain is 11%, which compares to 17% in Europe and 21% in North America. These differences take on greater significance when research linking higher surgery rates with improved survival is taken into account (Riaz et al 2012).

## THIS STUDY

In light of this context and evidence, Cancer Research UK commissioned an independent research team from the University of Birmingham's Health Services Management Centre and ICF GHK Consulting to examine the current state of cancer surgery services. The research sought to explore developments, issues and good practice across the four nations of the UK and in an international context. The work comprised three main elements; these are summarised below, and more information on the methodology can be found in Appendix 1:

- A review of international literature and evidence, the principal aim of which was to identify key themes and issues for further exploration.
- Qualitative interviews with stakeholders to explore views and experiences at a local and national level. Between April and August 2013, 36 in-depth interviews were carried out with a range of participants including surgeons, oncologists, senior managers, clinical

nurse specialists, policymakers and representatives of medical royal colleges, training bodies and professional organisations.

- An online survey (n=138) to determine whether there were additional benchmarks of good practice that could usefully inform discussions in the UK. The survey was distributed through networks in the six countries participating in the International Cancer Benchmarking Partnership: UK, Denmark, Sweden, Norway, Australia and Canada. Five international interviews were also carried out to explore issues in greater depth.

This report summarises the main themes and findings from the research, with each of the elements described above taken in turn in the chapters that follow. It concludes with a discussion of the major issues that are shaping the future of cancer surgery and a series of recommendations for cancer surgery policy, practice, training and research.

# POLICY AND PRACTICE CONTEXT

The following section sets out the key policy and practice developments in cancer services and, where appropriate, cancer surgery services specifically, from the publication of the Calman-Hine report in 1995 up to and including the latest cancer plan for England – *Improving Outcomes: a Strategy for Cancer* (DH, 2011).

Additional policy and practice developments are evident within the devolved nations. For example, the Cancer Control Programme (DHSSPS, 2006) was developed by the Department of Health, Social Services and Public Safety in Northern Ireland. The Programme set out 55 recommendations to improve the quality of every aspect of cancer care over the course of a ten-year period. The Scottish government produced its *Better Cancer Care* action plan in 2008 and announced the establishment of a Scottish Cancer Taskforce to oversee the delivery of the plan. The Welsh Government produced the Wales Cancer Plan – *Together Against Cancer* in June 2012 - to demonstrate its own commitment to tackling the disease.

## INVESTMENT IN WORKFORCE AND MDTs

Following publication of the UK-wide Calman-Hine report a raft of targeted policies and programmes to significantly improve cancer services and cancer outcomes have been introduced. These have included an additional investment of £640 million in cancer funding (National Audit Office 2010) to increase the capacity and capability of the workforce, including the development of cancer Clinical Nurse Specialists (CNSs), and the establishment of Multidisciplinary cancer teams (MDTs). The latter were established to bring together all the relevant experts to plan and co-ordinate care for individual patients. These have subsequently come to be seen as the 'gold standard' for the management of cancer patients' care.

## IMPROVING OUTCOMES GUIDANCE

Providers of cancer services have been peer reviewed against national standards since 2001 and are required to meet specific targets relating to waiting times for referral and treatment. Cancer services are also required to implement the National Institute for Clinical Excellence's (NICE) Improving Outcomes Guidance (IOGs) for a number of specified cancers. The IOG publications, which indicated optimum population levels and minimum procedure levels per annum for cancer units, have driven a series of reorganisations of services, centralising some treatments, including surgical procedures, where the evidence suggests clinical outcomes will be improved. For example, in 2001 the Clinical Outcomes Group issued guidance (DH, 2001) recommending centralisation of upper gastrointestinal cancer surgical services to centres serving a minimum planning population of approximately one million patients. Guidance for best practice on centralising pancreatic cancer surgery advised that centres should be undertaking more than 200 such procedures a year.

## TACKLING VARIATION AND REDUCING LENGTH OF STAY

The National Audit Office's (2010) report on delivering the Cancer Reform Strategy (DH, 2007) found that though there had been measurable improvements in efficiency in cancer services generally, there was scope to make further improvements by tackling variation and raising performance to the standard of the best. One area that has seen increasing focus in order to address variation is the length of stay for post-operative cancer patients. This has seen increased rates of day surgery and the introduction of enhanced recovery programmes.

As regards increasing rates of day surgery, much work has been undertaken on reducing the length of stay for mastectomies. In 2007, the NHS Improvement Transforming Inpatient Care Programme, as part of the Cancer Reform Strategy (2007), redesigned the breast care surgical pathway (excluding reconstruction). Its hypothesis was that: "Streamlining of the breast surgical pathway could reduce length of stay by 50% and release 25% of unnecessary bed days for 80% of major breast surgery (excluding reconstruction)" (NHS Improvement, 2011). At the time NHS Improvement's review of the Programme was published in 2011, the mean length of stay was calculated as having reduced from 2.35 days to 1.35 days overall, with a reduction by more than 40% of bed days – far exceeding the original assumption.

The day case or one night stay breast surgical pathway has been recommended as best practice throughout the NHS ([www.evidence.nhs.uk](http://www.evidence.nhs.uk)) and is the subject of a Best Practice Tariff (BPT) - these prices are set as part of the national tariff list to financially incentivise providers to adhere to evidence based best practice. Day case or one night stay breast surgery has also been included in the set of exemplar CQUIN (Commissioning for Quality and Innovation)<sup>1</sup> goals.

The Enhanced Recovery Partnership Programme was introduced into the NHS in April 2009 in order to address variation in length of stay by increasing the uptake of those providers practising the approach. Enhanced recovery is an evidence-based approach, pioneered in Denmark, which is designed to help people recover more quickly after having major surgery. It aims to ensure people are as healthy as possible prior to their surgery and enables people to be as active as possible post-operatively.

## PUBLICATION AND OUTCOMES DATA

The publication of surgeon-level data is intended to 'shine a light' on variation in clinical practice. Publication of surgeon-level data is mandated by NHS England, though it is up to the governments in the devolved nations to decide whether or not to do the same, and therefore currently surgeons operating in the devolved nations have an opt-out from publication. The nine surgical areas required to publish results are; adult cardiac surgery, vascular surgery, upper gastro-intestinal surgery, colorectal surgery, orthopaedic surgery, bariatric surgery, urological surgery, head and neck surgery, thyroid and endocrine surgery and interventional cardiology. At this stage, the published data which measures performance against a set of standards relating to survival rates, length of stay in hospital following a procedure, repeat operation rates, and number of operations performed, only covers a limited number of possible procedures.

Before publication, the data is routinely analysed by the relevant surgical association in order to calculate the appropriate standard for a surgeon and to determine acceptable and unacceptable variation from this. The results are therefore adjusted for case mix using accepted statistical techniques. This ensures that those surgeons who treat patients with more advanced cancer or with other medical conditions are not penalised. The first set of results was placed in the public domain on the NHS Choices website and on the websites of individual surgical specialty associations in September 2013.

Though the widespread reporting of outcome data is broadly welcomed, it is recognised that the outcomes described above provide a limited assessment. A 2011 pilot survey, commissioned by the Department of Health as part of the National Cancer Survivorship Initiative (NCSI), assessed the feasibility and acceptability to cancer patients of collecting

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<sup>1</sup> The CQUIN system was introduced in 2009 to make a proportion of healthcare providers' income conditional on demonstrating improvements in quality and innovation in specified areas of care.

information on quality of life through the use of Patient Reported Outcome Measures (PROMs). A further pilot survey looking at measuring quality of life in a broader range of cancer types is underway during 2013. Though this pilot is not considering surgery-specific outcome measures, it is nonetheless likely to produce some relevant measures to consider for surgery services.

## **MEDICAL TRAINING AND EDUCATION**

The NHS is subject to aspects of European law – the most significant of which from a workforce perspective has arguably been the European Working Time Regulations (EWTR). This has had a dramatic impact on how hospitals are staffed and doctors' working patterns. The EWTR limits a person's working week to an average of 48 hours. It has applied to consultants and career grade staff since October 1998. Initially junior doctors were exempt from this but the EWTR was extended to cover junior doctors in August 2004 and their working week has been reduced on a gradual basis reaching an average of 48 hours by 1 August 2009 (calculated over six months). Time on-call counts as work and compensatory rest has to be taken immediately if there is a failure to achieve 11 hours' rest between shifts. According to research by the Royal College of Surgeons (RCS) (2013) 400,000 surgical hours are lost each month as a result of the EWTR, which it is suggested is limiting access to training opportunities for junior staff.

In October 2013, Health Secretary Jeremy Hunt announced that the RCS is to chair an independent review of the implementation of the Working Time Directive (WTD) on the NHS and doctors. The review will focus on the impact of the regulations on the delivery of patient care and the training of doctors across different specialisms. Medical professionals, including the British Medical Association (BMA), and providers from across the NHS, will be represented on the taskforce which is due to report to the Secretary of State for Health in January 2014.

A review of UK postgraduate medical education has also recently been concluded with a final report published in October 2013 (Greenaway 2013). The *Shape of Training Review* aims to ensure that the UK continues to train effective doctors, including surgeons, who are fit to practise, provide high quality care and meet the needs of patients and the public. The review was jointly sponsored by the Academy of Medical Royal Colleges, the Conference of Postgraduate Medical Deans of the UK, the General Medical Council, Medical Education England (now Health Education England), the Medical Schools Council, NHS Scotland, NHS Wales and Northern Ireland Department of Health, Social Services and Public Safety.

The 2011 Cancer Plan for England (DH, 2011) recognised the need for central support for training programmes while the Department of Health continued to investigate the best way to incentivise the system, in order to ensure providers train their surgeons in new techniques in a timely manner. The document made reference to the national LAPCO programme (laparoscopic surgery), established through the National Cancer Action Team, and made a commitment to fund appropriate national training programmes. To date however, there have been no further such centrally-funded programmes for surgeons.

## **RESEARCH**

The National Cancer Research Institute (NCRI)<sup>2</sup> announced in its Strategic Plan for 2008-2013 (NCRI, 2008) that it would be working with others to consider the findings and recommendations of a 2008 review by Cancer Research UK. This had concluded that academic surgical oncology was under threat and that action was required "...to build

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<sup>2</sup> The NCRI is a partnership of seven Government partners, 14 charities and the Association of British Pharmaceutical Industry

capacity, encourage multi-disciplinary working, and facilitate the development of centres of research excellence in surgery.”

According to the NCRI (2012a), the government and charity funders spend over £500m per year on cancer research. However, the number of surgery-related project or programme grants and personal awards funded in cancer by NCRI Partners in 2010 represented less than 4% of the total number awarded, and accounted for less than 3% of the total invested (NCRI, 2012b p9). These figures are estimated to be in the same region as those in a RCS England report (RCS, 2011), which found that only 1.5% of government medical research spending was on surgical research.

Across the UK as a whole, the National Cancer Research Network<sup>3</sup> has increased the proportion of patients entering clinical trials four-fold in the last ten years or so, from less than 4% in 2001/02 to 18.3% in 2010/11 (NCRI, 2012a). In England one in every five newly diagnosed cancer patients is now participating in a trial – of which there are calculated as having been more than 1,100 including over 250,000 people between 2001/2 and 2010/11. Though this relates to cancer patients generally, the NCRN refers to its workstream as focusing on ‘portfolio balance and delivery’ which aims to promote uptake of trials in surgical research, as well as radiotherapy and palliative care research in its Strategic Plan for 2012-2017 (NCRI, 2012a).

The National Cancer Intelligence Network (NCIN) was established in June 2008 to bring together organisations with an interest in cancer intelligence in order to promote data collection and provide a common repository for cancer datasets (National Cancer Data Repository (NCDR)) with the objective of exploiting information to drive improvements in cancer care and clinical outcomes. The NCIN also enables the use of cancer information to support audit and research programmes. The NCIN undertook a major programme of modernisation in 2012 to create a unified national (England) cancer registration service providing more timely and comprehensive data and creating more opportunities for research in cancer. The NCIN was subsumed into Public Health England (PHE) in April 2013, and this move has caused some upheaval.

The Government’s “Plan for Growth” which runs for the whole of the Parliament until 2015, highlights ‘healthcare and life sciences’ as a sector to grow in the UK. In December 2011, the Prime Minister announced a life science strategy with a commitment to make more NHS health data available for research. There is also a commitment to streamline regulation and cut unnecessary bureaucracy in research governance in England through the establishment of a Health Research Authority (HRA) which also came into being in December 2011. The HRA is currently awaiting approval from the Department of Health to undertake work to streamline the process for setting up clinical trials.

Though these latter two developments relate to cancer generally and are not surgery specific, their impact is likely to have a positive effect on research relating to cancer surgery.

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<sup>3</sup> The National Cancer Research Network (NCRN) provides researchers with practical support. It comprises the National Institute for Health Research (NIHR) Cancer Research Network in England, the Scottish Cancer Research Network, the Wales Cancer Research Network and the Northern Ireland Cancer Trials Network.

# LITERATURE AND EVIDENCE REVIEW

The literature on cancer surgery services is tumour group specific in the main, rather than generic. There are however some cross-cutting themes which are explored below.

The main issues examined in the literature demonstrate the development of surgical treatment within tumour groups. Hence the literature on breast cancer – the surgical treatment of which might be considered the most advanced in terms of outcomes – focuses on decision-making and reconstruction. Whereas surgical treatment for gynaecological and lung cancers – which might be considered among the least well advanced – focuses on centralisation of services for the former and variation in access and care for the latter.

## ACCESS TO SURGERY

### (I) Age-related factors

The Royal College of Surgeons, in association with Age UK, published a document entitled *Access all Ages* in 2012 to highlight the anomaly between the incidence of cancer in the older population and surgery rates. The authors noted that while the incidence of breast cancer peaks in the 85+ age group, surgery rates peak for patients in their mid 60s and then decline sharply from the age of 70. Lavelle et al (2007 and 2012) also report that older women are less likely to receive surgical treatment for breast cancer.

However Zbar et al (2012), in their article on the principles of surgical oncology in the elderly, note that the issues in managing cancer in the elderly are complex and require an assessment of the likely length of survival of these patients without surgery, taking into account pre-existing illnesses and general state of health, and the risks and benefits associated with performing surgery.

The role of surgical treatment for older women with breast cancer is discussed by Wyld and Read (2007) who suggest that competing causes of death for older women mean they are less likely to die of their breast cancer in a stage for stage comparison to younger women and that their tolerance to certain therapies reduces the risk to benefit ratio.

Ramesh et al (2006) considered the risk to benefit dilemma facing surgeons in their earlier article and concluded that as a result of surgeons fearing increases in postoperative morbidity and mortality, elderly patients were often receiving sub-optimal cancer treatment.

Leonard et al's (2010) qualitative study investigating the attitudes, perceptions, and practices of breast cancer specialists with reference to the effect of patient age on management decisions found that of the 103 respondents, 41% thought age discrimination was a 'recognised problem', 4% thought it was a major concern, while 36% thought it was a minor issue and 20% thought age discrimination was not an issue at all

Pope et al (2007) address this issue in their article on PACE (pre-operative assessment of cancer in the elderly) and note that the elderly should receive individualised management, without such prejudice.

## **(II) Socio-economic and geographic factors**

It has long been recognised that outcomes are less favourable for cancer patients from poorer socio-economic backgrounds than for those from more affluent backgrounds, and that there are a range of reasons why this might be the case (Cancer Research UK, 2005). Published in 2005, Woods et al's review of research examining the association of cancer survival with socio-economic variables concluded that though tumour stage at diagnosis was a strong factor, there was also evidence of differential treatment between social groups.

Lejeune et al's (2010) retrospective study of nearly 72,000 records of UK colorectal cancer patients, diagnosed between 1997 and 2000, found that tumour stage helped to explain socio-economic disparities in the survival of colorectal cancer patients, with those in lower socio-economic groups having tumours at a more advanced stage at diagnosis. Downing et al (2007) also present evidence to suggest that patients living in more deprived areas have decreased odds of receiving breast-conserving surgery, though the authors acknowledge that later presentation and an advanced stage of disease might mean a narrowing down of choice.

Crawford et al's (2009) study of 34,923 lung cancer patients diagnosed between 1994 and 2002 also considers geography by examining not only social deprivation but also travel time to services. This formed part of a larger study examining the effect of travel time to health services on survival and treatment for five cancers using data supplied by the Northern and Yorkshire Cancer Registry and Information Service (NYCRIS). The lowest odds of confirmation of a histological diagnosis were observed among patients from the most deprived and furthest travel time quartile. The study also found that use of a service (i.e. surgery, radiotherapy or chemotherapy) declined with increasing distance between the location of the service and the patient's home. Again this was most evident for the most deprived group living at the longest travel times.

Hairon (2008) takes a different slant on geographical inequalities in access. Citing the first annual report from the National Mastectomy and Breast Reconstruction Audit in England and Wales (NHS Information Centre et al, 2008), she reports on inequitable access for women in England and Wales to immediate reconstruction surgery, noting that not all providers offer this option. Therefore immediate breast reconstruction is dependent on where women live.

## **(III) Ethnicity**

The effect of ethnicity on presentation, surgical management and outcomes has also been considered in the literature (Sadler et al, 2009; Morris et al, 2010; and Brown et al, 2010). Sadler et al's UK five year retrospective audit of 244 oesophageal and gastric cancer patients concludes that ethnicity seems to influence health-seeking behaviour, with white patients more likely to present earlier (within three months of symptom onset) for medical attention, than Asian or black patients. Morris et al's (2010) review of the evidence in the US found that black patients are less likely than white patients to undergo surgical resection of colon cancer, prostate cancer, non-small cell lung cancer, and others and are less likely than white patients to receive adjuvant therapy in some instances such as rectal cancer, colon cancer and breast cancer. The possible reasons for these findings are cited as multi-factorial and include patient factors, provider influences on the use of care, and hospital influences on quality of care.

## THE RELATIONSHIP BETWEEN SURGICAL VOLUME AND OUTCOMES

There is a significant body of literature on the association between volume of procedures undertaken and clinical outcomes achieved. However, it is not possible to provide a generic formula for this association, or indeed, to claim that the evidence supports this association for all procedures, or all specialities even. For example, statistics presented at a Scottish cross-party debate (Steele, 2013), showed that the risk adjusted operative mortality rate for lung cancer resection was 6.1% for surgeons undertaking less than seven procedures per annum, and 5.0% for surgeons undertaking more than 17 such procedures per annum; while for pancreatic resections, the risk adjusted operative mortality rate for surgeons undertaking less than two a year was 14.7 %, reducing to 4.6% for those undertaking more than four a year.

Improving Outcomes Guidance issued in 1999 advocated the centralisation of gynaecological cancers into cancer centres, though the arguments for and against continued in relation to specific cancers (see Olaitan and McCormack, 2007 and Crawford and Brunsell, 2007 in relation to ovarian cancer; McCrum et al, 2001 re: endometrial cancer and Falconer et al, re: vulval cancer).

Luft et al's (1979) study might be considered the starting point of the modern debate. The authors found that high volume hospitals had better peri-operative and long-term survival rates. Over two decades later, Halm et al's (2002) systematic review and methodological critique of the earlier literature concluded that high volume hospitals have better outcomes for major cancer resections and other high risk procedures.

Nuttall et al's 2004 systematic review of the literature relating to outcomes for two urological cancer procedures, but not a third, reached the same conclusion and Hanchanale and Javel's (2010) later study of the impact of volume on outcomes for radical urological cancer in England noted that high volume providers led to shorter inpatient stays in addition to lower mortality rates. Studies are similarly positive about the correlation with high volume and better clinical outcomes for pancreatic resection (Van Heek et al, 2005), and oesophageal cancer (Branagan and Davies, 2004). Birkmeyer et al's (2003) study examining surgeon volume and operative mortality in the US for pancreatic and oesophageal cancer, found a 10% difference in mortality rates between high volume and low volume units.

Wibe et al's (2004) study found that the rate of local recurrence for colorectal cancer was higher for hospitals with a low annual caseload of fewer than ten procedures than that for hospitals with a higher volume of 30 or more procedures. Borowski et al (2007) concluded that high volume surgeons had lower peri-operative mortality rates for elective colorectal cancer surgery and were also more likely to use restorative rectal procedures. Archampong et al's (2010) later systematic review and meta-analysis on the impact of surgeon volume on outcomes of rectal cancer surgery provides evidence that higher surgeon volume is associated with better overall survival and lower permanent stoma creation.

More recently, Luchtenborg et al's (2013) analysis of 134,293 patients with non-small-cell lung cancer diagnosed in England between 2004 and 2008, of whom 12,862 (9.6%) underwent surgical resection, found a positive association between volume and outcomes. The researchers concluded that, "Hospitals in England with high volumes of surgical resection of lung cancer perform surgery among patients who are older, are more socioeconomically deprived, and have more co-morbidity. Despite this, they achieve better survival, especially in the early postoperative period" (2013: 5).

However, the literature also suggests the existence of a law of diminishing returns as regards the centralisation of more routine cancer surgery. For example, Schrag et al's (2000) study

concludes that while hospital volume predicts outcomes, the differences are modest for more standard procedures, such as colon cancer surgery in comparison to the variation evident for more complex, higher risk surgeries, such as pancreatectomy and oesophagectomy. Ke et al (2012) meanwhile suggest that there is consistent evidence from four studies to suggest that centralising services increases the costs of accessing care for patients and their carers and it is unclear whether centralisation results in economies of scale and is cost-effective.

There is also debate as to whether data reflecting the volume of procedures should be based at the individual surgeon or unit level. In its guidance on minimum surgeon volumes (2009), the Association of Upper Gastrointestinal Surgeons of Great Britain and Ireland strongly advocates for unit volumes rather than individual surgeon volumes to be used as the denominator. A paper in *The Lancet* (Walker et al, 2013) makes the point that if the number of procedures performed by some surgeons in some specialties is low, the ability to identify concerning mortality rates is unlikely. Therefore there is a danger of 'false complacency' by interpreting no evidence of poor performance as evidence of acceptable performance. The national bowel cancer audit project (Cornish et al, 2011) also shows that the organisational infrastructure of hospitals (including for example the number of consultants and specialist nurses per surgical unit and larger ITU and HDU facilities) is also as important in determining patient outcomes as the volume of cases performed.

## MULTIDISCIPLINARY TEAMS

Improving Outcomes Guidance provides detailed information about the membership, structure, and organisation of cancer MDTs and literature demonstrates the positive impacts of MDT working on patient outcomes (Friedland et al, 2001; Stephens et al, 2006; Newman et al, 2006; Hong et al, 2010 and Lamb et al, 2011). However the attendance of particular staff at MDTs may be sub-optimal at times. For example, Alani et al's (2009) survey of oral and maxillofacial surgeons' attitudes towards the treatment of oral cancer patients, found that though national guidelines stated that a consultant restorative dentist needed to be a member of the MDT, this was the experience for only 30% of respondents.

Variations in approach between clinicians can be discussed at MDTs and studies show that when the attendance of a particular specialist is missing then the outcome of decisions might be quite different. For example, Durrant et al's (2011) survey of breast and plastic surgeons found that plastic surgeons show a greater propensity for immediate reconstruction compared to their breast surgeon colleagues - 26.3% of breast surgeons who responded stated that they would not offer reconstruction at all. Differences in approach to pre-operative oncological screening for bilateral breast reduction were also highlighted in Hennidge et al's (2010) 2009 survey of UK breast and plastic surgeons, with breast surgeons reportedly being universally pro-screening, a phenomenon not prevalent among plastic surgeons.

Lamb et al's (2011a) systematic review synthesised the evidence from 37 studies on the clinical, social and technological factors that affect the quality of clinical decisions at MDTs. The authors found that MDTs did change decisions previously made by individual physicians, but that there were regular occurrences of MDTs also failing to reach a decision. The review also found that nursing staff did not play a particularly active role and that patient preferences were not routinely discussed. Time pressure, heavy caseloads, low attendance, poor team working, and lack of leadership lead to poorer decision-making. The authors made a number of recommendations to address what they saw as current shortcomings - these included specific time set aside in job plans to prepare for MDTs, the availability of training in team and leadership skills, and systematic input from nursing staff.

A qualitative study of clinical decision-making in one gynaecological MDT (Kidger et al, 2009), that was not included in Lamb et al's review, produced similar findings regarding the unsystematic consideration of patient-related factors, compared to disease-specific information; and variation in participation of team members in the discussion, depending on their role. Kidger et al's study also noted the differing outcomes of discussions, with some patients' cases receiving a short discussion, followed by an agreed treatment decision, some cases resulting in a lengthy discussion and a clear treatment outcome and some cases being discussed but without any treatment plan having been agreed.

Lamb et al's later paper reporting the results of a 2009 national survey of 1,636 MDT members about effective MDT working in the UK, produced findings consistent with earlier studies, with respondents emphasising the role of clinical nurse specialists (CNSs) as being central in acting as the patients' advocate and complementing the role of the physician. The role of the MDT Co-ordinator is also considered pivotal in the smooth running and operation of an MDT (NCAT, 2010a). A national survey of 265 MDT co-ordinators in the UK (Jalil et al, 2012) found that half of the respondents felt further training was required by co-ordinators in areas such as oncology, anatomy and physiology, audit and research, peer-review, and leadership skills.

## TRAINING AND EDUCATION

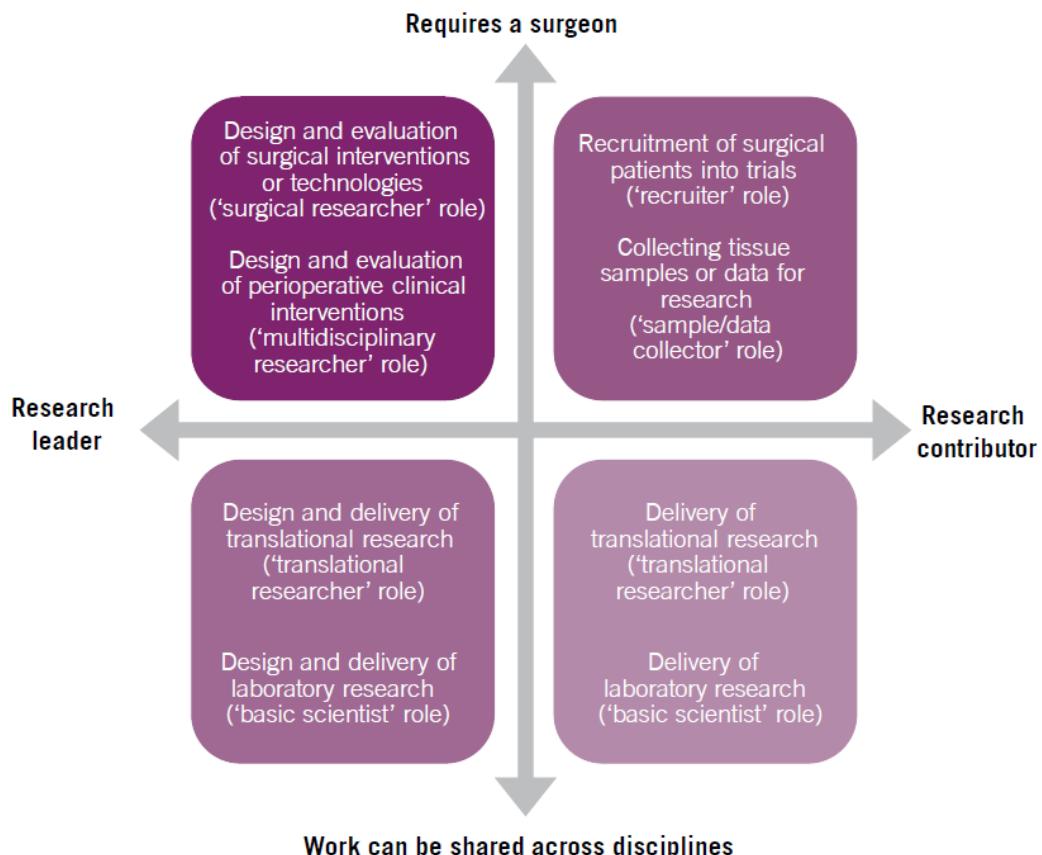
An evidence synthesis for the *Shape of Training* review (Oates, 2013) confirms the absence of a significant body of literature in the subject area, though a small number of papers relevant to surgical training are cited. These include Dhanda et al's (2011) online survey of 95 oral and maxillofacial trainees which aimed to compare the experiences of trainees, pre and post the introduction of Modernising Medical Careers (MMC). According to the survey results, the post-MMC group (n=29) spent half as much time on basic surgical training as their pre-MMC colleagues but both groups reported a similar range of surgical experiences. However, the pre-MMC groups were more satisfied with their basic surgical training than the post-MMC group.

Oates also considers the influence of EWTR on medical education, citing the reviews commissioned by Medical Education England (Temple, 2010a; 2010b) and the GMC (Morrow et al, 2012a; 2012b), and Moonsinghe et al's (2011) systematic review of 72 studies on the impact of reduced hours on education and on clinical outcome. Oates notes that while the authors conclude there is evidence that reduced hours do not impact on quality, there is also an acknowledgement of conflicting results from those studies reporting the impact of EWTR, and that further research of a more robust nature is required in this area.

In responding to the calls for evidence for the *Shape of Training* review, The Joint Committee on Surgical Training suggested the following as potential solutions to the issue of balancing generalist and specialist training: "Concentrating pre-CCT (Certificates of Completion of Training) training on the achievement of generalist skills and competencies within the surgical specialty (and) moving the majority of special interest training to post-CCT via 2-3 year funded fellowship posts, linked to service needs and commissioned by the responsible bodies in the 4 nations of the UK" (GMC, 2013: 40).

## RESEARCH AND DEVELOPMENT

Figure 2: Roles a surgeon might have in cancer research



Source: National Cancer Research Institute 2012

Individual surgeons can play different roles within research. For example, cancer research involving surgery in conjunction with neoadjuvant therapies can be surgeon-led or oncologist-led – this type of research is multidisciplinary by definition. Meanwhile, some research will examine the role of surgery by comparing two techniques against one another. Where 'surgical research' is mentioned in this report, the term covers all types of cancer research involving surgery.

### Case study - surgery-only: the CLASICC trial

This trial compared keyhole (laparoscopic) surgery with standard open surgery for bowel cancer and was carried out between 1996-2002. At the time the trial was carried out, bowel cancer surgery was usually open surgery as standard. While keyhole surgery takes longer to carry out than open surgery, patients normally recover faster and experience fewer side effects.

The aims of this trial were to find out:

- If keyhole surgery is safe
- If keyhole surgery is as useful as open surgery at stopping cancer from coming back
- More about side effects and quality of life

The trial recruited 794 patients with bowel cancer:

- A third had open surgery

- Two thirds had keyhole surgery

The researchers found that keyhole surgery is as useful as open surgery for all stages of bowel cancer.

The researchers looked at whose cancer had come back, how many people were alive three years after treatment and quality of life. They found no difference between the two treatment groups.

The trial was led by Professor Pierre Guillou, Professor of Surgery at St. James' University Hospital.

Source: *CancerHelp UK*

### **Case study – surgeon-led research: the EORTC 40983 trial**

This was an international trial looking at chemotherapy before and after surgery to remove secondary liver cancer that had spread from a cancer that started in the bowel. In the UK, this trial was supported by Cancer Research UK.

The aim of this trial was to find out if having chemotherapy both before and after surgery worked better than having surgery alone.

The trial recruited 364 people. Half had FOLFOX chemotherapy before and after surgery. Half had surgery alone.

The trial team found that having chemotherapy and surgery was a useful treatment for bowel cancer that has spread.

The trial was led in the UK by Professor John Primrose, Professor of Surgery at the University of Southampton.

Source: *CancerHelp UK*

It is reported (Purushotham et al, 2012) that, globally, surgical oncology only represents about 9% of all cancer research – disproportionately low in comparison with surgery's contribution to cancer treatment. According to Purushotham et al's research, the US publishes the most papers. Japan comes second, followed by the large Western European countries, including the UK. Citing Sullivan et al's (2008a) study, the authors make the point that, "Although the relationship between research activity and patient outcomes is complex, what is clear is that low research activity does correlate with poorer outcomes."

Limited engagement with oncological surgical research from an early career stage (studying towards a MD or PhD) is highlighted in Sullivan's (2008b) review of the junior academic clinical faculty in the UK's National Cancer Research Institute. Nearly half (49%) of the junior faculty fellows at the time of writing were medical oncologists with only 12% of posts filled by surgeons. Engagement with research at a later stage in a surgeon's career is the focus of Healey et al's (2011) evaluation of the breast cancer research output of 277 UK and 36 Irish breast surgeons. The authors make the point that a small minority of surgeons are responsible for the majority of output. The authors also note that almost a quarter - 23% - of the UK and Ireland-based breast surgeons included in the evaluation did not appear to have published any breast-related research at all.

# SUMMARY OF THE INTERVIEW FINDINGS

Views and experiences of cancer surgery services were explored through 36 in-depth interviews with cancer experts and practitioners at a national level and in a number of case study sites in England and the devolved nations. Details of the participant sample and interview methods can be found in Appendix 1. Thematic analysis of the interview data revealed several major themes which are reported in turn below. In the expectation that interviews might touch upon sensitive issues, and to encourage the free expression of views, anonymity was guaranteed. Therefore quotations from the interviews have been attributed using only the interviewee's role.

## CENTRALISATION AND RECONFIGURATION

We begin this section by considering centralisation and reconfiguration, as it was a major theme arising from the research and seems to be the basis from which all other themes identified naturally flow. When interviewees were asked the opening broad question 'What has been the most significant change in cancer surgery services in your organisation in the last two or so years?' almost all referred to the reorganisation and centralisation of services resulting from the implementation of Improving Outcomes Guidance. Such guidance takes into account the empirical relation between surgical volume and clinical outcome, a debate which has been present in the literature since the late 1970s (Luft et al, 1979). Put simply, the premise is that the more surgical procedures that are carried out within a unit, the better the clinical outcomes for those patients.

## VOLUME AND OUTCOMES

Many interviewees took for granted the integrity and reliability of the body of evidence relating to the positive relationship between volume and outcome but support for centralisation on this basis was not unequivocal.

*"Well, actually there isn't a lot of evidence to be perfectly honest with you if you really do a proper evaluation. For every paper there is that says there is evidence there's another one that says there isn't actually." (Consultant, specialist hospital).*

A view was also expressed that the research undertaken in this area does not methodologically take into account the mix between complex and more straightforward procedures and while it makes sense to build up a team of people who are familiar with dealing with complex procedures, for more straightforward procedures, surgeons should be competent, regardless of the volume.

*"So I think if you're dealing with the complex end of a field then the more you've done collectively and the more expertise you have, it's more likely you're going to make the right decision for the patient. If it's a fairly sort of straightforward/standard colon cancer, for example, you should be competent at being able to know how it should be treated and treat it well, irrespective of volume." (Consultant, specialist provider)*

There are several other nuances to the debate as discussed by interviewees. Some interviewees noted that evidence was either non-existent, or ambiguous for some

procedures. Others pointed out that you could still have a good surgeon undertaking smaller numbers of procedures and achieving good clinical outcomes, and equally a surgeon performing large numbers of procedures but achieving poorer clinical outcomes because they were essentially a poorer surgeon.

*"I'm not sure that it's ever been proven robustly. I think there are some very good surgeons that can do very few cases and still get brilliant outcomes, and there are some very poor surgeons who can do loads of cases and still not get good outcomes, but the majority of us in the middle probably do get better as we do a certain number-but what that number is, I don't know." (Consultant, secondary provider)*

Interviewees suggested that the volume deemed appropriate within guidance should be based on minimum numbers, rather than absolute numbers. The view was also expressed that the volume deemed appropriate should be based at the unit level rather than the individual surgeon level, as the number of procedures performed by an individual surgeon would not be large enough to judge competence in a methodologically valid way. The observation was subsequently made that it would then be for peers to identify and tackle poor performance by an individual within the team.

## **WINNERS AND LOSERS**

Interviewees recognised that centralisation would lead to winners and losers in the system, the losers being smaller District General Hospital (DGH) type providers and they expressed concern at the impact that this would have on the system as a whole. The impact of centralisation across the system is complex and was conceptualised by one interviewee as 'a domino effect'. When specific cancer services are removed from a provider and centralised elsewhere, the surgical team will either follow the service, or if they remain, may come to see the provider as an unattractive employment proposition because its surgical status has been 'downgraded' or somehow compromised. Either way, key members of staff, including surgeons, specialist cancer nurses, radiotherapists and pathology staff may all be affected by such a move. The removal, voluntarily, or otherwise of surgeons from a provider by these means will have an impact on remaining services, particularly on the provider's ability to maintain surgical rotas and an emergency surgical service. This in turn may raise legitimate concerns about the surgical cover available and the viability of Accident and Emergency Departments.

It is this impact and the sense that this is not happening in a managed way across the system that is causing concern among the stakeholders we spoke to.

*"It's being done with a lack of coherent systems thinking, you are saying we'll take this group out because there's some evidence they may get marginally better outcomes if they are done in a big centre. What about everyone else that derives benefit from the skills of the surgeons that you are going to run down? What happens to them? What happens to the broader picture? It's a complex situation."*

*(Consultant, DGH)*

*"If you simply said we'll only do the colorectal cancer cases in the centre and we'll leave the surgeons in the periphery and tell them they can't do major cases, well that sort of downgrades the guys in the periphery...And you will fail to recruit surgeons to work in the periphery and then you won't have any surgeons to do the emergency work. So if you then take a step further and say well actually all the emergency laparotomies are going to be done in the centre as well you'd then leave the periphery as a district general hospital with no significant surgery on site. So if a medical patient*

*becomes unwell you've then got to build in a robust system for a surgeon to go and see that medical patient really quickly and decide if they need an operation or not and, if they need an operation, be able to transfer them quickly and effectively to the centre, all of which is actually really hard to achieve." (National interviewee)*

## **POPULATION DENSITY AND DISEASE INCIDENCE**

The volume-outcome debate and NICE guidance (IOGs) is overlaid with considerations of density of population and incidence of disease. While absolute populations may not be considered large enough to support particular services, the number of new cases seen may yet fulfil a different aspect of the criteria, resulting in situations which though only partially complying with the guidelines, make sense from a local perspective. Frustration was expressed by some interviewees regarding the overly prescriptive nature of guidelines and peer reviews on a number of issues and the fact that 'one size does not fit all.'

*"The size of our population...is about 600,000...and, of course, a lot of the NICE guidelines said you've got to have a million population. Now, in head and neck we were told we had to have a hundred new cases and a million population. Currently we're getting about 150 new cases from our 600,000. So, you know, the numbers that were set up very much reflected practice elsewhere in the UK, rather than in the high cancer areas like ourselves and in the north-west of England." (Consultant, secondary provider)*

## **PATIENT EXPERIENCE**

While interviewees talked about the positive impact on patients of centralisation in terms of improved clinical outcomes, a number also raised the potential for negative impacts. There were two main points raised – one relating to the need for patients to travel further for their surgery and the second point relating to the relational aspects of care and the potential for surgeons to miss out on contact with their patients prior to surgery, if their pre-surgical assessment and care was provided at another site.

*"You might not see the patient before you operate on them as they were booked on a different site. Consistency of individual care matters to patients and to the consultant-but that is being lost." (Consultant, secondary provider)*

A concept of shared care and ensuring the right processes and infrastructure are in place to support this approach is likely to become increasingly important as centralisation leads to surgery being performed at 'the centre' and other aspects of the care pathway being delivered elsewhere.

*"Once a person's been discharged home, if they become unwell do they go back to the centre or do they go back to a local hospital? If they become unwell at home and they call an ambulance, the ambulance will take them to the local hospital and the local hospital may not have the records of the operation because we don't transfer our patient records very effectively between sites...I have an example of a specialty in which patients were transferred to the centre for their major surgery and then transferred back to the local hospital for follow-up and there was a breakdown in communication such that no one actually looked at the histopathology outcomes from the major surgery and then discussed with the patient if they needed further treatment or not. And that was something that was a systematic problem that went on for about six months." (National interviewee)*

*"The district general hospital has to be seen as an integral part of the cancer centre, of the specialist service and it is packaged as such, that my local hospital is part of the central hospital so I'm seen there, I'm assessed there, I'm supported there, I go back there, I have my operation, I then come back to my local place, but they're all part of one. But that's not the way it's packaged."* (National interviewee)

One interviewee, who was aware of patients who were travelling much further for their surgery, felt very strongly that there is not sufficient patient voice within the centralisation and reconfiguration debate, and that decisions are made without the patient perspective being taken into account adequately. An alternative view was offered that patients would be prepared to travel for expert care.

*"So patients do come from near and far. It caused a bit of political disharmony, but the most compelling argument is usually the patient, and we always assume that patients don't want to travel, but actually if you're going to get expert care you will."* (Service Manager, tertiary provider)

However, there was no empirical evidence offered to support either side of the argument which suggests that units had not undertaken any specific work to determine patient preferences.

## **POLITICAL FACTORS**

Interviewees commented on what might be the limit of centralisation and how this would be determined and by whom. Political appetite was cited as the main limiting factor by some, whereas the influence of commissioners was also raised as a factor, though this was considered as both a driver for and obstacle to centralisation.

*"The approach has now become more streamlined by national commissioning i.e. peritoneal and other levels through the new commissioning architecture and CCGs. We argue that centralisation equals a quality service, and these are the key metrics on which commissioning is based."* (Consultant, tertiary provider)

*"So let's talk about hepatobiliary and pancreatic cancer surgery...specialist surgery in that area is supposed to serve a population of two million, but we have a hospital in our region that serves less than a million. But they persist in doing it and their network persists in supporting them to do it. So even though we know that that's not within either the spirit or the letter of the guidance, both the commissioners, because of their wish to support their local hospitals, and the individuals within that trust work outside national norms."* (National interviewee)

## **SPECIALISATION AND SUB-SPECIALISATION**

Centralisation and professional specialisation (and sub-specialisation)<sup>4</sup> might be considered as symbiotic in their relationship, with each enforcing the need for the other. Specialisation and sub-specialisation were seen as a positive development for patients, and inevitable given the increasing complexity of treatment. But as with centralisation, specialisation and sub-specialisation cause wider system issues. The main issue related to the ability to manage

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<sup>4</sup> Most surgeons specialise in one type of surgery. Surgeons work in ten main specialties, some of which are divided up again into subspecialties. Specialties include general surgery, cardiothoracic surgery, neurosurgery, otorhinolaryngology, paediatric surgery, plastic surgery, trauma and orthopaedic surgery, urology, oral and maxillofacial surgery, and vascular surgery

emergency procedures, particularly in smaller units. Surgeons talked about their confidence in undertaking general surgical procedures that were outside the scope of their specialist area.

*"I think the impact (of specialisation and sub-specialisation) has overall been positive, I think it's been a good thing for patients, we're getting better at doing things that we never used to do before, so that has worked for the specialisation, patients get much better care in the daytime and for routine operating. It does get a bit sticky when you're on-call but then a big department like this with 12 consultants, I can at any time call upon someone else to give me a hand if there's a procedure I haven't done in quite a while, so that doesn't create a major issue." (Consultant, secondary provider)*

*"If you have super specialisation with enormous teams in huge hospitals then you know it kind of works for everyone but how is that going to work in xxxx, how is it going to work in Cornwall? It's fine in the middle of London. We all specialise but we all have to be general urologists because there's only five of us. When I am on call I have to deal with everything but inevitably in my routine work I largely just do prostate cancer, you know I will hand over the renal cancer to someone else, I will hand over Stone Disease to someone else." (Consultant, DGH)*

*"I know a lot of breast surgeons no longer either like to ... or feel they are capable of doing general surgery but one of the reasons I moved to xxxx, was in order to keep doing a little bit of general surgery" (Consultant, DGH).*

Additionally, interviewees talked about the impact of meeting waiting-time targets and providing cover for colleagues.

*"The problem occurs when it comes to targets and getting things done, so clearly, I can't do a target rhinoplasty because I haven't done a nosejob in a while and my rhinoplastic surgeon, he can't do a laryngectomy because he hasn't done one of those in a while so it kind of becomes difficult." (Consultant, secondary provider)*

This suggests that the management of theatre lists is a complex trade-off between meeting waiting-time targets and ensuring an appropriately specialised consultant is available.

*"The main bottleneck is getting patients into theatre for operating. It's because of targets, because you have patients who don't have cancer needing their stuff done by 18 weeks. You have patients with cancer who need their stuff done sooner, but then which target do you breach at any given time? So that's a discussion the Trust has to have with itself all the time and then based on which they think is a greater need, they have to rearrange things and because we're getting more specialised I can't do, well I don't do many of the normal ENT procedures, my other colleagues don't do much cancer work, which means if I take on their list and they have to be accommodated in a clinic..that my clinic has to be cancelled or done by someone else." (Consultant, secondary provider)*

## TRAINING

Discussions regarding specialisation and sub-specialisation inevitably led to the more general subject of training – both the formal training programmes for junior doctors and training in new techniques for all grades. As regards the former, there was a general sense of disillusionment about the current structure of training for junior doctors (Modernising Medical Careers specialty training started in August 2007) though it was difficult to disentangle this from the constraints of the European Working Time Regulations (EWTR). These time

constraints are reported to result in trainees spending less time in theatre than they might have done previously, as all hours at work, including on-call periods count towards the 48 hour working week.

*"So a lot of those hours are not happening when they are likely to be stood opposite the boss undertaking certain procedures – it's more out of hours, weekends and nights." (Consultant, tertiary provider)*

The limitations of the training programme for the most junior doctors – Foundation Years 1 and 2 – were not considered conducive to them becoming more engaged in surgery.

*"It's a complete and utter shambles. They don't have the inclination, there's no real camaraderie, they are lost in the wilderness. They are doing nights, and covering multi-speciality areas so they don't really belong to anyone." (Consultant surgeon, tertiary centre)*

*"Well, I don't think they have ownership of their clinical practice and I don't think they have membership of the clinical team. And they work in shifts and essentially...you don't have the integration and the feeling that you're part of a single team, which used to be the case in the old days." (Consultant, specialist provider)*

A knock on effect of the EWTR with other training grades was also noted.

*"The training of junior medical staff is getting worse not better. I understand the reasons why the hours limits have been imposed...The problem is now it's extending out into the other grades so even our Registrars – we don't have out of hours registrar cover beyond eight o'clock in the evening because of the constraints on their time and the fact that they are only allowed to work a certain number of hours. So we have this unsatisfactory situation whereby if we ask them to provide on call cover, then their daytime training suffers which we think is not acceptable so basically they don't get any emergency experience and the additional knock-on effect is that when I am on call I do a week at a time." (Consultant, DGH)*

There has also been an increase in the number of women entering surgical training programmes – in 2011, 26% of surgical trainees were women and it is anecdotally reported that a significant number opt for flexible (part-time) training places. If this is the case, this will also have service implications in terms of managing rotas and providing out of hours cover, which in turn will potentially impact on the emergency experience these trainees are able to gain.

Interviewees commented on how the current training programmes were resulting in surgeons who were taking up consultant posts at the end of their training being experienced in depth but not breadth.

*"The problem at the moment is that the way people are being recruited into consultant surgical posts is that there's an expectation that they are sub-speciality trained. But inevitably that means that they spend very little time doing a breadth of surgery. So we can produce somebody at the end of it who's quite a good colorectal surgeon, but actually they've done virtually no upper GI surgery, a tiny amount of vascular surgery. And so, while they can do everything that's straightforward and easy, when it gets to really complicated stuff they'll struggle because they don't have the breadth of training." (National interviewee)*

Interviewees also noted that you have to have surgeons who are trained in both open and minimally invasive surgery because you may start the surgery laparoscopically but hit complications and have to open the patient up. Indeed, a recent trial of laparoscopic surgery for colorectal cancer showed that in 16% of cases, laparoscopic surgery had to be converted into open surgery during the procedure itself (van der Pas et al 2013).

In addition to talking about the training of junior doctors, interviewees discussed the training that was required across the grades in new techniques and technologies – such as training in laparoscopic techniques. Many interviewees referred to the Laparoscopic Colorectal Surgery (LAPCO) programme as an example of a successful national training programme. The LAPCO programme was introduced by the now defunct National Cancer Action Team (NCAT) and the Department of Health in 2007 to address the shortage of trained surgeons who could undertake laparoscopic bowel resections – it ceased in April 2013 when funding was no longer available. Though interviewees were full of praise for the programme, one interviewee noted that capacity was still an issue in laparoscopic surgery.

*"We're struggling for capacity because it takes a long time to learn to do these things. I mean laparoscopic surgery is quite a skill where you're sort of remotely manipulating small instruments and looking at what you're doing on a screen...you can't pick them (surgeons) off a shelf as it were."* (Consultant, secondary care)

A Royal College of Surgeon's (2013) briefing on the impact of NHS innovation and research strategies specifically mentioned the need for nationally commissioned training programmes and urged the government to ensure the benefits of nationally commissioned training programmes are retained under the new funding system for training and education. The briefing also notes the importance of ensuring consultants are supported by their organisations to undertake training, education and research and raises concerns that the time available for these sorts of activities in job plans has been declining in some organisations.

Training for consultants is paid for by their own organisation – it has been standard practice to allocate each consultant a study leave budget of £1,000 a year which normally covers attendance at conferences as well as undertaking formal training programmes. Consultants are usually responsible for identifying their own training needs and allocating their study leave budget accordingly. However, the specialist nature of some of the training required means that more creative solutions are sometimes required.

*"When I was at xxxx DGH as the Medical Director, I paid for a consultant at xxxx to come over once a week and train a young consultant in laparoscopic surgery."* (Consultant, tertiary provider)

*"I have spent time on robotics and I think it has a lot of advantages in terms of your learning curve and getting up and running. It took me two years, going from a high kind of experience level of laparoscopy, it still took me two years to learn that technique...And the only way I learnt it was by getting mentored by a French guy that we flew over here once a month. It was a very expensive way of doing it."* (Consultant, DGH)

Interviewees also talked about the training of clinical nurse specialists (CNSs), noting that there is no national training programme available, and that ensuring the availability of well-qualified and experienced nurses was critical to the overall provision of cancer surgery services.

*"We are starting a project with Prostate Cancer UK to look at seeing whether or not we can actually develop a training programme...It's starting to get worse because a lot of the existing CNSs are going into their fifties and you know looking towards retirement now so we want to try and sort it out before we have a real problem in five or ten years."*

## WORKFORCE ISSUES

Shortages or problems recruiting specific kinds of staff tended to be mentioned at the local rather than national level, though there was a general sense that there were delays in recruiting people to fill vacancies because of the constraints imposed by organisations in the current financial climate. One interviewee talked about a delay of many months to fill a consultant post, and that this was a result of organisational processes rather than the lack of availability of appropriately skilled doctors.

*"The second issue is the credit crunch has led to tightening of services, so we're currently one oncologist down and have been down for nearly six months now with no end in sight." (Consultant, secondary provider)*

*"We have a particular problem in that when they (CNSs) leave we don't have automatic recruitment now. And, again, I think that's not uncommon around the country so you have to make the case that you need the person that's just left. And, sadly, the person that's just left has almost always been working beyond their original job description and been putting in a lot of extra hours and doing a really good job and, of course, once they leave there's a huge gap in the service and it's taking us six to twelve months to fill it." (Consultant, DGH)*

In general, surgery as a profession is still highly competitive to enter, with no lack of applicants to speciality training programmes. However, some concerns were raised by interviewees in certain locations about consultants in specific specialities. These included longstanding issues with shortages of oncologists in some parts of Scotland; oncoplastics and maxillo-facial consultants in England; and future workforce planning around breast radiology – with a perception that not enough people were coming through the system in that speciality.

There were also concerns about replacing surgeons in DGHs and the reluctance of surgeons to apply for consultant posts in these smaller units because of the unit's perceived vulnerability.

*"There are pressure areas where surgeons are retiring, there is difficulty in getting a new colleague in post. A lot of these services are maybe just one, two handed services. One surgeon retires or moves on, 50% of the workforce has gone, which is certainly the case within some of the DGHs." (National interviewee)*

In contrast to shortages, or difficulties in recruitment, a small number of interviewees referred to a 'glut' of GI consultants. When this comment was tested with other interviewees, it was noted that these are the 'front door' or 'emergency' surgeons, and they are therefore needed in larger numbers to cover rotas. The drawback of this situation is that individuals may then struggle to undertake the required number of cancer procedures to keep their volumes at an 'acceptable level', according to guidance. A specific example was given of a unit seeing 90 oesophagectomies a year with seven consultants, each expected to undertake 20 oesophagectomies a year. Reducing the number of consultants in the unit was not an option however as it would mean a difficult and unsustainable on call rota.

Other local issues identified included shortages of non-medical staff such as theatre staff and CNSs. Again, financial constraints appeared to be the main reason for difficulties in recruiting these staff, rather than a lack of suitably qualified staff.

*"I think there is a decrease in accessibility to clinical nurse specialists ... it has become a bit of a luxury and we don't have enough, either here or generally. And I think where there might have been a reasonable cohort about 10 years ago I think they have diminished significantly across the patch."* (Consultant, specialist provider)

## MEASURING SURGICAL QUALITY AND OUTCOMES

There was general agreement that greater transparency in publishing clinical outcome data is a good thing but a number of concerns were expressed by interviewees. In particular, people were concerned about the recent publication of surgeon level data, noting that in reality clinical outcomes were not related just to the individual surgeon but depended on the whole clinical pathway and clinical infrastructure, including pre-surgical and post-operative care; other departments such as intensive care units, diagnostics and pathology; and other staff groups such as anaesthetists and nurses.

In addition, the view was expressed that data at the individual surgeon level is methodologically problematic because the number of specific procedures undertaken by any individual surgeon is likely to be too low to allow for meaningful interpretation. Though this is recognised by surgeons themselves, it is not necessarily an issue of which members of the public would be aware.

*"The numbers are small, statistical variation has probably been by chance, whereas if you get practitioners with huge numbers, say cardiac surgeons who specialise in coronary artery vascularisation, well, you can then start to look – any variation is based on big numbers and you can be pretty certain it's because of clinical standards. Our problem in so many surgical specialities is that we are small-volume practitioners."* (Consultant, tertiary provider)

*"You could publish surgical outcomes for every cancer team in the country but it would mean nothing because the numbers would bounce up and down because the numbers would be so low. You couldn't actually show good from bad... There are lots of things you could do, lots of things you could count, but if you just put them out, it is not – it doesn't differentiate good from bad. You couldn't tell anything from it statistically, and you could argue that it would be too dangerous to put it out because it may be interpreted by the press or by patients to take a particular decision which would actually be the wrong decision or would be completely misinformed."* (National interviewee)

It was suggested that making surgeon level data available to the public might have the effect of influencing surgeon behaviour, so surgeons become more risk averse and less likely to either perform more complex procedures, or operate on patients with higher clinical risk factors, both circumstances which might have a higher risk of mortality attached. 'Marginal' cases might be declined surgery where they might have previously been offered it.

*"So, the question is, if everybody aims to have the lowest possible mortality rate, what's going to happen to the people who are marginal? Because you're going to say, 'Well, I can't afford to [operate on] him because it's going to make my figures look bad'... But, actually, a proportion of those patients are going to be five-year survivors."*

*And there's a real difficulty in the short-term-ism that operative mortality and one-year survival produce, when actually what we should be saying is, 'What's the impact of all of these factors on the population as a whole?' You know, not just the population that you've operated on." (National interviewee)*

It was noted that in some cancers (e.g. oesophageal) the 'marginal cases' group is fairly large because the risks of operating are always relatively high. Several people pointed out that a surgeon who is very conservative about who they operate on would look far better in terms of crude performance data than a surgeon who is willing to operate in riskier and more complex cases. The suggestion was that data should therefore also be published on how many cases are referred to a unit and how many of those cases are subsequently operated on.

*"Let's say I just collect data on a procedure that I only offer to a very highly select group of women, in other words they've got small cancers, they're young women and they've got no complications, no co-morbidities for instance. I'm likely to get fantastic results, whereas another surgeon might well offer that procedure to a whole more complex group of women. Whereas on paper, clearly, he's doing more cases, but the outcome results may be very different and may actually suggest that he's a worse surgeon. But really he's getting better results because he's offering the surgery and the treatment to more women than the first surgeon." (National interviewee)*

The view was also expressed that while mortality might be a suitable indicator for something like cardiac surgery, cancer is more complicated, and that there should be a focus on longer-term outcomes such as five-year survival rates as well as short-term outcomes such as 30 day mortality.

Taking the argument a stage further, cautions were aired about measuring individual versus population outcomes. For example, evidence shows that driving up resection rates for lung cancer is likely to make the biggest impact on outcomes, but this means higher individual risk traded off against overall population gain. It was suggested that reporting 30 day mortality might have the undesirable effect of driving down resection rates instead.

*"What the [evidence shows] is – I'll summarise it for you – for every extra patient that dies in the hospital, you save thirty five people over five years. So if you increase the resection rate, you increase the near to treatment mortality...but you also increase five year survival...That's why cancer surgery being judged on thirty day mortality is completely misleading." (Consultant surgeon)*

There was widespread recognition of the importance of considering quality of outcomes in a more holistic way, particularly taking into account the patient perspective. Many units were trying to find meaningful ways to incorporate the patient experience in the data they collected on outcomes. And though there were one or two examples of this happening in local areas, with patient surveys, it was not systematic. A number of interviewees also mentioned that the development of Patient Reported Outcome Measures (PROMs) in cancer care would be a positive step forward.

*"Publishing surgeon level data is positive but it's given us all a bit of a scare and we've all been out there checking that our numbers are correct. I'm a big proponent of transparency and knowing the good, the bad and the ugly but my caveat is to put less emphasis on the absolute numbers or rates and more emphasis on the quality." (Clinical lead and consultant surgeon)*

## ACCESS TO SURGERY

In contrast to findings in the literature, the consensus view from interviewees is that older patients are not discriminated against in terms of access to surgery in general, or particular procedures, and several examples were given of patients in their 90s who were being "actively considered" for surgery. Nonetheless it was also recognised that risk-benefit profiles differed according to type of cancer/surgery as well as patient-related factors such as co-morbidities and overall health. Consequently, surgery was a far less viable option in some cases as the potential benefits of operating would be far outweighed by the known or anticipated risks. As interviewees explained:

*"Clearly if we have a 95 year old who's got other co-morbidities and oesophageal cancer, then it's probably inappropriate to consider surgical intervention in that patient because the survival from an oesophagectomy in a 95 year old is pretty small"*  
(Consultant, secondary provider)

*"Surgery for colorectal cancer is rarely withheld for age, because the complications of not operating are obstruction, perforation, and are fatal, so the risk benefit of operating is in favour of operating, generally. But if you go to other types of surgery, so for example, pancreatic surgery, oesophageal surgery, the risks of surgery are enormous, and the likelihood of an elderly, frail patient benefiting from it are very small. And the mortality from such an intervention would be substantial, and so people would generally withhold it unless they thought there was a realisable benefit."* (National interviewee)

Fitness for surgery was assessed in different ways with most units discussing the use of clear protocols. Some units undertake Cardio Pulmonary Exercise (CPEX) testing for high risk patients or high risk procedures. This requires special kit and is usually anaesthetic-led, so it is not universally available and DGHs generally would not have access to this sort of equipment. However, it was noted that in spite of the protocols there was still room for surgeon judgement and patient choice.

*"Fitness for surgery - you can protocolise, but it has to be individualised, we don't have any fixed rules for, in terms of age limits or anything like that."* (Consultant surgeon, secondary provider)

It was suggested that the MDT system had helped to develop practice in this regard, by challenging assumptions about patient preferences. It was also noted however that the advent of surgeon-level reporting would be a big driver to getting the patient assessment right before surgery.

Though access in general was not considered a cause for concern among interviewees, there were some specific issues for certain tumour groups, demographic groups and procedures. Examples were given of significant variation in referral rates from a particular geographic area for a rarer cancer; and a suggestion of inequity of access to laparoscopic surgery in one area of the country due to a shortage of appropriately trained consultants. There were also examples of variation in access patterns that were attributed to patient behaviour, beliefs or attitudes. It was suggested that while there was evidence to support reluctance within the Asian community in general to engage in screening programmes, there was a specific barrier for the Muslim community in engaging in colorectal procedures as this might ultimately lead to the creation of a stoma, and the associated difficulties this might present in maintaining religious cleanliness.

A view was also expressed that better educated, 'middle class' patients may receive a different level of service to other demographic groups because they would be better able to navigate the system and would be more demanding.

*"I think the more complex the pathways, so disadvantaged groups will get a less optimal service .... So, I think the best example is in different ethnic groups, particularly if they don't speak good English, they will not ... be able to access the resources available to them, as well as people who understand the health service and how to access it. ...you don't have to look any further than highly educated middle class families, who come to you with a list of questions off the Internet, and quite rightly, demand their rights and a high quality of care. ...they will tend to get all the resources thrown at them, not through any bias or wrong, but because actually they're demanding them and making sure that the right things are done." (National interviewee)*

Variation in access to certain procedures was also seen as a result of late and emergency presentations narrowing down patients' options. It was suggested that 25% of colorectal patients presented as emergencies and in Wales, late presentation was raised as an issue affecting cancer survival rates in general.

*"Cancer survival in Wales is less than it is in England, which is less than it is in mainland Europe. And a lot of that is due to late presentation. And that doesn't seem to be a primary care problem – the GPs will send us patients when they get them – but it seems to relate more to patient expectations and not going to the GP until you've got a lump growing out somewhere, you know, rather than the six months earlier...I think that if we were to influence that and get patients in earlier, then we would see things like thoracic surgery requirements for lung cancers going up.' (Consultant, DGH)*

There was however, a slightly different view offered regarding the relationship between demographics, late presentation, and outcome.

*"It's well documented at a national level that for colon cancer there is a clear inverse relationship between social deprivation and outcome after treatment. Poorer people tend to present later, have emergency surgery and do worse. I went into a project with a student with that prejudice and tracked 600 patients – but social deprivation didn't seem to make a difference to the type of care they received." (Consultant, tertiary provider)*

## **PATIENT INFORMATION AND DECISION-MAKING**

Interviewees mentioned a lack of information and decision-making support available to patients and there was little evidence that genuinely shared decision-making was taking place. As one surgeon explained, patients' choices may be strongly influenced by how a decision is 'framed'.

*"The decision to treat, to do an operation is made in the course of a conversation between the surgeon and the patient...Of course there is the issue of how it is put to the patient...If the surgeon's saying, well we could do this but it's a big operation, and this can happen...whereas if...the surgeon's saying well actually we can do this, there are some risks but you know, if you get through this, this will be very beneficial to you." (Consultant surgeon, secondary provider)*

Certainly some interviewees felt that this was an area where improvements could be made, particularly in improving communication between the doctor and the patient.

*"Cancer is probably better than most when it comes to shared decision-making, but I'm sure there's room for improvement in general communication skills because we're all individuals, we've got different personalities. Some of us are more gobby than others and are more willing to talk. Others are, you know, don't find interaction with patients that easy and have to work on it." (National interviewee)*

Several interviewees talked about the national training course in advanced communication skills for senior healthcare professionals involved in cancer care that was established by the National Cancer Action Team (NCAT) and is organised by the Royal Marsden, but uptake across the country is unknown.

## **VARIATION AND SERVICE IMPROVEMENT**

It is clear interviewees recognised that variation in practice still exists. In some cases this was seen as legitimate, though nonetheless problematic. Variation can depend on the following:

- The stage at which patients present;
- A lack of evidence to support one particular type of procedure over another, in which case the choice of procedure depends on surgeon preference;
- Access to technology, for example whether robotic surgery is available at a particular site; and
- Demographics.

Interviewees felt that indefensible variation of practice leading to poorer clinical outcomes for patients has reduced over time and consider centralisation, specialisation and sub-specialisation, and the role of MDTs and peer review to have done much to standardise practice. However, there are still tangible differences between units.

*"There are still variants in the system but it's becoming more difficult to defend. So you know in terms of the breast pathway, whereas in xxxx it's a twenty four hour, forty eight hour pathway, down in the xxxx hospital, the same surgeon was doing a four or five day pathway. I was like "Well, why are you doing that?" You know, the patients don't want it, the patients want to get home, but it was that kind of getting away with it, because you're within a smaller hospital because there is less supervision, less peer group around so he was able to put in a default position of "This is what I am comfortable with" rather than actually the evidence base is best." (National interviewee)*

*"Our oncologists are very keen at the xxxx to give chemotherapy because they believe there are definite advantages to be had for it. But I've known MDTs in other – from other cancer centres – where there's a huge reluctance. And there are patients with node positive breast cancer and they're saying, 'Well, it's only one node. They don't get any chemotherapy.' It's not even discussed with them." (National interviewee)*

It is suggested that further improvements in clinical outcomes will come about through different solutions depending on the tumour group in question. For example, encouraging earlier presentation and improving the emergency surgery pathway could result in improved outcomes for colorectal cancer, while increasing the number of thoracic surgeons could improve outcomes for lung cancer. For less common and rarer cancers, further centralisation

was considered the optimum solution. A key issue appears to be whether, and how quickly, patients who enter as an emergency are picked up by the relevant MDT.

*"The concern I have is when patients come in as an emergency, and they don't necessarily get to see a specialist surgeon, particularly with bowel cancer, ovarian cancer, sometimes in lung cancer. So at the weekends, or if they don't have an internal referral... That's one area that needs more work as patients quite often end up under a general surgeon and get all sorts of things done in a department where they haven't got specialist surgery." (National interviewee)*

In lung cancer, data shows that resection rates are significantly higher in hospitals that employ specialist thoracic surgeons, and also that higher resection rates are correlated with increased five year survival. One interviewee commented that there had been a "there's no point operating" mentality for lung cancer, to the extent that they believed there has been significant under-investment in surgery for lung cancer compared to other tumour groups.

*"Lung cancer's said to be incurable...it's not like breast cancer, it's thought to be people's own fault for smoking...It's a massive killer and you know, for some reason there's no investment in it. And they always say oh well there's no point operating on it because everyone dies... If you want improved results for lung cancer you need more operating...We are nowhere near the optimum resection rate in the country. Nationally it's only about 11, 12 per cent I think and in some pockets in the country where there are specialist lung cancer surgeons it's approaching 25, 35 per cent." (National interviewee)*

One interviewee talked about their unit's success in driving down lengths of stay for radical prostatectomy from ten days to five, as a result of adopting the enhanced recovery approach. But the introduction of these principles into cancer pathways was also raised as an area where variation in practice is still apparent.

*"[Enhanced recovery] saves hospitals money and it reduces complications, so there are lot of good reasons for patients, clinicians and managers to take it up. But the uptake is variable, there are a lot of places that do it well and there are a lot of places that do it variably and there are some places that are still not quite there yet." (National interviewee)*

## **ROLE AND MANAGEMENT OF MDTs**

MDTs were recognised as the 'gold standard' in patient management and credited with making a substantial contribution to improving cancer care. In general, interviewees were very positive about the system and felt it was working well in their units. The usual pattern reported was a weekly one-hour MDT considering eight to ten patients at each session.

However, there were concerns raised about their management in some instances. Many expressed concerns about capacity and the number of cases presented at MDTs and subsequently the time allocated to each patient's case. Interviewees also talked about the occasional difficulties in getting everyone to attend who had an important contribution to make, and the availability of the information necessary for effective decisions to be made; the resource implications – calculated on people's time in attendance, preparation and travel; and the danger that MDTs would become a means in themselves rather than a means to an end.

*"MDTs are over run, MDTs are full, at capacity." (National interviewee)*

*"In our last MDT yesterday, in an hour and a half, we had 60 patients to discuss ... which allows you 90 seconds per patient, which is clearly totally insufficient." (Consultant, DGH)*

*"Sometimes there are an awful lot of cases and a lot of them are very routine and really we get a lot more out of it if we just discuss the complex interesting ones. But because of the way the thing is set up you just have to discuss everyone, which is a bit of a chore and it's also a very expensive way of doing it." (Consultant, tertiary provider)*

It was noted that radiologists shoulder a large burden in terms of preparation for an MDT. It was estimated that they might have to spend four hours preparing for an hour's MDT with ten patients. It was recognised that increasing the number of MDTs, while enabling more capacity, would have a greater exponential impact on this staff group.

One organisation raised the problem of delays in receiving patient scans and other information from units for MDT meetings. This appears to be an issue both of capacity in providing diagnostic tests and technological limitations – for example, it was noted that not all hospitals use PACS (picture archiving and communication system) and therefore have to use discs to transfer images.

The use of Virtual MDTs, through the means of teleconferencing, appears quite a widespread practice. Though interviewees recognised the benefits of working in this way by keeping costs as low as possible and enabling the attendance of specialists, comments were made about their clunkiness, in terms of altering the dynamics of interaction between MDT members.

*"Teleconferencing is a work around – for example, if your pathology service is 7 miles down the road, do you really want to pay your pathologist for three hours to come to a 1 hour meeting? We just can't afford it." (Consultant, specialist provider)*

*"When you work on multi-sites...not always everyone can get to the meetings, so we've got video conference facilities. It always seems incredibly wooden and it's almost as if it's like a tick box. But when you actually are in an MDT and it's a face-to-face meeting, I really think that the discussion is richer and there's more information shared by human beings actually interfacing with each other, rather than just going through a list remotely." (CNS, secondary provider)*

The need to ensure the MDT did not become overly ritualised to the extent that it constrained decision-making elsewhere was expressed by a number of interviewees, as was the occasionally overly prescriptive nature of the peer review process.

*"Particularly the trainees, they seem to want to manage everything through the MDT. I mean: 'Is this person going to have a biopsy?' 'Oh, let's take it to the MDT.' 'Here's this other biopsy. What are we going to do there?' 'Well, let's see if the MDT want a CAT scan.' And we keep getting this repeat discussion at MDTs. And it's actually undermining the confidence, I think, in some of our trainees. They feel they can't make decisions." (Consultant, specialist provider and clinical director)*

*'A lot of things that govern the way the MDTs are constructed and the way that they're measured and so forth is driven by the...external peer review processes and, you*

*know, the trouble is that peer review have got one size fits all and so they say to us, 'Right, your MDT must have this, must have that, must have this, must have that, and if you haven't, you're not – you're at risk and we have to raise that as an immediate concern.' You go, 'Well, hang on a minute, it's not appropriate for us to have that construction because it doesn't fit our pattern of work.' (Consultant, specialist provider)*

## INNOVATION AND TECHNOLOGY

Interviewees reported that within cancer surgery services, the appetite for innovation and the use of new technology was apparent but that major capital investment – for example the purchase of a robot – would require the production of a robust business case and planning on a population basis. Such equipment also results in ongoing maintenance and running costs which have to be factored in, and persuading commissioners to support the use of such technology has proved difficult. At present there is no nationally agreed tariff for robotic surgery.

*"Well you can create a tariff until the cows come home but they won't pay it, they'll only pay for a standard resection - you know, whatever the tariff is - without using the technology. And clearly that is going to be an untellable situation because you'll make an organisation bankrupt, and it is a big issue, it is a big issue nationally." (Consultant, specialist provider)*

One interviewee talked about the opportunity that the introduction of robotics could have brought to driving centralisation but that the government had missed the chance to look at this kind of innovation system-wide.

*"The problem with robotics is that it was an incredible opportunity for our government to introduce rationalisation and sense into the introduction of these things and it completely flunked it. You know, it could have bought 10 robots for the country and used the robot as a mechanism for rationalisation." (National interviewee)*

However, while the evidence to support the use of laparoscopic procedures appears to be universally accepted, there was talk of little evidence supporting the use of robotics, in all but a few procedures.

*'But robotics are very, very good in one or two niche areas. And you'll find urologists who will bounce up and down and, you know, make great play of not having it for their pelvic surgery, but in terms of numbers of cases and shifting the cancer survival curve – I think there's more sound and fury than actual benefit, to be quite honest.' (Consultant, tertiary provider)*

*"Perhaps there's a marginal benefit for some patients in having robotic surgery but does it equate to spending £2million on the kit every five to six years and then the huge running costs? I would have to say, with my Clinical Director hat on, I think that's a total waste of money." (Consultant, DGH)*

With the introduction of any new procedure or technology, there is always a learning curve to be addressed. Literature exists which calculates the likely clinical outcomes of a surgeon attempting a new procedure against the volume of those procedures – so that for example, a surgeon undertaking more than a certain number of procedures might begin to see mortality reduce, followed by another step change in outcomes after another specified number of

procedures and so on. While the methodological rigour of these studies was debated because of the relatively small numbers of operations involved, it was nonetheless recognised that clinical outcomes for those patients undergoing procedures that were new or involved new technology might be affected until surgeons had honed their skills.

Surgeons towards the later stages of their career who were interviewed, talked about the reduced likelihood of undergoing training on new techniques, given the stage of their career and the possible impact on outcomes.

*"For someone of my age and my speciality...I think if I had started (doing laparoscopies) I'd probably have done more harm than good, you know, getting over the learning curve." (Consultant, tertiary provider)*

*"Once [surgeons] are trained and feel comfortable dealing with a particular illness or disease in a particular way, it's easy to stay in your comfort zone. To suddenly halfway through your career have to go on courses and learn new techniques, it requires extra effort on the first part, but also it means them operating initially outside their comfort zone and surgeons don't like doing that because they know that the moment they do that they've got to go through a learning curve and when they go through a learning curve their morbidity and their complications go up and that makes them uncomfortable. So, you know, I think, there's a desire to just stick with what you know." (National interviewee)*

This attitude, while entirely understandable, may impact on the supervision of juniors, particularly in smaller units. So while a younger surgeon may have trained in a particular technique or procedure, they may then be supervised by a senior consultant who is not.

Several participants argued that the pace of innovation would be helped by centralisation, because having the specialist team in one place would overcome some of the attitudinal and cultural barriers to the uptake of new technologies. There was also a very strong view expressed that the next phase of innovation needs to focus on how surgery can be combined and scheduled with other treatments to improve outcomes.

## **RESEARCH**

There are well-recognised barriers to research generally which interviewees discussed. These included having the time to undertake research, access to funding, and receiving incentives or recognition for this type of work. Interviewees also talked about the amount of 'red tape' involved in carrying out research. Although the 'red tape' problem wasn't specific to research involving surgery, interviewees noted that in drug research, the infrastructure and resources to support trials are provided by the pharmaceutical industry, which also provides people to do much of the 'legwork'. This is not the case in surgery research.

*"It's so appalling the paperwork and red tape surrounding research that one just absolutely almost faints at the prospect of trying to go through all the paperwork and all the bureaucracy...I have to say the regulatory environment surrounding research, it really is a massive turn off." (National interviewee)*

*"We got ethical approval [for a large multi-site trial] in 1999 but that took 10 years from conception to publication. Now if we go on doing research which takes 10 years, we'll continue getting answers after they become irrelevant, that's just ridiculous." (National interviewee)*

Interviewees suggested that in order to increase the amount of surgical oncology research, both top down and bottom up approaches were required – these might include more targeted support from funding bodies, and academic institutions, or more recognition and incentives for surgical trainees to become involved in research. The definition of academic surgery was also discussed.

*"The academic environment has never been very supportive until recently of surgeons doing research. Ten years ago we had a Professor of Surgery and we've not had one since. The University is not prepared to pay for one, and the hospital is not prepared to pay for it." (Consultant, tertiary provider)*

*"It's only got worse by the reorganisation of the careers pathways... There isn't any incentive to get them to do research as part of training. And so every single time we get a new trainee here we sit them down and say, "Right, you've got every opportunity, we'll give you a dedicated time to do projects and research in your timetable," and I could count on one hand...in the last...eight years, how many have actually produced anything." (Consultant, specialist provider)*

Though interviewees commented on the small number of national research trials available, the recruitment of patients into those that did exist was generally considered good. There were some specific issues with the ability of smaller units to be as involved in research as they might like to be because of consultants' workloads and time constraints. It was recognised that the level of R&D support in teaching hospitals would be higher and that this would provide more opportunities for consultants to be involved in trials. The role of the CNS was also seen as critical to trial recruitment in surgical specialities as they see more of the patients and can perhaps more easily identify them as suitable to take part in trials. In DGHs, CNSs were seen as likely to have an even greater role to play, as smaller units were considered less likely to be able to recruit dedicated research nurses.

Interviewees also talked about the differences in perception and attitudes from the wider medical and academic community, policy makers, and funders, towards surgical trials and medical trials.

*"And that's probably our own fault because we don't give the time to promote it. But I'm saying in a lot of talks that I give when I give them evidence of outcomes of things that we do, you know when I can show a graph of 50% five year survival for example for some procedure or whatever that we do, I say, "If this was a drug everybody would be going out and buying shares in it." Because when I go to talks given by non-surgical oncology colleagues, you know if they have 10% survival on this fantastic new drug that costs a fortune then they consider that to be a great success. If I had 90% of my patients dying I'd be up in front of the GMC...It's interesting with regards to the involvement of the commissioning side of things because all of a sudden they might have to actually recognise the evidence base of what surgery can achieve as opposed to what very expensive drugs will actually sort of achieve, which is much less benefit." (Consultant, specialist provider)*

Interviewees commented on the specific difficulties of clinical trials in surgical research, noting that RCT (randomised controlled trial) comparisons may produce 'gold standard' evidence but may not always be feasible or desirable in surgical research. They would also mean training surgeons in a new technique that might not prove to be any more effective than the technique they already use. Interviewees also pointed out that it is very difficult to 'standardise' the intervention for a surgical trial because the intervention is not just the surgery

itself but everything that happens around it, whereas it is much easier to standardise the intervention in a chemotherapy trial.

Interviewees also commented that it is important to develop the evidence-base for new techniques and technologies, while recognising the associated difficulty of trying to robustly demonstrate what longer-term outcomes actually are. However, most studies tend only to focus on short-term benefits.

*"One of the difficulties that we face across the board is to know what impact these technologies have on long-term cancer outcomes. ...when we first started to (use) a thing called a harmonic scalpel...we could dramatically reduce blood loss and ... the reduced blood loss more than paid for using the more expensive equipment. But what I couldn't put my hand on my heart and say is, 'Actually, that's translated into improved outcomes in terms of long-term survival for the patients... Implicitly you believe losing less blood, doing an operation in a smoother fashion should result in better outcomes, but it's really difficult to prove it. "* (National interviewee)

A number of interviewees talked about neo-adjuvant therapy being at the real forefront of developments in cancer treatment, and the need to focus research on understanding the relationship between surgery and other treatments and how these could be combined to improve patient outcomes.

*"Although surgery remains the preeminent treatment, it's by no means the only treatment for colorectal cancer now. Whereas perhaps 20 years ago, we'd have said it is the only treatment. As a consequence, the arrangement, the alignment between other therapies and surgery, needs to be looked at very carefully...That interface is the frontier of cancer treatment, not just colorectal, but all cancer treatment, almost all cancer treatment. And one of the areas that we need to look at is how we think about delivering drug treatment, for example, before surgery to make surgery safer, reduce the need for surgery, and make it less hazardous, and increase the cure rates for the patients."* (National interviewee)

*"But there's a sort of feeling out there that, in terms of resecting bowel cancer, we've kind of gone as far as we can with the surgical approach and that most of the developments will be medical oncological developments. Neo-adjuvant therapies and the place of that... So I would see the opportunities for research more as working out the relative contributions of the different treatment methods. You know, how we relate to use of radiotherapy, for example. There's a tendency now, after radiotherapy, to leave the interval to surgery a little bit longer. And so there are clinical questions like that to answer."* (Consultant, tertiary provider)

However, it was recognised that the sort of research needed will depend on the stage of development in surgical terms with each tumour group or procedure.

## **DEVOLVED NATIONS: DIFFERENCES IN PRACTICE**

There are a number of both substantive and more subtle differences between the organisation and management of cancer surgery services in England and the devolved nations. The most significant factor appears to be population size and population density which affects economies of scale for investment in technology, and the associated centralisation agenda. Scotland's population is five million, over a fifth of which is concentrated in Glasgow and Edinburgh. Wales has a total population of just over three million but more than two-thirds of the total population is concentrated in South Wales, with

some patients in North Wales flowing to providers across the border with England. Northern Ireland has a population of 1.8million – almost a sixth of which lives in Belfast.

*“...We had no PET scans at all in Wales up until about three years ago and we’ve now got half because we’ve got a joint NHS and Cardiff University scanner that they have half the time for research purposes. So we’ve now got half a scanner ...but for us it’s just not quite enough and the problem is [that] building another one is very expensive and there probably isn’t a need for one-and-a-half scanners, and Cardiff don’t need another half scanner and so there is sometimes a problem with a population of 2.4 million as to things like Da Vinci robots and PET scanners and everything, but just in terms of the economies of the scale there.” (Consultant, secondary provider)*

*“Well, I think in terms of the speciality, the issue we have in cancer service tends to be this issue about robotic surgery and whether we can maintain a pelvic cancer centre here in the absence of the technology. Secondly, we have an issue in terms of providing diagnostic services. There is – we’ve got four specialist oncologists; we need a little bit more funding in terms of access to diagnosis.” (Consultant, tertiary provider)*

Centralisation is as politically sensitive in the devolved nations as it is in England, though for different reasons.

*“And, arguably, for a population of five million you need one centre doing the complicated stuff, but tensions between regions in Scotland is phenomenal, first of all geography doesn’t work for us, but with some better infrastructure that would be fine. The centralisation would always be around Edinburgh and Glasgow and there would be too much tension there.” (Service manager, Scotland)*

*“... the problem’s been compounded over the years by new hospitals being built... so that there’s too many hospitals. So there is a difficulty there and it’s for historical and largely political reasons ...the opposing factions ... disagreed on just about everything; one thing that would unite them was a threat to close the local hospital.” (Consultant, tertiary provider)*

Scotland and Wales have introduced new or slightly different elements from England into their cancer services. For example, the Scottish Government has introduced different targets for cancer services to achieve. Standards set for 2012/13, include a requirement that 90% of planned/elective patients commence treatment within 18 weeks of referral. Health Boards are also working to deliver the Patient Rights (Scotland) Act which contains a 12 weeks treatment time guarantee (TTG) for inpatient and day case treatment that came into effect from 1<sup>st</sup> October 2012 – that Act states that eligible patients who are receiving planned treatment provided on an inpatient or day-case basis will not wait longer than 12 weeks from the date that the treatment is agreed to the start of their treatment.

The Welsh Government’s strategy requires that every cancer patient undergoing complex surgery in Wales, “should receive excellent peri-operative care, as delivered through the enhanced recovery after surgery (ERAS) and the Transforming Theatres initiatives. Cancer surgery services should be configured in a way that enables the highest standard of multidisciplinary care and outcome. This will require Local Health Boards, working through the Cancer Networks or WHSSC, to centralise services for which good outcomes depend upon volume” (Welsh Government, 2012: 7).

It is also the responsibility of the local Health Board to assign a named Key Worker whose role it is to co-ordinate all care and support for everyone with a diagnosis of cancer. Other points to note in Wales regarding workforce issues include the opportunity for surgeons to opt out of surgeon-level outcome reporting, the introduction of a different consultant contract by the Welsh Government in December 2003, recognised difficulties recruiting junior doctors, and increasing numbers of older GPs (over 60).

Interviewees from Northern Ireland talked about 'dragging along a while after England and Wales' when it came to the development of cancer services. Interviewees also mentioned funding issues over the appointment of CNSs.

*"There are people out there who will do the jobs if their jobs were going to be paid for. So I think we can do with more nurse specialists dedicated to oncology, but funding those positions is a problem." (Consultant, tertiary provider)*

# INTERNATIONAL SURVEY FINDINGS

A key aim of the research was to explore and compare cancer surgery trends, performance and challenges in an international context. This was undertaken through an online survey initially distributed to cancer surgeons and other key groups in the six countries participating in the International Cancer Benchmarking Partnership (ICBP): UK, Australia, Canada, Denmark, Norway and Sweden. A snowballing technique was employed, whereby respondents were encouraged to forward the survey to their contacts. This approach resulted in responses from a wider range of European and non-European countries than those originally sampled. A total of 138 responses were received, the majority of which (82%) were from surgeons. Other respondents included medical oncologists, specialist physicians, specialist cancer nurses, healthcare managers and policymakers. Further details of the survey methodology and respondent characteristics can be found in Appendix 1.

To explore emerging findings in more detail we also conducted a small number (n=4) of international interviews. Quotations from these interviews, as well as free text survey responses, have been used below to illustrate the findings.

## KEY STRENGTHS AND CHALLENGES

The survey started with a series of open questions to gather participants' general views about the key issues for cancer surgery services in their country. Despite the wide variation in countries and areas of surgical specialty, some clear common themes emerged from these responses:

- Service centralisation and multidisciplinary team working were felt by many to be the key strengths and most important recent developments in their country;
- Innovation in surgical techniques was also considered by many to be a major development, with specific examples given including laparoscopic approaches, sentinel node biopsy and oncoplastic breast surgery;
- There is an established cancer surgery infrastructure in many countries – particularly ICBP countries – which has facilitated consistency of approach; and
- Funding was the most frequently reported challenge for surgery services: this was raised both as an issue in general and a specific barrier in relation to the uptake of new technology.

Centralisation and MDT working were the subject of specific questions and so are covered in detail later in this section. On infrastructure, participants – especially those from ICBP countries – commended the establishment of referral pathways, national guidance and quality registers and national cancer plans in their countries. The introduction of quality registers and the development of outcome measures in particular were seen to have played a driving role in service improvement over recent years.

*"15 years ago it was a complete black box – it was unclear what was happening. Now we understand where surgery is happening, and we understand processes of care associated with that." (Policymaker, Canada)*

Funding and capacity constraints were cited by most participants as the key challenge to cancer surgery services. Many noted cost pressures on services, which were said to be driving

up waiting times in some cases. Particular difficulties securing funding for research and to support the purchase and implementation of new technologies were also reported.

*"The greatest challenge currently is the move away from "patient-centred care" to "budget-centred care" due to financial crisis. This obstructs even developments which would be more cost effective in the long term." (Cancer surgeon, Scotland)*

## **SERVICE CENTRALISATION**

The message was clear from survey respondents that centralisation of services into a smaller number of high-volume centres continues to be the major issue for cancer surgery services. The vast majority reported a trend towards centralisation in their countries and this was generally – although not exclusively – regarded as a positive development in terms of improving surgical outcomes. Comments indicated that the nature and extent of centralisation varies across the countries surveyed, as would be expected. For example, we were told that Norway and Denmark have centralised complex surgery nationally, while Sweden is rationalising services at a county level.

Centralisation of services was the most cited strength of national systems; conversely, what was felt to be insufficient progress in centralising cancer surgery service into specialist centres was among the most commonly identified weaknesses. Very few respondents had objections to centralisation in principle, though interviewees often qualified their support with the caveat that it is not appropriate for all types of surgery.

*"Much cancer surgery can be performed in medium or small units. They can come out with better results than the larger ones. Centralisation is good for rare diseases with complicated diagnosis and treatment like pancreatic cancer, oesophageal cancer. For many other cancer diagnoses it has been difficult to show it's the only way to go." (Cancer surgeon, Sweden)*

Participants warned that strong political barriers can exist to centralisation. Robust data on the link between volumes and outcomes has helped to overcome this barrier in some countries (for example, in Sweden) but political will or clinical ownership of decision making was recognised as being essential to drive the agenda.

Centralisation of services has implications for the specialisation of the surgical workforce. Survey respondents raised similar issues to those shared in the local and national interviews. The key challenge articulated was that of ensuring surgery is undertaken by specialists and in sufficient volume to maximise outcomes, while also maintaining a workforce skilled in general surgery. This could present problems for capacity in the system, including for individual surgeon workload.

*"For me the challenge is providing an increasingly specialised surgical service whilst having to continue to deliver a large volume of general urological care and on-call." (Cancer surgeon, England)*

In the view of some respondents, the European Working Time Directive was exacerbating this issue.

In addition to the training and development of specialist skills among the workforce, there is also an implication for the recruitment of new surgeons. In addition to the factors detailed above, some interviewees suggested that centralising complex surgery in tertiary centres may cause local hospitals to be less appealing to new surgeons.

## MULTIDISCIPLINARY TEAMS

Respondents were asked to rate how effective they thought MDTs were in their country on a scale of 1 (highly ineffective) to 10 (highly effective). Overall, only 9% of respondents give a rating of 1-4; 34% gave a rating of 5-7; and 57% a rating of 8-10. The lowest ratings came from respondents in countries in the 'Other' group who reported that MDT working was not yet well established in cancer services. MDTs were rated particularly highly in the UK; 20% of UK respondents gave a rating of 10, compared to 8% for the other ICBP countries.

### How well are MDTs working in your country?

Country	Average rating (out of 10)
Scotland	8
Wales	7.9
England	7.8
ICBP (excl. England, Scotland and Wales)	7.7
Europe non-ICBP	6.2
Other	6.2
<b>Average</b>	<b>7.4</b>

Concerns about how effectively MDTs were operating were also shared, echoing many of the issues also identified through the local and national interviews. For example, respondents reported lack of time for discussion, individual team members dominating discussions or difficulties ensuring wide professional representation. Some noted the potential for further improvement, often with regard to the practical and technical aspects of facilitating meetings:

*"MDTs are well established in Norway, and mandatory for most cancer diseases. There is further room for improvement with regard to organization, documentation and technical support for optimal display of images, PAD slides, endoscopic images/movies and other information." (Cancer surgeon, Norway)*

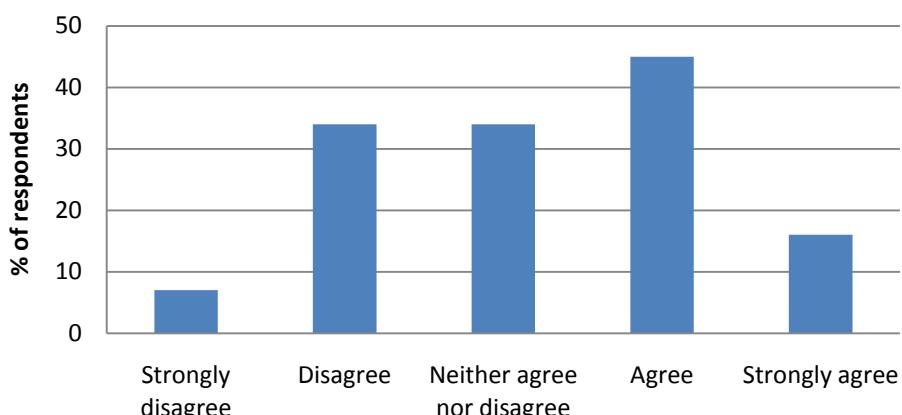
## RESEARCH AND INNOVATION

Views were mixed about the strength of the research culture in surgery. In response to the statement that 'There is a strong research culture in cancer surgery services in my country', 45% agreed, 30% disagreed and 25% neither agreed nor disagreed. Even among those who agreed, many noted significant barriers to research:

*"Academic surgery has virtually disappeared. Many Universities do not have Professors of Surgery. Cancer research is not well aligned and not intended to deliver from the patient's perspective unless producing a 'cure'." (Cancer surgeon, England)*

*"There are very few good supportive mechanisms to allow research to be carried out. There are many administrative barriers to carrying out research as well." (Cancer surgeon, Wales)*

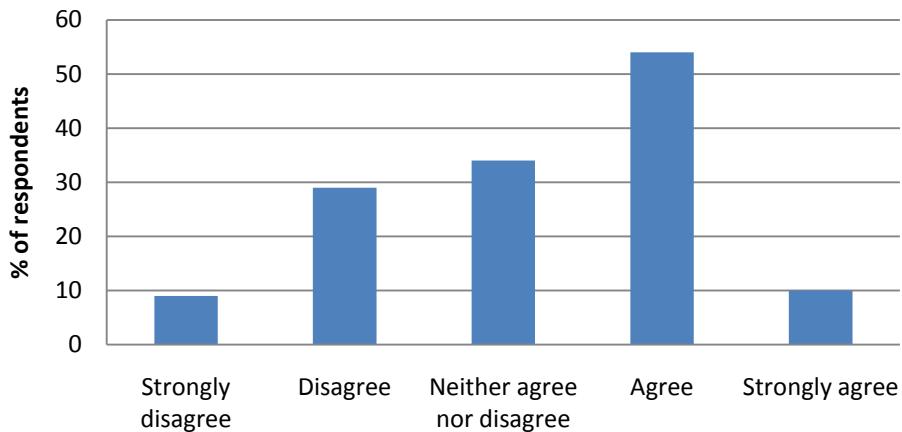
### 'There is a strong research culture in my country'



Respondents held mixed views about the pace at which new surgical techniques are adopted, although positive responses were more prevalent. 46% agreed that effective new techniques were quickly adopted in their country, whereas 28% disagreed. Within this, respondents from Scotland and Sweden were particularly positive about the research culture in their country. Respondents from countries in the 'Other' group were most likely to disagree with the statement. The main cited barrier to technology adoption was funding, although the lack of training programmes and/or supportive national guidance were also mentioned.

*"Challenges include the need to develop new techniques and treatments in the face of reduced funding within the NHS." (Cancer surgeon, England)*

### 'Cancer surgery services quickly adopt effective new techniques in my country'

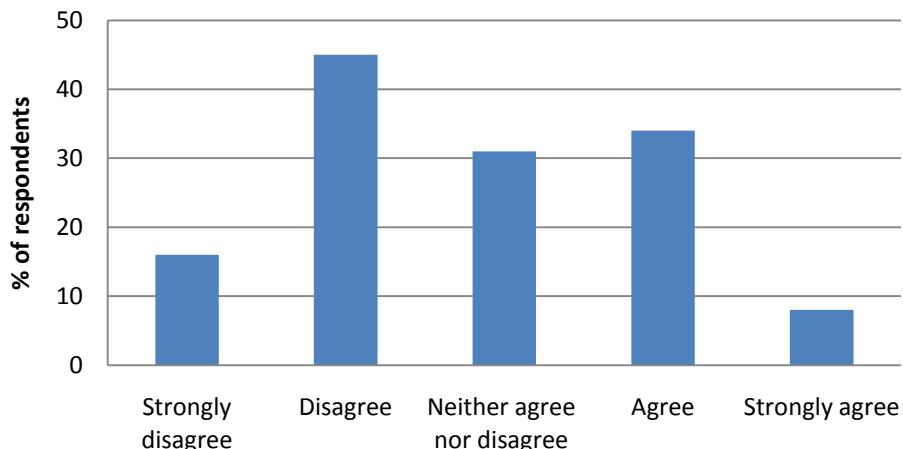


Responses showed variation by country: respondents from ICBP countries (80%) and Scotland (66%) more likely to agree that new techniques are quickly adopted, whereas respondents from Wales (58%) and England (52%) were more likely to disagree.

*"Financial restraints mean that there is always a time lag between new treatments being available and uptake/general availability." (Cancer surgeon, Wales)*

Respondents were more likely to disagree (46%) than agree (31%) that surgery competes effectively for funding against other disciplines.

#### **'Surgical cancer research competes effectively for funding against other disciplines in my country'**



Here again, Scotland appeared to be an outlier within the UK; although the sample size and sampling method prohibits any generalisations about differences between the nations being drawn from these findings. Whereas 75% of Scottish respondents felt surgery did compete effectively for funding, almost the same proportion of English respondents (74%) disagreed. The least positive assessment of the competitiveness of surgery research was given by respondents from Australia, 80% of whom disagreed with the statement.

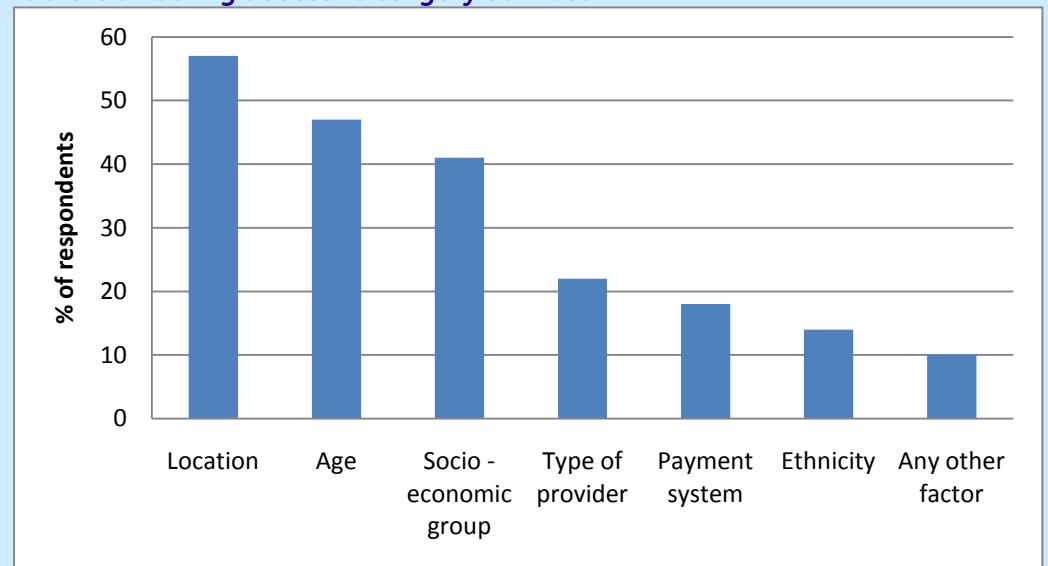
*"Funding of surgical research has always been most common problem... [Equally] surgical jobs are mostly heavily clinically orientated with very little time reserved for research." (Cancer surgeon, Australia)*

#### **ACCESS TO SURGERY**

The survey probed respondents for their views about the factors that affect patient access to surgery. Geographical location was the factor most commonly reported to affect access (42% of respondents), followed by age (35%) and socioeconomic group (30%). Some cited evidence to support their response.

*"Clear data from [the lung cancer audit] that resection rates for lung cancer start to fall from age 55! Ethnic minorities are under-represented for all cancer treatments. Patients with lung cancer are more likely to receive surgery if first seen in a surgical centre, so patients living distant from the tertiary centre are less likely to be operated." (Medical oncologist, England)*

### Factors affecting access to surgery services



Age and geographical location were often linked to the context of service centralisation. While the consolidation of surgery into a smaller number of (usually urban) centres would increase travelling time for almost all patients, respondents felt this would pose a particular barrier to access for older patients and those living in rural areas. Perhaps unsurprisingly, the potential for centralisation to reduce access for these groups was most likely to be identified by respondents in geographically large countries such as Canada, or those with significant rural populations as in Scotland.

The implications of this connection are not fully understood, and it is not just in the UK that little is known about patients' willingness to travel for specialist care:

*"What we don't understand is the patient perspective on how far they are willing to travel...However what's not understood is where we have gone from seven centres to two, do we understand for those patients who now have to travel 5 hours or more what the impact is on them?" (Policymaker, Canada)*

Parallels between the UK and international interviews were also found in views about the declining impact of age as a criterion for offering or withholding surgery:

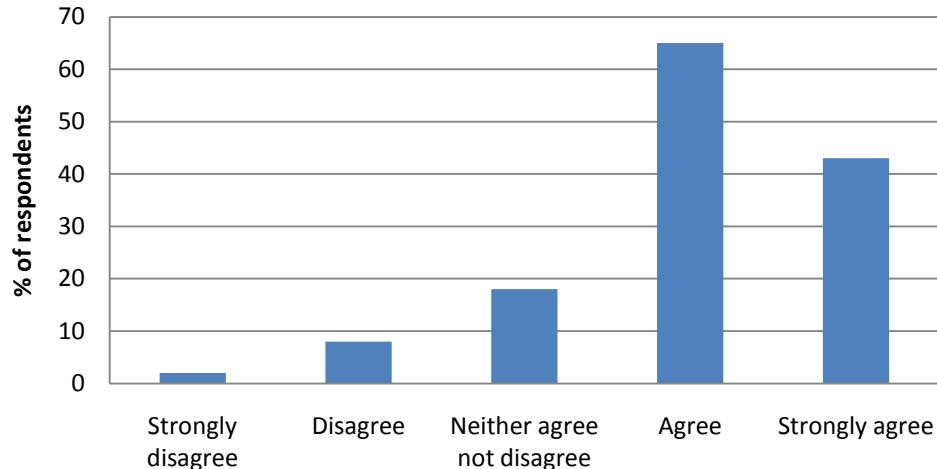
*"There has been some reluctance to treat elderly patients as radically as younger patients. This has been the case for breast cancer patients, but lately, the recommendations have changed, in accordance with international guidelines, and age is no longer a significant factor for choosing type of treatment." (General surgeon, Denmark)*

Respondents were also asked for their opinions on the processes for assessing patient fitness for surgery. In general, these were felt to be improving, driven by various factors including new technologies such as CPEX testing, the availability of good imaging and the development of pre-operative assessment clinics to standardise practice.

### PUBLISHING DATA ON SURGICAL QUALITY

Respondents were overwhelmingly positive about the value of publishing quality data: 80% agreed that this is or could be a driver for service improvement, and only 7% disagreed.

**'Publishing data on surgical quality is/could be a driver for improvement in my country'**



Comments on the topic of surgeon-specific data were most often made by those from England, whose responses can best be characterised as qualified support.

*"Publishing performance data is a great idea but in the present system it is flawed due to huge inaccuracies in collection and lack of adjustment for case mix."*  
(Cancer surgeon, England)

Caveats were made about the need to select appropriate outcome measures and to contextualise data so that surgeons operating on more complex patients were not represented as performing more poorly. Failing to meet these conditions would, it was felt, create the perverse incentive for surgeons to 'cherry pick' the patients with least risk as this would enhance their outcomes.

# LOOKING FORWARD: CONCLUSIONS AND RECOMMENDATIONS

Surgery is an essential component of the management and treatment of cancer. Moreover, given the technological and demographic trends discussed in the introduction to this report, the contribution of surgery across the cancer pathway is set to increase in coming years.

There have been continued improvements in access to and the quality of cancer surgery, with ever more people benefitting from advances across a range of areas including pre-operative assessment, surgical techniques, multidisciplinary team-working and the specialisation of care. For many common cancers, keyhole (or laparoscopic) procedures are increasingly the norm, with far less pain and injury to the patient and faster recovery times. But gaps still remain, and further improvements to surgery services will have to be made in a challenging financial environment and an era of rising public expectations.

This research gathered evidence and examples of variation in surgical practice and outcomes. Our findings suggest that there are sometimes marked differences between providers (at the surgeon, MDT and hospital level) in decisions about whether and how surgery is performed. Of course, variation may be entirely appropriate where it results from services being tailored to local needs. The evidence we reviewed, and the views of many that we spoke to, suggests that not all variation can be accounted for on clinical grounds. This suggests that there is considerable scope to further understanding of what best practice cancer surgery looks like, and embed this as the norm across the health system.

The issues that surgery services face, and the way in which they can be most effectively organised and delivered, differ across cancer types. This is for several reasons, not least because surgery is the major or even the only treatment for some cancers, whereas for others it is rarely used. In short, surgery services must be considered on a tumour-by-tumour basis; there is no one-size-fits-all. So while benefits to patients with more complex cancers will likely come from further centralisation of technology and expertise into specialist centres, a priority for improvement in relation to colorectal cancer should be the quality of surgical care delivered within emergency settings (where almost a quarter of patients are currently diagnosed). In the case of lung cancer, the evidence points to the need for further investment to increase access to specialist thoracic surgeons. National work to support the adoption of enhanced recovery principles has so far focused on colorectal, gynaecological and urological cancer, but this model of care has the potential to drive improvements in other specialities too.

Despite this diversity, the issue of reconfiguration – and in particular, that of centralisation – will continue to be foremost in discussions about cancer surgery services. Many of the other themes that emerged from our research are strongly connected to and/or will be substantially affected by ongoing decisions about how surgery services should be configured. Therefore, it is here that we start our conclusions and recommendations, before moving on to consider the themes of specialisation and training; MDTs; measuring quality and performance; and research.

## 1. CENTRALISATION AND RECONFIGURATION

For some types of complex and high risk surgery, there is a growing evidence base to support further centralisation of services into larger, specialist units. This can be expected to deliver further improvements in the quality and outcomes of care, although whether it will also achieve cost savings is less certain. But we heard from many of our interviewees that the way in which reconfiguration is currently being approached stands to benefit certain cancer patients, but risks disadvantaging others. Questions were frequently raised about the impact that the relocation of cancer surgical teams would have on remaining cancer services and emergency care at local general hospitals. Whether such hospitals would have sufficient numbers of surgical staff to safely cover emergency surgery rotas was a particular concern.

Therefore, it is vital that those planning and leading efforts to centralise cancer surgery services take a whole system view, to ensure that potential knock-on effects are – as far as is possible – anticipated and addressed. This means looking at the impact that relocating specialist staff and resources could have on other elements of the cancer pathway which continue to be delivered at local hospitals (e.g. diagnostics, follow up), as well as on the delivery of clinical services beyond oncology.

There are other potential risks to centralisation too, especially in relation to patient access and the care experience. The issue of how fragmentation and/or duplication are avoided when certain aspects of the cancer pathway are moved into specialist hospitals needs more detailed consideration. Ensuring that local general hospitals can access specialist expertise to support diagnosis, pre-surgical assessment and follow-up care is imperative, as is the timely sharing of information between providers based in different locations. High quality and coordinated care requires hospitals to work effectively together for the benefit of patients. Providers must consider how joined-up care can be achieved, with potential options including managed provider networks, integrated hub and spoke models and shared care arrangements. Our findings suggest that further work is needed to pilot and assess different models for supporting integrated cancer pathways and to understand how these might work in practice.

Transportation also needs to be thought through. A recent report on the reconfiguration of surgery services emphasised that, "Patient transport is key to the public's sense of security and belief in the reshaping of services. The most common cause for concern is transport links between the 'local' hospital and an element of the service that may be moved to another location" (Royal College of Surgeons 2013). A 2011 survey of Scottish patients found that 8% would not be willing to travel further than their local area to access highly specialised services when they needed them and a further 42% would only be willing to travel within their region; the examples of specialised services given in the survey were complex surgery and cutting edge cancer treatments (YouGov 2011). More research is needed to understand whether the increases in travel requirements – and associated out-of-pocket costs – that result from the centralisation of cancer services will pose a barrier to patient access, especially among less affluent groups. Ensuring equitable access to specialised services must be a priority.

A final issue concerns the enduring question of whether there is sufficient political will – at a national and local level – to see through difficult decisions about service reconfiguration (Lister 2011). Changes to local services can be unpopular and cause considerable anxiety; especially in the current financial context, much needed discussions about quality and safety of patient care can come to be drowned out by concerns that change is merely a 'cost cutting' exercise. Political leaders must support commissioners and providers to publicly make the case for and implement change where this is backed by sound clinical evidence.

## Centralisation and reconfiguration: recommendations

- **At a minimum, all proposals to centralise services should include a robust assessment of their likely impact on acute and emergency care in local general hospitals.** A system-wide perspective and strategic leadership are essential to help ensure that decisions which deliver benefits to one group of patients do not disadvantage others. All four UK nations must be clear about how this will be achieved.
- **Where surgical pathways are delivered across specialist units and local general hospitals, structures to specifically support integrated working must be put in place.** Further development and piloting of promising approaches such as shared care arrangements and hub-and-spoke models is needed.
- **Research should be commissioned to examine how centralisation impacts on patients in areas such as care coordination, transportation and out-of-pocket costs.** Currently, far too little is known about the impact of centralisation of cancer surgery on patients' experiences of care.
- **More work is needed to better understand variation in resection rates, in particular variation based on age and geography, as well as amongst certain social groups.** Evidence suggests that considerable variation exists, but it remains unclear whether this is indefensible or whether some variation may be appropriate for clinical reasons.

## 2. SPECIALISATION AND SUB-SPECIALISATION

While specialisation is not solely an outcome of service centralisation, it is nonetheless driven and accelerated by it. There was a widespread view among those we interviewed that increasing specialisation has been vital in improving patient access to, and the quality and outcomes of surgical care. Moreover, specialisation is a necessity as the surgical management of cancer has become more complex. However, specialisation raises several similar issues to those discussed above in relation to centralisation. The evidence base focuses almost exclusively on the impact of specialisation on *cancer* treatment and outcomes. But specialisation in cancer has wider health system effects. We heard that specialisation can lead to surgeons becoming de-skilled in the core skills of their specialty. Put simply, a consequence of high levels of specialisation is that surgeons may no longer feel comfortable and competent to deliver generalist care and/or are no longer available for emergency on-call rotas.

The challenge, then, is to ensure that the workforce has the right skills and experience to deliver generalist surgical care, alongside the trend for specialisation. This inevitably opens up the broader issue of surgical training. Back in 2001, the Royal College of Surgeons concluded that:

*There is a continuing role for the generalist, especially in smaller hospitals or in remote areas and a need for superspecialists to maintain the generalist skills needed for a quality emergency service. Training programmes and appraisal processes must recognise this need for a careful balance* (Royal College of Surgeons, 2001).

This issue has once again come to the fore with the recent publication of the *Shape of Training* review. The demands of a growing older population and increasing number of people with multiple morbidities require – the review concluded – “a better balance between

doctors who are trained to provide care across a general specialty area, and those prepared to deliver more specialised care" (Greenaway 2013). It called for greater emphasis within medical education and training on the development of generalist skills, with specialisation explicitly driven by workforce and patient needs. Our findings strongly support these conclusions as they apply to the surgical workforce.

Another striking theme within the findings was that, as cancer care has become increasingly complex, so too has decision-making about whether and how patients should be treated. Far more 'close call' decisions are now made, where outcomes are less certain and/or the potential benefits of treatment may need to be considered against substantial risks. Our findings lead us to question whether surgical training has kept up with the need to communicate effectively to patients. It is essential that surgeons are equipped with the communication and relational skills to make what may be highly complex decisions with (rather than for) their patients. Any review of surgical training could usefully consider how extensively and effectively skills for shared decision-making are taught.

Finally, there was universal praise among interviewees for national surgical training programmes, such as LAPCO. National programmes of this kind have helped to train surgeons consistently and quickly; avoid the duplication of effort and investment that can occur when training is devolved to a local level; and promote equitable patient access to new techniques.

### **Specialisation and sub-specialisation: recommendations**

- **A re-think of medical education and training is needed to ensure a surgical workforce with the right balance of skills to deliver high quality specialist and generalist care.** Our findings here support the conclusions reached by the recent Shape of Training review. Far more emphasis in training on the skills surgeons need to share information and decisions with patients is also needed. This could be coupled with investment to produce patient information tools which would support surgeons to present treatment options in a clear and comprehensible way.
- **In future, the governments of all four UK nations should commit to funding national programmes to train surgeons in innovative techniques where there is evidence of patient benefit.** All patients should have access to effective new surgical techniques. The experience of laparoscopic surgery suggests that this aim is unlikely to be achieved unless training in new techniques is funded and coordinated nationally.

### **3. QUALITY AND PERFORMANCE**

During the time that this research was carried out, performance data for individual surgeons in ten speciality areas was published for the first time. This included upper gastrointestinal, head and neck and colorectal cancer surgery. There was widespread support among interviewees for greater transparency and access to information about surgical performance. At the same time, many expressed concerns about the value and interpretation of surgeon-level data. The possibility that surgeon-level reporting would result in risk aversion – especially among more junior surgeons – was raised. With reference to the complexity and 'team game' nature of cancer surgery, persuasive arguments were made for the publication of data at unit rather than individual surgeon level; on longer-term survival as well as near-to-treatment outcomes; and across a range of indicators including the care experience and patient quality of life.

Considerable progress has been made in assessing the performance of cancer services. National programmes for quality assurance and improvement exist in England and Wales (National Cancer Peer Review) and Scotland (Cancer Quality Performance Indicators). But there seems to be something of a disconnect between current trends for surgeon-level reporting in the NHS, and efforts to define and assess quality in cancer care. Early surgical outcomes, such as 30 day mortality and post-treatment complications, are relatively easy to measure, but in isolation they give a very limited picture of service quality. A wider range of indicators are needed to make meaningful assessments of performance and drive improvement in cancer surgery. We urge the four national health departments to work with the National Cancer Intelligence Network, professional bodies, patient groups and others to develop a comprehensive set of quality indicators for cancer surgery services against which performance should be regularly reported.

Finally, while clinical outcomes such as survival are very important, so too is the impact that surgery has on processes of patient recovery and health-related quality of life. Many interviewees acknowledged the value of patient-reported outcomes, but our findings indicate that these are not being widely used. Investment is needed to better understand the outcomes that are most valued by patients, develop robust measures for these, and support their integration into routine assessments of care.

### **Quality and performance: recommendations**

- **National health departments should work with the National Cancer Intelligence Network, professional bodies, patient groups and others to develop a comprehensive set of quality indicators for cancer surgery services.** A wider range of indicators – capturing short and longer-term outcomes, and clinical and patient-reported factors – are needed to make meaningful assessments of performance and drive improvements.
- **NHS England should reconsider the inclusion of certain cancer specialities in its drive to report surgeon-level outcomes.** Cancer surgery is a ‘team game’ and our findings strongly indicate that performance data are only meaningful when reported at the unit rather than individual level.
- **Cancer services should be required to routinely gather patient-reported outcomes, in order to assess the impact that surgical interventions (and other treatments) have on recovery outcomes and patients’ quality of life.** This will require further work to develop patient-reported outcome measures to ensure that they are available for all cancer types, and more support for professionals to implement these tools within their practice.

## **4. MULTIDISCIPLINARY TEAMS**

MDTs are a key part of a high quality cancer service, and are becoming increasingly important with the need to deliver coordinated and effective multi-modal care. They are now an established part of cancer care within the NHS, which may explain why MDTs were more highly rated by survey respondents from the UK than any other country. However our research also suggests that they are not always operating as effectively as they could be. MDTs are coming under growing pressure as the demand for cancer services increases. In the most extreme examples shared with us, we were left with the sense that meetings were being stretched to the limit, with insufficient time available to meaningfully discuss each patient’s care.

Interviewees consistently emphasised staff having time to prepare for meetings; information to support decision-making (e.g. scan images and test results) being available at the right time; and the importance of having the right team composition and good attendance. These issues all appeared to be more of a challenge where MDTs included staff across different locations. On the issue of attendance, there is evidence for some tumour groups that patients are more likely to be offered surgery when a surgeon has been present at the MDT meeting during which their case was discussed.

The factors that promote effective functioning of MDTs are well understood; in addition to the issues already mentioned, these include (National Cancer Action Team 2010a):

- MDTs periodically assessing their own effectiveness and performance, where possible benchmarking against similar MDTs using cancer peer review processes;
- Clear criteria about which patients and types of clinical questions need to be addressed by MDTs;
- Organisations demonstrating their support for MDT meetings via adequate funding/resources in terms of people, time, equipment and facilities;
- Networking opportunities for MDTs to share local practice, learning and experiences.

These factors need to be reviewed in the current context, and especially in light of the more challenging financial climate in which services are now operating. The key recommendation here is that MDT development and support must be central to cancer improvement strategies at a local and national level.

Further work is also needed to understand the role of virtual MDTs (vMDTs), where teams – supported by information and communication technologies – share information and meet remotely, rather than face-to-face. This approach offers significant potential to improve convenience, team-working and patient access to specialist services, particularly where multiple providers are involved in delivering complex pathways of care. Our research, and evidence more widely (e.g. Munro and Swartzman 2013), indicates that there are several barriers to the implementation of vMDTs. Above all, the technology and IT systems to support virtual working must be of high quality and acceptable to team members. We share the conclusions reached by Munro and Swartzman (2013) in their recent review that, "If vMDTs are to make any useful contribution to the management of patients with cancer, then a nationally coordinated and planned programme of research is required. The *ad hoc* development will not lead to meaningful progress."

### **Multidisciplinary teams: recommendations**

- **Commitments to developing and supporting MDTs are needed within both national and local plans/programmes to develop cancer services.** Organisations must regularly assess whether appropriate and sufficient resources are in place for MDTs to function effectively. This includes staff time to prepare for and attend meetings, which should be recognised in job plans. Given that the demand for cancer services is increasing, the NHS must be prepared to increase these resources to allow staff to participate in longer or more frequent meetings.
- **There is much research and piloting work underway to support the development of telemedicine within the NHS; this could usefully extend its focus to include models of remote clinical teamworking such as vMDTs.** Virtual MDTs (vMDTs) have emerged in response to the logistical challenges of coordinating teams working at different locations,

but little is known about the circumstances in which vMDTs are most appropriate and the factors that contribute to their effectiveness.

## 5. RESEARCH AND INNOVATION

High quality research is fundamental to delivering ongoing improvements in the surgical treatment of cancer. There are several examples where surgical research has yielded innovative new techniques and then driven their uptake in practice: laparoscopic surgery is a prime example. Despite this, our review confirms the conclusions reached by both the Royal College of Surgeons (2011) and the National Cancer Research Institute (2012) about the lack of a widespread research culture in cancer surgery. We heard about the need for stronger leadership and incentives to support surgical research, as well as the methodological challenges that researchers in this field face. There was a view among many who responded to our international survey that surgery does not compete effectively for funding against other areas of treatment research, especially drug therapy. This appears to be borne out by patterns of investment: in 2010, less than 3% of the investment in cancer research made by the 22 partners of the National Cancer Research Institute was surgery related (National Cancer Research Institute 2012).

Detailed recommendations for developing surgical research have already been put forward by the Royal College of Surgeons (2011) and the National Cancer Research Institute (2012). These should now be fully considered and addressed. Funders must look at how they can target investment to build an infrastructure which will support and grow research capability, as well as funding individual studies. This should build on recent work to establish a network of Surgical Trials Units in England, which are supporting surgical specialist leads to develop and deliver new multi-centre clinical trials.

There is an evident need for strategic leadership and coordination at a national level. In radiotherapy, these same issues were principally addressed through the establishment in 2009 of CTRad (the Clinical and Translation Radiotherapy Research Working Group). There may be much benefit to setting up an equivalent body for cancer surgery research. There are also strong links between research and many of the themes discussed above. For example, a stronger emphasis could be given within the surgical curriculum to the development of research skills, with opportunities for trainees to apply these in practice through individual projects or involvement in larger studies. Indicators of research performance could be incorporated into data reporting requirements for cancer surgery, which would allow research activity to be benchmarked and tracked over time.

### Research and innovation: recommendations

- **Research funders should consider creating dedicated funding streams for research involving surgery (standalone or multi-disciplinary) and programmes to train future research leaders within the profession.** Surgical research is under-represented compared to other clinical areas and more action is needed to help surgical teams access research funding and infrastructure support. Funders and professional bodies should also consider how their communications can help expand the pool of research-active surgeons.
- **Key organisations including Cancer Research UK, the National Institute for Health Research and National Cancer Research Institute (NCRI) should consider establishing a national body to drive forward surgical research equivalent to CTRad (the Clinical and Translation Radiotherapy Research Working Group).** Such a group could support

implementation of the detailed recommendations to support and develop surgical research that have already been made by the NCRI and the Royal College of Surgeons.

- **Indicators of research performance should be incorporated into data reporting requirements for cancer surgery to allow research activity to be benchmarked and tracked over time.** These should be gathered at unit level and might include, for example, the number of trials that the unit is participating in and the proportion of patients recruited to take part.

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# APPENDIX 1: METHODOLOGY

## OVERVIEW

Cancer Research UK commissioned an independent research team to carry out a review of key issues in cancer surgery services. The review was guided by the following key questions:

- What is the state of cancer surgery services across the UK?
- What does the UK do well in comparison with international counterparts?
- What are the key challenges?
- What is the impact of the NHS reforms and efficiency savings on cancer surgery services?
- What needs to be done to build on best practice and address challenges in order to improve patient outcomes?
- How well are MDTs working for surgery?

These issues were explored through a mixed-methods study, carried out between March and September 2013. The study comprised three key elements:

1. A review of international literature and evidence;
2. In-depth interviews at a local, national and international level;
3. An online survey distributed through organisations and networks in six countries.

Each of these is explained in more detail below.

## LITERATURE AND EVIDENCE REVIEW

The study commenced with a review of publicly available literature and evidence to summarise existing knowledge on cancer surgery services in the UK, identify gaps in that knowledge base and gather any relevant comparative insights from other countries. Early findings from the literature review were also used to generate the key themes and issues that were more fully explored in the other elements of the study. Literature was identified in three main ways: i) a structured search of electronic bibliographic databases including Medline, Embase, CINAHL, The Cochrane Library and HMIC; ii) a search of internet-based sources including the websites of key national organisations, government health departments, research bodies and other relevant sources such as national cancer audit reports; and iii) studies and data provided by our interviewees.

## IN-DEPTH INTERVIEWS

First-hand views and experiences of cancer surgery services were explored through in-depth telephone interviews. Nationally, interviewees included policymakers and representatives from medical royal colleges and speciality associations, patient charities and other key national bodies in the cancer field. Several of our national interviewees also had clinical posts within the NHS and their responses often reflected their dual roles. At a local level, interviewees represented integrated, tertiary, specialist and district general hospital (DGH) providers (n=10) and covered a range of tumour groups including colorectal, breast, prostate, head and neck, upper gastro-intestinal, lung, urological and peritoneal. The sample was comprised of seven English NHS trusts, and a single organisation from Scotland, Wales and Northern Ireland. While interviewees were mostly surgeons, our sample also included senior

and service managers and other members of MDTs including nurse specialists and medical oncologists.

Interviews were semi-structured, based on a topic guide that combined core questions with more detailed probes to clarify responses and explore issues in greater depth. On average they lasted 40 minutes and – with participants' permission – were digitally recorded; they were then transcribed verbatim. Thematic analysis of the data was carried out, guided by the principles of Ritchie and Spencer's (1994) Framework Approach. This involves the initial identification of analytical themes derived from the research questions and existing literature, to which additional themes are added as new insights emerge from the data. The value of this approach is that it is particularly well-suited to the problem-oriented nature of applied and policy relevant research, whilst also allowing for an analytical process which remains grounded in and driven by participants' accounts.

### **INTERNATIONAL SURVEY AND INTERVIEWS**

The final element of the study was an online survey to explore and compare cancer surgery trends, performance and challenges in a wider international context. A mixed-methods survey was designed, combining fixed response (quantitative) and free text (qualitative) questions. It commenced with a series of questions eliciting general thoughts about surgery services and their recent development in the respondent's country, followed by more specific questions addressing the topics identified through the literature and evidence review.

The survey was distributed to relevant networks, organisations and individuals based in (or working across) the six countries participating in the International Cancer Benchmarking Partnership: UK, Denmark, Sweden, Norway, Australia and Canada. A covering email explained the purpose of the survey and encouraged responses from the following groups: i) cancer surgeons; ii) other members of clinical teams including oncologists and nurse specialists; iii) policymakers and planners; and iv) cancer surgery service managers. A snowballing technique was employed, whereby respondents were encouraged to forward details of the survey through their personal networks. This approach has the merit of maximising survey reach, but it also has disadvantages. Above all, there is no way of knowing the size of the overall survey population, therefore the response rate cannot be reliably calculated. In the event, we also received several responses from individuals in countries outside of the original sample.

The table below shows the number of responses by region. Our category for 'Europe non-ICBP' comprises responses from France, Italy, Germany, Greece, Netherlands, Poland and Portugal. In the group we have termed 'Other' are respondents from a diverse group of countries including India, Brazil, Tunisia and Madagascar.

### Number of responses by region

Area	Number of responses
England	39
Scotland	28
Wales	15
ICBP (excl. England, Scotland and Wales)	25
Europe non-ICBP	13
Other	18
<b>Total</b>	<b>138</b>

The majority of respondents (82%) were surgeons; of these, 73% described themselves as specialist cancer surgeons, with the remainder being either general or reconstructive surgeons. The next most represented groups were medical oncologists and specialist physicians (6% each). Other respondents included specialist cancer nurses, healthcare managers and policymakers. Many of those who responded reported involvement in surgical training (69%) and/or surgical cancer research (59%).

A wide range of tumour group specialisms were represented. The most common areas that respondents reported a specialist interest in were breast (40%), colorectal (27%) and upper GI (21%). More than ten respondents listed urological, sarcoma, skin, head and neck or lung cancer as an area of expertise.