



Outcomes



Cancer Clinical Academic Group



KING'S HEALTH PARTNERS

An Academic Health Sciences Centre for London

Pioneering better health for all

King's Health Partners has

- three of the UK's leading NHS Foundation Trusts
- a university ranked 16th in the world which achieved outstanding scores across its health faculties in the 2014 Research Excellence Framework. In the world university rankings for clinical, pre-clinical and health, King's College London is 11th
- 4.2m patient contacts each year
- over 36,000 staff
- more than 25,000 students
- a combined annual turnover of £3.2bn
- clinical services provided across central and south London and beyond, including seven mental health and physical healthcare hospitals and many community sites
- a comprehensive portfolio of excellent quality clinical services with international recognition in cancer, diabetes, mental health, regenerative medicine, transplantation, cardiac and clinical neurosciences
- a major trauma centre and two hyper-acute stroke units

About King's Health Partners

King's Health Partners Academic Health Sciences Centre brings together one of the world's top research-led universities, King's College London, and three of London's most prestigious and highly regarded NHS Foundation Trusts – Guy's and St Thomas', King's College Hospital and South London and Maudsley.

The partnership provides a powerful combination of complex clinical specialties that cover a wide range of physical and mental health conditions and a breadth of research expertise that spans disciplines from medicine and biomedical sciences to the social sciences and humanities.

There are three parts to our mission: excellence in research, education and clinical care.

To support our mission, we are delivering programmes of work to:

- join up mental and physical healthcare so that we treat the whole person, mind and body
- increase the value of the care we provide and the outcomes we achieve for our patients and service users
- integrate care across local primary, secondary and social care services to make it easier for people to get the care and support they need
- improve the public health of our local community by tackling inequalities and supporting people to live healthy lives

We are structured to deliver our mission for excellence. Our 21 Clinical Academic Groups (CAGs) bring together all the clinical services and staff from the three trusts with the relevant academic departments of King's College London.

Foreword



**Professor John
Moxham, Director
of Clinical Strategy**

At King's Health Partners we are committed to improving outcomes for our patients and service users. We believe that being open and transparent about the care and outcomes we deliver results in a culture of improvement across our partnership. This in turn leads to better outcomes for the people we serve and better value for the money we spend. This is why we are publishing a series of outcomes books that will help patients, service users, carers, referring clinicians and commissioners to make better informed decisions, and our staff to drive up the quality of the care we provide. The books report key outcomes for treatments provided by our 21 Clinical Academic Groups (CAGs). CAGs form the building blocks of our Academic Health Sciences Centre. We believe that by bringing together our clinicians and academics across teaching, training and research, we can use their combined expertise to achieve better outcomes for our patients and service users.

Our books are designed for a clinical and lay audience and contain a summary of patient volumes and measures (e.g. length of stay, re-admissions, patient experience), clinical outcomes, educational activities, technological and research innovations and publications. They also focus on other important measures, such as staff satisfaction and wellbeing.

The primary purpose of King's Health Partners is to improve health and wellbeing locally and globally. We must deliver this goal against a challenging economic environment, with rising demand for, and costs of, healthcare. We will only achieve sustainable health improvement if we strive always to increase value. We define value in terms of outcomes that matter to patients, over the full cycle of care, divided by the cost of producing those outcomes. By publishing outcomes books we have more information to support us measuring the value of the healthcare we provide.

Our goal is to increase the depth and breadth of reporting each year. Books will be updated regularly to demonstrate progress against our mission to achieve world-class research, education and clinical care. We hope you find these data valuable. Please send comments and suggestions to us at kingshealthpartners@kcl.ac.uk For more information please visit our website at www.kingshealthpartners.org

**Professor John Moxham, Director of Clinical
Strategy, King's Health Partners**
April 2015

A handwritten signature in black ink, appearing to read "John Moxham".

Foreword from the Cancer Clinical Academic Group



**Professor Arnie
Purushotham,
Cancer Clinical
Academic
Group Lead**

Our focus at King's Health Partners is to deliver the best care and treatment for patients, advance cancer research and create the ideal training environment for all. We have transformed our services to become truly patient centred and continue to implement this ethos in every aspect of our work. All partners of King's Health Partners (Guy's and St Thomas', King's College Hospital, King's College London and South London and Maudsley) are contributing in our journey to world class cancer care.

We are building upon great successes, examples of which include:

- reconfiguring our clinical services to create high volume centres of excellence, including Europe's largest adult allogeneic bone marrow transplantation programme
- advancing the integration of cancer-related basic, translational and clinical research and doubling our annual research income in four years
- increasing our research output to over 2,000 peer reviewed publications in the last four years (an increase of 30%)
- contributing to a very successful clinical medicine submission in the governmental Research Excellence Framework review, ranking third behind Oxbridge for quality
- collaborating with university partners in the Francis Crick Institute
- commencing work on a new radiotherapy and chemotherapy centre at the Queen Mary's Hospital site, Sidcup, Kent

- doubling the number of new clinical trials launched in the last four years
- collaborating with The King's Fund to share learning from our approach to Experience Based Co-Design and developed a toolkit which is being used nationally and internationally
- launching the Masters in Research in Translational Oncology in 2009 and the MSc in Research Biobanking in 2015
- building greater links with our partners in Europe, India, China, Africa, Australia and North America

The new state-of-the-art £160m Cancer Centre being built at Guy's Hospital, opening in 2016, will further transform our services and the way in which we deliver cancer care. The creation of the new centre is patient-led, involving them in our planning, both for delivery of care and in the design of the building.

We acknowledge London and the United Kingdom still lag behind other European countries in cancer outcomes. We need to focus more on a cancer prevention strategy – raising awareness about

smoking cessation, alcohol reduction, a healthy diet and regular exercise. We also need to find a way to increase earlier diagnosis and greater uptake of cancer screening in hard to reach groups, for example population groups that are socio-economically challenged and the black and ethnic minority population, where we know uptake of invitation to screening is lower. Finally, we need to support GPs as best as we can, based on what they require, working towards greater integration between primary, secondary and tertiary care.

We are at a critical and exciting time for cancer services. Working together we can take cancer care to the next level benefiting our patients across south east London and beyond.

**Professor Arnie Purushotham,
Cancer Clinical Academic Group Lead**

April 2015



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Integrating mental and physical healthcare within King's Health Partners

Mental and physical integrated healthcare

King's Health Partners aims to create a centre where world-class research, education and clinical practice (the 'tripartite mission') are brought together for the benefit of patients.

We want to make sure the lessons from research are used more swiftly, effectively and sympathetically to improve healthcare services for people with physical and/or mental health problems.

We will achieve this transformation of healthcare for the whole person, through our commitment to integrated mental and physical healthcare, research, education and clinical delivery, across our breadth of services and from conception to the last days of life.

We aim to:

- transform outcomes for patients with both mental and physical health conditions, to ensure that care in all healthcare settings addresses the whole person, and is patient centred

- expand our internationally recognised programme of mental health research and provide comprehensive innovative staff education programmes
- develop and evaluate novel and integrated mental and physical healthcare pathways in collaboration with commissioners, patients and primary care colleagues

More specifically, we will:

- address underlying physical health risk factors which contribute to the excess mortality and morbidity experienced by patients with enduring mental health problems
- reduce the adverse impact of mental health disorders on outcomes of long-term conditions and medically unexplained symptoms
- integrate service provision for the whole person throughout all of our specialties

Academic integrated care system

We are committed to working with our partners across local boroughs to integrate services at a local level to improve patient care. To this end we will use 2015 to test the provider offer of new models of care to enable a more integrated academic healthcare system.

We are a founder member of Southwark and Lambeth Integrated Care (SLIC), a movement for change aiming to genuinely transform how care services are delivered so they are coordinated around the needs of people, treating mental health, physical health and social care needs holistically.

This programme is vital to address the crisis within our healthcare economy and quality must improve significantly so people receive effective care and experience it positively.

A lot has already been achieved. Work to date has built an ever deepening shared understanding of the issues, a commitment to action, and an understanding of the options to reduce avoidable emergency admissions, speed up delays in discharge, improve mental and physical health liaison and reduce admission to residential care.

Public health integrated care system

Public health has been identified as a priority for King's Health Partners and is one of our biggest challenges. We have developed a strategy approved by our Board – over the next five years we aim to be recognised internationally for our academic and service innovation in urban public health in addressing local and international issues, with a focus on inequalities in health and healthcare delivery, particularly with regard to ethnicity and deprivation.

Our Clinical Academic Groups (CAGs) and the south east London sector will be an innovative test bed to develop and trial solutions in prevention and management of long term conditions of public health importance, thereby achieving academic, training and service delivery to improve public health advances.

In order to reduce morbidity and premature mortality whilst reducing health inequalities in south east London, all CAGs are responding to the call for increased action on smoking and harmful drinking. We are implementing both an alcohol and tobacco strategy.

Alcohol strategy

- developing appropriate resources for clinical staff and patients
- developing and implementing training for all staff on alcohol early identification and intervention
- establishing ourselves as a centre of excellence for integrated research, training and practice in the management and prevention of alcohol misuse
- attracting funding for future alcohol clinical, training and research initiatives
- monitoring the impact of the strategy on indicators of alcohol related harm

Tobacco strategy

- supporting all clinical sites to be smoke-free
- developing an informatics structure for routinely and systematically recording smoking status
- support, referrals and treatment uptake for smoking cessation across the partnership
- co-producing clinical care pathway for nicotine dependence treatment
- developing and implementing training packages for smoking cessation interventions for all our healthcare professionals
- monitoring the impact of our smoking cessation strategy in relation to knowledge and uptake of skills by staff, uptake of smoking interventions, outcomes of interventions, user satisfaction, prevalence of smoking, cost-effectiveness of interventions



Introduction to the Cancer Clinical Academic Group

King's Health Partners is the largest provider of NHS funded cancer services in London. Our mission is to increase the life expectancy of patients with cancer, to alleviate suffering, to deepen knowledge and understanding of cancer, and to enhance the experience of patients, carers and families. Our cancer services provide an integrated approach to both mental and physical wellbeing, which is supported by excellence in research and training.

We are recognised as national and international leaders in cancer immunology, cancer imaging, the application of mathematics to interrogate complex data sets, epidemiology, palliative care, breast,

thoracic, prostate cancers and haemato-oncology. The Comprehensive Cancer Imaging Centre,¹ the Experimental Cancer Medicine Centre² and the Breakthrough Breast Cancer Unit³ are all based at King's Health Partners.

We are members of the high profile London Cancer Alliance along with Imperial College Academic Health Science Centre, St George's University Hospitals NHS Foundation Trust and The Royal Marsden NHS Foundation Trust. We are also part of the Francis Crick Institute, an inter-disciplinary medical research institute bringing discovery science to bear on translation for patient benefit.

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1. The Comprehensive Cancer Imaging Centre (CCIC) is a major collaboration between King's College London and University College London, supported by funding from Cancer Research UK (CRUK), Engineering and Physical Sciences Research Council (EPSRC), Medical Research Council (MRC) and the Department of Health, to develop novel imaging methods to better understand cancer and improve diagnosis and patient outcomes.
 2. Experimental Cancer Medicine Centre (ECMC) Network is jointly supported by Cancer Research UK and the Department of Health.
 3. The Breakthrough Research Unit and King's College London investigates a poorly understood type of breast cancer called basal-like breast cancer.

We have achieved a tremendous amount since becoming an Academic Health Science Centre yet we recognise there is still more to do to ensure we improve the lives of those affected by cancer.

The cancer commissioning strategy for NHS England states that despite the fact more people are surviving cancer than ever before, mortality and survival rates vary significantly between London boroughs.

Fourteen London Clinical Commissioning Groups have lower one year survival rates than the England average mortality rates. Cancer is the second leading cause of death across the capital and this rises to the leading cause of premature (or under the age of 75 years) death.

Patients in London are still being diagnosed when their cancer is at a later stage than our European counterparts, meaning successful treatment is less likely. Across the capital, between 25 and 30% of cancer diagnoses are made in Accident and Emergency (A&E).

The National Cancer Patient Experience Survey reports poor patient experience, with nine out of the 10 worst reported hospitals for cancer patient experience being in London – a position London holds year on year.

We are a comprehensive cancer centre, providing high-impact and innovative clinical services along the entire patient pathway from prevention and

screening through diagnostics, treatment and survivorship or end of life care. Furthermore, we deliver ‘whole person’ care by ensuring that mental and physical health services collaborate to treat the entire individual. Services are offered across King's Health Partners member organisations at:

- Guy's Hospital at London Bridge
- King's College Hospital at Denmark Hill
- Princess Royal Hospital in Bromley
- St Thomas' Hospital at Westminster Bridge

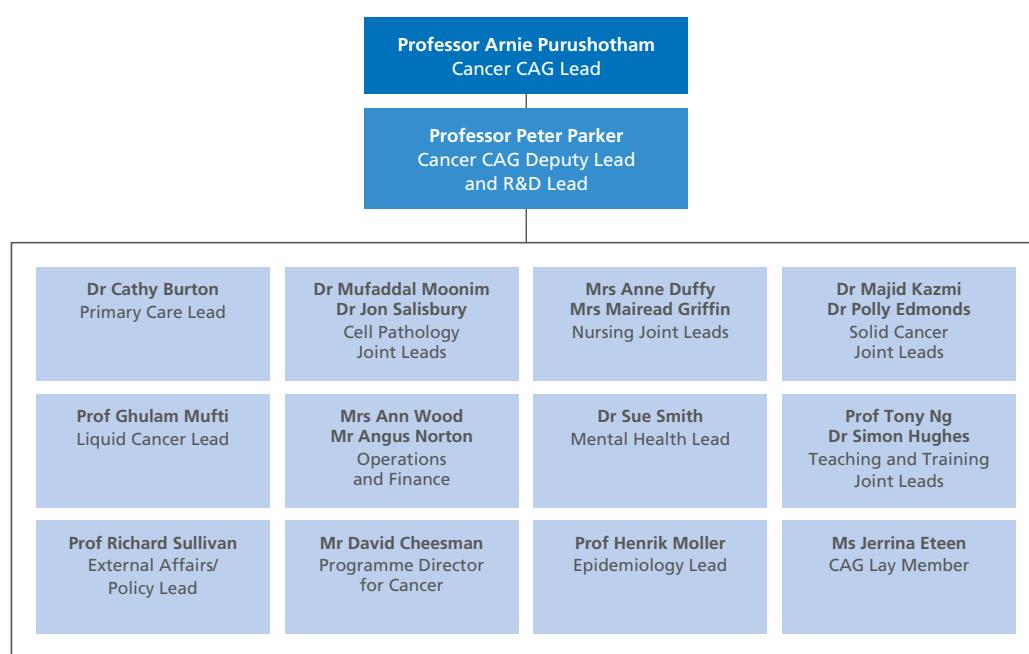
Achievements to date

- reconfigured our clinical services to create high volume centres of excellence, including Europe's largest adult allogeneic bone marrow transplantation programme
- advancing the integration of cancer-related basic, translational and clinical research and doubling our annual research income in four years
- increased research output to over 2,000 peer reviewed publications in the last four years (an increase of 30%)
- cancer was part of a very successful clinical medicine submission in the governmental Research Excellence Framework review, ranking third behind Oxbridge for quality

- work has commenced on a new radiotherapy and chemotherapy centre at our Queen Mary's Hospital site, Sidcup, Kent
- doubled the number of new clinical trials launched in the last four years
- building a new state-of-the art £160m Cancer Centre at Guy's
- collaborating with The King's Fund to share learning from our approach to Experience Based Co-Design and developing a toolkit which is being used nationally and internationally
- launched the Masters in Research in Translational Oncology in 2009
- active member of the European Organisation for Research and Treatment of Cancer Network
- extended the biobanking service from breast and haemato-oncology to include lung, head and neck, upper gastrointestinal (GI) and prostate cancers
- fostered links with our European partners, Africa, Asia, Australia and North America and our staff authored a high profile Cancer Policy Briefing for the G-20 Health Ministers summit
- launched the MSc in Research Biobanking in 2015
- developed a multi-professional, modular training programme to enhance the skills of our workforce
- collaborated with university partners in the new Francis Crick Institute
- King's College Hospital leads the way in acute promyelocytic leukaemia (APL) expertise with survival rates rising from 56% in 1990 to over 90% in 2013
- established nurse led clinics and advanced practitioner roles
- provide a wide range of supportive care services available to patients throughout their treatment and survivorship phases



Team structure





King's Health Partners new cancer centre at Guy's Hospital

We are currently building a new cancer centre at Guy's which will be able to treat more patients with cancer – about 6,500 patients per year and will deliver radiotherapy treatments across all of south east London.

Photo: David Tett Photography

Our vision

Our vision is to provide the very best cancer service to our patients by combining first class clinical care with ground-breaking research and high quality training and development.

Over the next five years we will:

- improve outcomes and experience for cancer patients with complex needs in part through earlier diagnosis and the provision of high quality survivorship care
- embed whole person care across the cancer pathway and strive to bring treatment programmes closer to home
- develop and test new biological and cellular therapies in a range of cancers
- open a new £160 million integrated cancer centre at Guy's Hospital in 2016, which will transform the delivery of cancer services, so patients will receive the right treatment at the right time, delivered within fewer visits and tailored to their needs

Together we aspire to be not only one of the leading comprehensive cancer centres in the UK but also one of the best in the world. We have ambitious plans to improve our services by working closely together. We have started work on the new cancer centre and this incredible new building will open in 2016, bringing together many of our hospital-based cancer services, innovation and core research activities under one roof.

Professor Arnie Purushotham, Director of King's Health Partners Cancer Centre

Professor Arnie Purushotham, Director of King's Health Partners Cancer Centre is driving this build forward and has this to say:

"Through innovative cancer research, clinical care, training and education, King's Health Partners will maximise the benefits of joint working to accelerate 'bench to bedside' developments, resulting in improved treatments for patients.

This is an exciting time with many new developments within healthcare technology which we will use to deliver better and more efficient care."

We aim to

- increase life expectancy of individuals diagnosed with cancer in south east London and alleviate their suffering
- enhance the experience of patients and carers affected by cancer
- deepen knowledge and understanding of cancer by increasing the quality, quantity and profile of cancer-related research
- develop an internationally recognised pool of talented cancer clinicians, researchers and academics

Our ambitions are

- to have no unnecessary waiting for patients
- to have a single check-in per visit for patient appointments
- to have a personalised service from the initial welcome through to any subsequent service
- to improve support services with on-site complementary therapies and a patient information centre
- to have an accessible service, open six days a week and for longer hours
- to have an outstanding and uplifting experience when inside the building

Looking ahead to new discoveries

The new research, innovation and learning hub, located on the ninth floor of the new Cancer Centre at Guy's, will help scientists, clinicians, health professionals and patients to develop technologies and conduct research that will drive the discovery of causes, better treatment and ultimately improve the survival of cancer patients.

All staff will also conduct more clinical trials than ever before, increasing the different treatment options we can potentially provide. This will mean more patients receiving ground breaking treatments that will be best in class.

Enhancing the patient experience

Over the last few years, we have been investing in new integrated technology, such as electronic patient notes and single check-in facilities to enhance the service for patients. We aim to transform how we work to focus around the needs of our patients and staff. New technologies will be at the heart of the care we provide for patients in the new Cancer Centre. It will improve how we run our clinics and how we engage with patients, as well as reducing waiting times, which will make a real difference to our patients.

We aim to be at the forefront of technological innovation, not just in the technology we use to aid patient care but also the patient journey. We are looking at everything from how technology can be used from before a patient first arrives and

checks in, to identifying opportunities for patients to use their own smartphones or other mobile devices to manage their care.

This centre will see a step change in how we treat cancer and attend to the holistic needs of patients and carers.

Dr Majid Kazmi, Clinical Director of Cancer Services, Guy's and St Thomas' NHS Foundation Trust

Working with our acute care, academic, general practitioner and community partners as well as the local population, we are developing and applying innovations in the discovery, development and delivery of new types of cancer care.

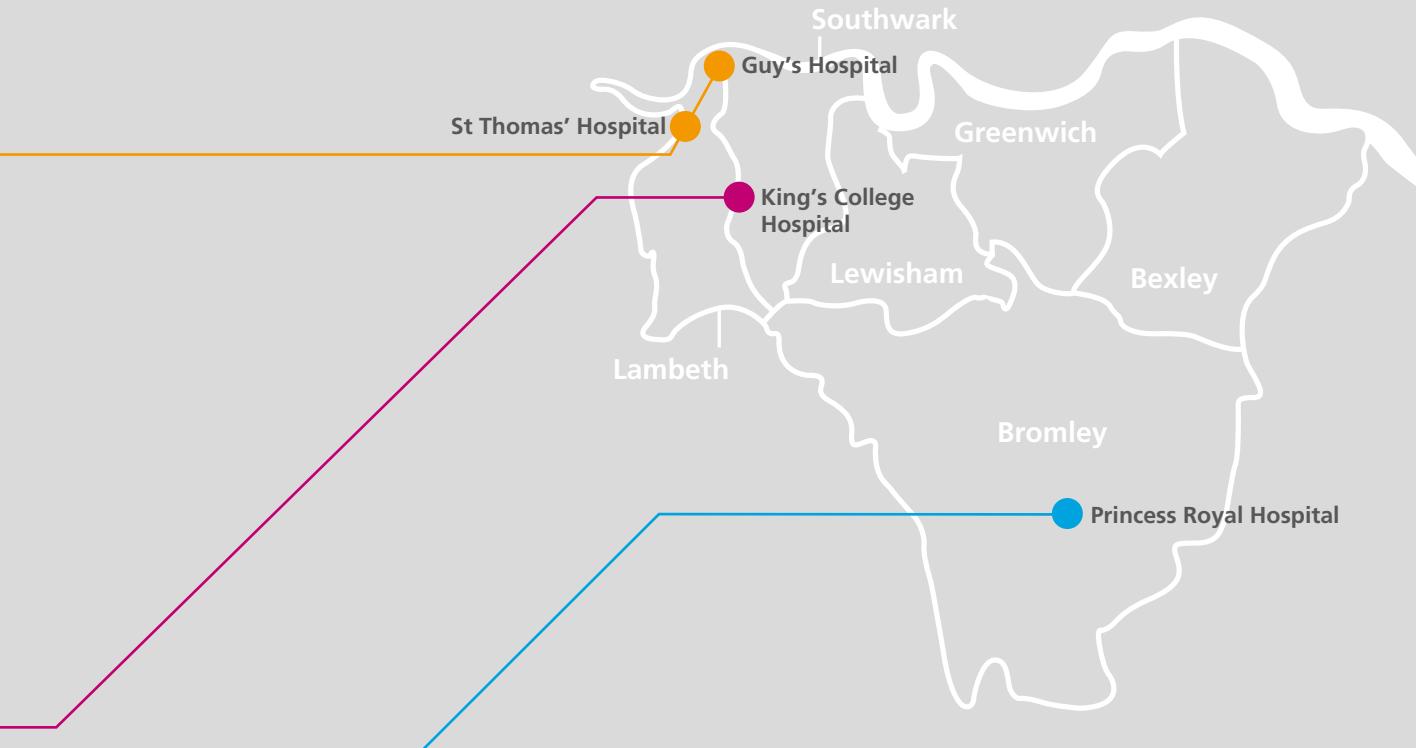
Our objectives

- to enable greater integration of the major practitioners of cancer care; surgeons, medical oncologists and clinical oncologists and facilitation of clinical research both across disciplines and patient groupings
- to improve supportive care, patient information and complementary therapies provided at each stage of the patients' pathway to improve quality of life both during treatment and into survivorship
- to provide an outstanding patient experience and environment that will 'lift the spirits' for those using the building

List of cancer services

Guy's and St Thomas'					
	Diagnosis	Surgery	Chemo	Radiotherapy	Notes
Breast	✓	✓	✓	✓	Genetics specialist centre
Lung	✓	✓	✓	✓	All surgery for south east London
Colorectal	✓	✓	✓	✓	
Urology	✓	✓	✓	✓	
Gynaecological	✓	✓	✓	✓	Brachytherapy at St Thomas' Hospital
Head and neck	✓	✓	✓	✓	
Skin	✓	✓	✓	✓	National specialist centre
OG	✓	✓	✓	✓	
Brain & CNS			✓	✓	
Haematology	✓	(N/A)	✓	✓	
HPB			✓	✓	

King's College Hospital				
	Diagnosis	Surgery	Chemo	Notes
Breast	✓	✓	✓	
Lung	✓			
Colorectal	✓			
Urology	✓			Renal cancer surgery
Gynaecological	✓			Surgery for early endometrial cancer only
Head and neck	✓			
Skin	✓			
OG	✓			
Brain & CNS	✓	✓		All surgery for south east London
Haematology	✓	✓ (BMT)	✓	Centralised bone marrow transplant (BMT) service for King's Health Partners: Centre of Excellence for myelodysplasia
HPB	✓	✓		All surgery for south east London



Princess Royal Hospital				
	Diagnosis	Surgery	Chemo	Notes
Breast	✓	✓	✓	
Lung	✓			
Colorectal	✓	✓	✓	
Urology	✓	✓		Surgery for bladder cancer only
Gynaecological	✓	✓		Surgery for early endometrial cancer only
Head and neck	✓			
Skin	✓	✓		
OG	✓			
Brain & CNS				
Haematology	✓			
HPB				



Patient experience

Collecting and analysing data about patients' experiences of healthcare is essential to achieving high quality care. Across King's Health Partners we are committed to using patient experience data to improve the quality of the care we provide.

We also measure clinical outcomes which we define as measurable changes in the health or quality of life of patients that result from the care they have received. The regular and systematic review of clinical outcomes provides the data necessary for us to continuously improve all aspects of clinical practice.

A number of important outcome measures are collected by cancer registries. The population level cancer registries in England, Northern Ireland, Scotland and Wales collect structured information about every patient diagnosed with cancer. Cancer registries are allowed by statute to collect this information to help us better understand and treat cancer.

Focus on patient views

The importance of patient experience

The Francis Report highlighted the central importance of listening to patients and carers and attending to the experience of healthcare services.

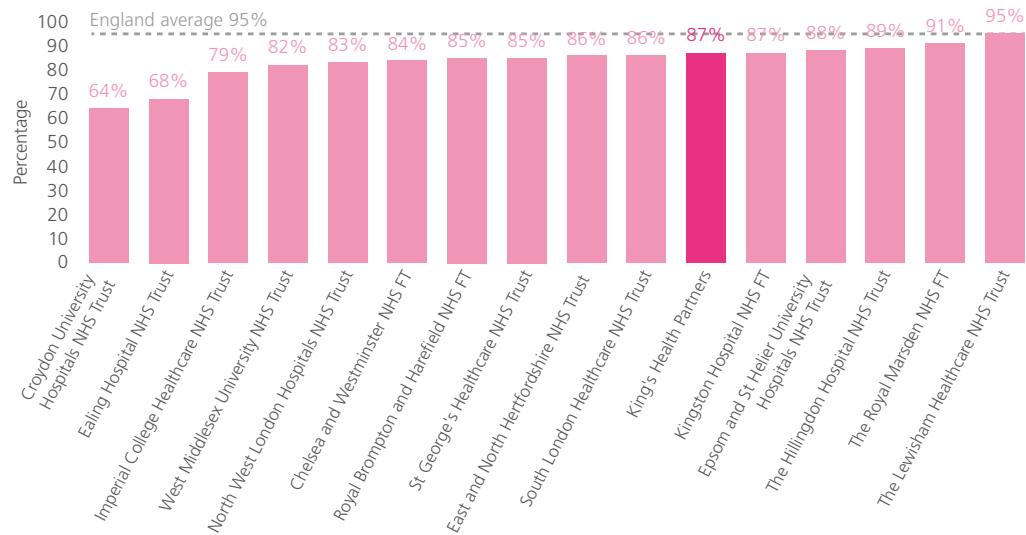
In cancer, one of the tools to understand patient experience is the National Cancer Patient Experience Survey which has been run annually since 2010.

The 2012/13 National Survey¹ published in August 2013, demonstrated 88% and 85% of cancer patients treated at Guy's and St Thomas and King's College Hospital rated their care as 'excellent' or 'very good', respectively, compared to the national average of 88%. The chart below shows performance across the seventeen members of the London Cancer Alliance.

1. The survey included all adult patients (aged 16 and over) with a primary diagnosis of cancer who had been admitted to an NHS hospital as an inpatient or as a day case patient,

and had been discharged between 1st September 2012 and 30th November 2012.

Figure 1 | Percentage of patients who rated their care as either excellent or very good in the 2012 national cancer patient experience survey



The national cancer patient experience survey consists of seventy questions. The table below shows the performance for King's College Hospital, Guy's and St Thomas' and the London Cancer Alliance average over the last three years with respect to a number of questions nationally ranked in the top and bottom 20%.

My care was very good from the doctor and nurses, and I don't know what to say or how can I repay, thank the mighty God for giving such wisdom to doctors and nurses.

Top 20%			
	2010	2011	2012
Guy's and St Thomas'	20	10	7
King's College Hospital	0	1	2
London Cancer Alliance	n/k	n/k	7.6

Bottom 20%			
	2010	2011	2012
Guy's and St Thomas'	17	15	12
King's College Hospital	23	40	39
London Cancer Alliance	n/k	n/k	27.5

We also monitor monthly patient feedback as part of the NHS friends and family test. Figures 2 and 3 provide examples of the type of indicators we monitor.

Figure 2 | Given information on medication side effects

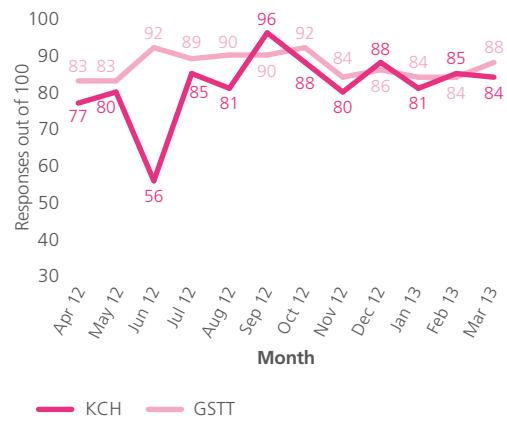
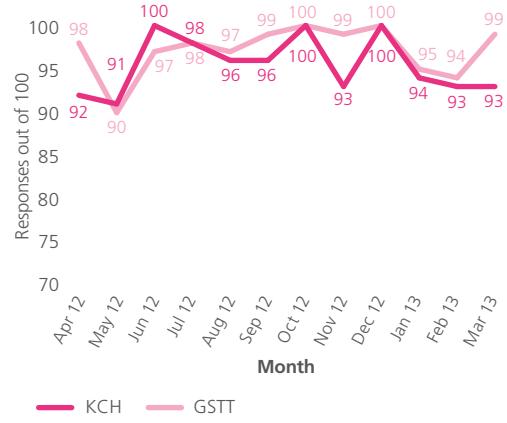


Figure 3 | Given information on contacting the service post discharge



How we are improving our performance

Performance across the Cancer CAG is mixed and it is clear that we need to do more to improve the patient experience across our various sites. This is particularly important, given King's Health Partners status as London's largest cancer care provider.

We are introducing the following changes in order to improve patient experience:

- £160m new cancer centre on the Guy's site
- new patient helpline to improve access to clinical advice and care
- involvement in the eSMART project aimed at improving the real-time assessment and management of chemotherapy induced side effects
- facilitating an environment in which staff routinely listen to our patients to understand what contributes to and what gets in the way of good care
- enhancing the information available to the public and our patients about cancer services on our website
- understanding and responding to the needs of our patients through holistic needs assessments and the use of real time feedback tools about satisfaction with services



**Diana Crawshaw,
Chair of the Patient
Reference Group**

- embedding the practice of patients and staff co-designing services. The most prominent example is the Patient Reference Group for the Cancer Centre at Guy's Hospital – a group of 25 patients working with staff to develop the designs both of the physical building and the services

Patient involvement is fundamental to everything we do; the central point of planning for the new Cancer Centre is our Patient Reference Group.

The operation was very successful and although I had a few complications afterwards. I was well taken care of by amazing teams of people on Page Ward. When I was admitted to Hedley, Atkins Ward at Guys, an SHO called Adam and a young doctor called Lonnie, were kind, calm, professional and treated me like my treatment was my business as well as theirs.

The group was set up to make sure patients and carers influence us to:

- improve services in ways that are important to them
- help us to design a cancer centre fit to deliver the best possible care and patient experience

The Patient Reference Group meets every two months. Its purpose is to provide a patient perspective on cancer services.

Together with staff and external partners the group also shapes future plans and ideas. Overall they act as a forum to steer and provide feedback on challenges, issues and ideas brought to the group and to make recommendations to the relevant professionals and health providers involved in the Cancer Centre.

Chairing the Patient Reference Group has come as an unexpected privilege. I value the personal contact that I have with members and enjoy the role of ensuring that all patient voices are heard.

Diana Crawshaw, Chair of the Patient Reference Group

Encouraging cancer patients to lead an active life

Investment in and support of physical activity is a key example of King's Health Partner's vision for the care of cancer patients.

Many clinical nurse specialists have led the promotion of physical activity to support patients during and post treatment.

Physical activity can take many forms including gym classes, walking the dog or housework. Being active can be challenging, therefore support is available through opportunities including leisure centre led exercise, hospital based classes and 1:1 advice.

Clinical nurse specialists in selected tumour sites currently offer physical activity support to their patients at the end of their treatment.

Participating in this physical activity programme has made me more aware of the benefits of being active and has also focussed me more on doing things and not just sitting about waiting to recover.

Julie² was diagnosed with ovarian cancer. Her treatment included surgery and chemotherapy and she currently has three monthly check-ups.

I found out about the physical activity programme when I had a follow up appointment after my treatment. The support nurse had a chat with me about lifestyle and mentioned physical activity.

I realised exercise was important and probably would have done it if the programme wasn't there but it spurred me on and it was reassuring to have a gym programme set out by an expert and to have them there on hand if I needed help.

Focus on survival

Survival

When people are diagnosed with cancer, one of the first things they want to know is their chances of survival and recovery. Understanding survival statistics becomes extremely important, yet it can also be confusing. Survival statistics describe the proportion of people with a certain type of cancer who will be alive a certain time after the cancer is diagnosed. Survival rates can be given for any length of time. Short term survival is the most sensitive tool for comparison of patient groups and populations, but patients and carers may be more interested in the chance of survival in the longer term or in the average survival time.

Figure 4 indicates the wide variation in survival estimates depending on the type of cancer. For example women with breast cancer have an average 96–97% one-year survival compared with patients with upper gastrointestinal cancer who will have a much lower one-year survival rate (34.6% nationally).

Patients diagnosed with cancer are often treated in more than one hospital – their 'pathway of care' may involve outpatient treatment at their local hospital but they may have their surgery and/or radiotherapy at a larger cancer centre. Because these pathways involve care at more than one hospital, survival data is often reported by residential area (rather than by hospital).

2. Not her real name, name changed for confidentiality.

Figure 4 | Survival rates by tumour group, one year from diagnosis – reported by the London cancer network area

Year of diagnosis 2009					
	Tumour group	South east London	South west London	North west London	London Cancer Alliance*
■ Above national average (statistically significant)	Head and Neck inc. Thyroid	81.2%	86.2%	82.9%	83.3%
	Upper gastrointestinal	39.7%	37.4%	38.2%	38.4%
	Colorectal	77.2%	78.0%	76.4%	77.2%
	Lung	35.9%	35.5%	34.1%	35.2%
	Skin	97.3%	98.3%	96.1%	97.5%
	Breast	96.6%	97.6%	98.3%	97.5%
	Gynaecological	83.4%	88.0%	86.6%	86.0%
	Prostate	96.5%	97.0%	95.9%	96.5%
	Urology	73.4%	74.8%	74.3%	74.1%
	Brain	63.9%	52.1%	50.2%	55.0%
■ Below national average	Haematology	82.8%	81.1%	76.8%	80.4%

*The London Cancer Alliance was established in 2011 as the integrated cancer system across west and south London. It serves a population of over 5 million.

The above table illustrates that some areas in London are performing better than others and against the average for England as a whole. This is in spite of the fact London has some of the most deprived boroughs in England with eastern parts of London experiencing the most severe problems

King's Health Partners is the cancer centre for south east London (SEL) and is therefore very experienced at providing care to one of the most deprived areas in London and England. We have better than national average survival rates for lung, upper GI, urology, colorectal, haematology

and brain cancers. We are below the national average for head, neck and skin.

Why there is such variation in survival rates across London and England

Since the 1970s, there have been well-documented inequalities in cancer survival in England. There have been a number of strategies for addressing these inequalities most recently in the Department of Health's Improving Outcomes: A Strategy for Cancer (2011).

During the 1990s, cancer survival improved significantly for almost all the common cancers. However, for many cancers, survival improved more for patients living in more affluent areas than for those in deprived areas.

Possible explanations for the lower survival in people living in more deprived areas include differences in:

- timeliness of diagnosis (delays, advanced stage of disease)
- treatment (delays, poorer access to optimal care and lower compliance)
- general health and type of disease (histological type or more aggressive disease)

Patients with lung cancer or cancer of the upper gastro-intestinal system have some of the worst survival rates nationally.

We have therefore examined these tumour groups in closer detail. The following sections for each tumour group includes a summary analysis under clinical outcomes and the steps we are putting in place to improve survival rates.

Next steps for the Cancer CAG

To ensure rapid diagnosis we have held 'speed dating' events with local GPs to raise awareness of cancer signs and symptoms and we have

introduced a range of advanced diagnostic services such as computed tomography imaging, digital mammography, mole mapping, auto-fluorescent bronchoscopy and four-dimensional CT imaging.³

We have developed an e-prescribing solution, which has been rolled out across south east London, to support the delivery of chemotherapy according to agreed protocols. Patients' urgent care needs are met by our acute oncology service – a multi-site service working to a shared operational policy. The King's Health Partners malignant spinal cord compression service, based at King's College Hospital, gives rapid access to diagnostics and treatment for patients across south east London.

More and more patients are living longer after a cancer diagnosis. Through our survivorship programme we are replacing 'one size fits all' follow up pathways with a range of patient-led services.

The speed of initialising treatment from the time I was diagnosed was very impressive. I began treatment within 3 weeks of finding out. The professionalism of the staff and the level of expertise was top drawer. Contacting you about clinics and receiving written information was also very good. My Macmillan nurse has also been outstanding.

3. Four dimensional CT imaging not only identifies the location of a tumour, but also captures the movement of a tumour.

This technology makes CT scans more accurate and faster than conventional CT scans.



I received excellent care. The consultants helped me through a difficult time to explain everything about my diagnosis and treatment. Despite being incredibly busy they always took their time and gave the individual attention I needed by answering my many questions and allaying my fears.

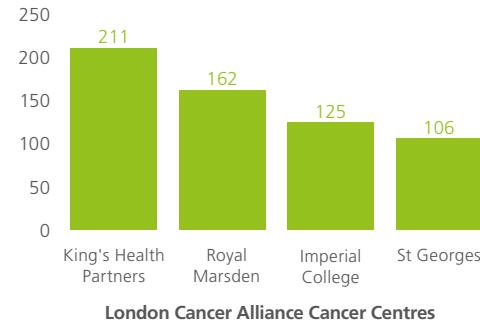
Laura, Breast cancer care patient at Guy's

Types of cancer we treat

Brain cancer

Our neuro-oncology (brain cancer) service provides treatment and care for patients with tumours of the brain and is the largest of its kind in the UK. The team of neurosurgeons, neuro-oncologists, neuro-pathologists, neuro-radiologists, palliative care (pain relief) doctors, clinical nurse specialists and therapists treats patients with all types of brain and spine tumours. They combine clinical expertise and innovative ways of working with state-of-the-art facilities to ensure our patients receive the very best care and treatment.

Figure 5 | Neuro-oncology
number of treatments 2013/14



All treatment activity graphs include courses of radiotherapy, regimes of chemotherapy and individual surgical intervention.

This integrated approach to clinical care is reflected in our impressive clinical outcomes. For example our survival rates (within one year of diagnosis) are excellent (the best in England, 63.9%) and significantly better than both the London Cancer Alliance (55.0%) and England (43.7%) averages.

The team aims to provide a personalised treatment package for each patient based on the most advanced knowledge and technology. For example our patients have access to the latest clinical equipment including stereotaxy, intra-operative navigation, functional imaging and intra-operative stimulation technology for awake brain tumour surgery, intra-surgery fluorescence guidance and advanced radiotherapy machines. We also run specialised multidisciplinary clinics as well as children's clinics and provide the UK's only dedicated Teenage and Young Adult Service for central nervous system tumours.

This service is provided at King's College Hospital with oncology support provided at Guy's and St Thomas' Hospital.

Breast cancer

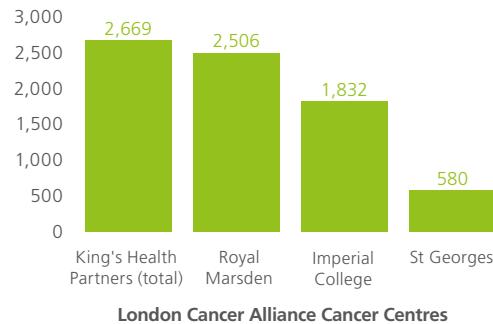
King's Health Partners breast cancer service provides exceptional clinical care to patients across south east London. We offer a comprehensive service from breast screening, one stop diagnostic clinics, comprehensive portfolio treatments, holistic needs assessments, lymphoedema and end of treatment clinics to palliative care.

Features contributing to the high quality services are as follows:

- we provide comprehensive cancer treatment with outstanding medical and nursing care
- we deliver internationally competitive research including the triple negative programme undertaken by the Breakthrough Breast Cancer Unit and first in woman global studies in intraoperative imaging
- we have a reputation for excellence as a training centre for regional and international breast cancer trainees across all clinical domains
- we were one of the first providers in the UK to introduce 3D imaging machinery to breast scanning to improve diagnostics
- we operate a multidisciplinary high risk/ breast cancer susceptibility gene (BRCA) clinic for assessment and advice to BRCA gene mutation carriers for women in south east England

- we offer an end of treatment consultation with a member of the nursing team for all patients providing an onward referral to survivorship where appropriate. Guy's and St Thomas' is a pilot site for a Macmillan project on holistic needs assessment

Figure 6 | Breast cancer
number of treatments 2013/14



Clinical outcomes

Our survival rates (within one year of diagnosis) for breast cancer patients is 96.6% which is the same as the national average and slightly below the London Cancer Alliance average (97.5%). There are a number of reasons why south east London falls behind other London sectors:

- the uptake for screening is lower in south east London compared with the rest of the London Cancer Alliance (63.6%) and well behind the national target of 70%

- stage for stage, we have greater numbers of late stage presentations
- south east London has lower socio-economic status and poorer health education than either north west London or south west London

I liked the breast care at King's. They were really kind and supportive. The Macmillan Centre was also very good. I don't feel that I could have paid for better treatment.

We are working hard with colleagues in primary care to address these problems. We support the Prowess project – a new culturally inclusive service intervention to increase screening uptake and improve awareness of breast screening.

The project is delivered in community based settings in south London. We are also working with local GPs to raise awareness of breast cancer amongst ethnic minority groups.

Breast clinics are run at Guy's, King's College, Sidcup, Princess Royal, Greenwich and Lewisham Hospitals with oncology consultants attending clinics across all sites.

Patient experience

Figures 7 and 8 summarise our scores in the last two national cancer patient experience surveys. They confirm that patients are telling us that their experience of both inpatient and outpatient breast cancer services are improving across virtually all elements of the survey.

While this is encouraging, the scores remain lower than national averages. As mentioned earlier there are a number of factors that influence ratings, known as the London effect. It is clear we need to do more to improve the experience of patients who use our breast services such as greater use of holistic needs assessments and the development of the new cancer centre on the Guy's site.

All the staff at Guy's and St Thomas's have been outstandingly caring, kind and compassionate. I am overwhelmed by their dedication and patience, when often they are clearly busy and understaffed. They always appear cheerful – particularly in the chemotherapy day unit, and the breast care nurses.

Figure 7 | Breast cancer, inpatient treatment experience 2012/13 and 2013/14

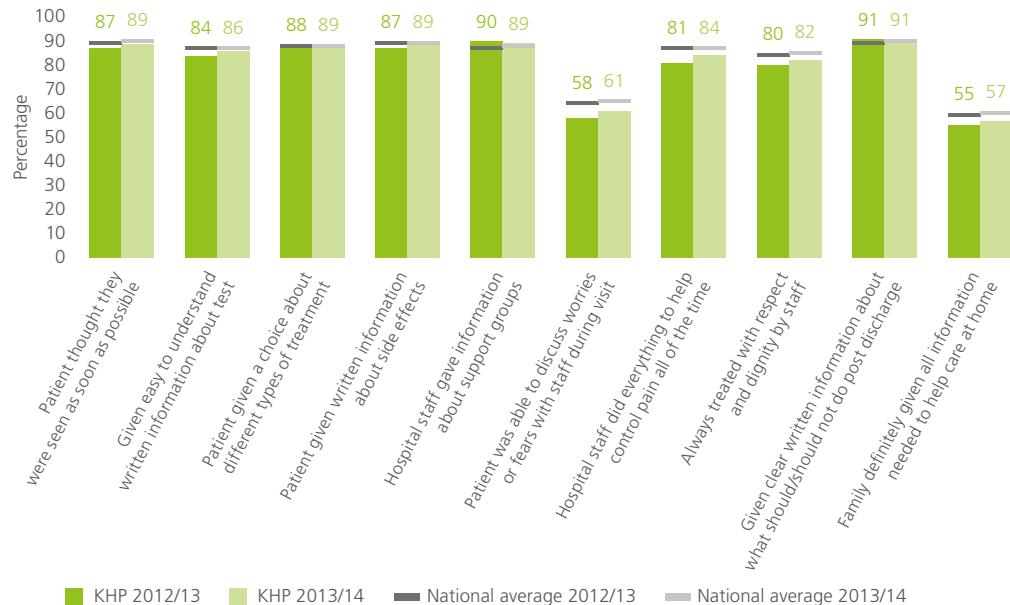
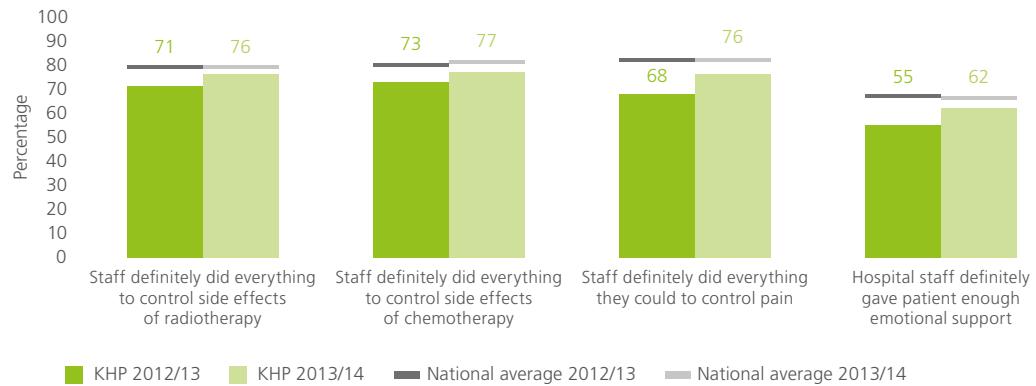


Figure 8 | Breast cancer, outpatient treatment experience 2012/13 and 2013/14



Colorectal cancer

King's Health Partners Integrated Cancer Centre is the regional centre for early rectal cancer and anal cancer. We specialise in locally advanced primary and recurrent rectal cancer and are known for our work on liver metastases, complex retro-rectal tumours and malignant polyps.

We have a long established and highly rated laparoscopic surgery training centre. Patients benefit from our enhanced recovery programme and we have been successfully provided follow up clinics that are run by nurses.

Appointments are aligned to the national five year test schedule after which most patients are discharged to their GP. Our colorectal service is provided both at King's and at Guy's and St Thomas' Hospitals.

Clinical outcomes

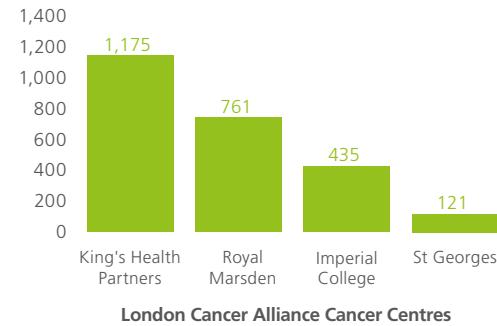
Survival rates

Despite the public health challenges in south east London, King's Health Partners service is reporting better survival rates than the national average (77.2% compared 76.9%). There are a number of factors that contribute to this:

- we have run an enhanced recovery programme for patients post-surgery for about six years
- we have joint ward rounds with care of the elderly physicians to improve the medical input to this elderly group of patients. Our 90 day mortality rate is therefore 1.91% compared with a national average of 2.98%
- all patients are discussed within a multidisciplinary team meeting with referrals onto liver and thoracic surgeons after chemotherapy, where appropriate

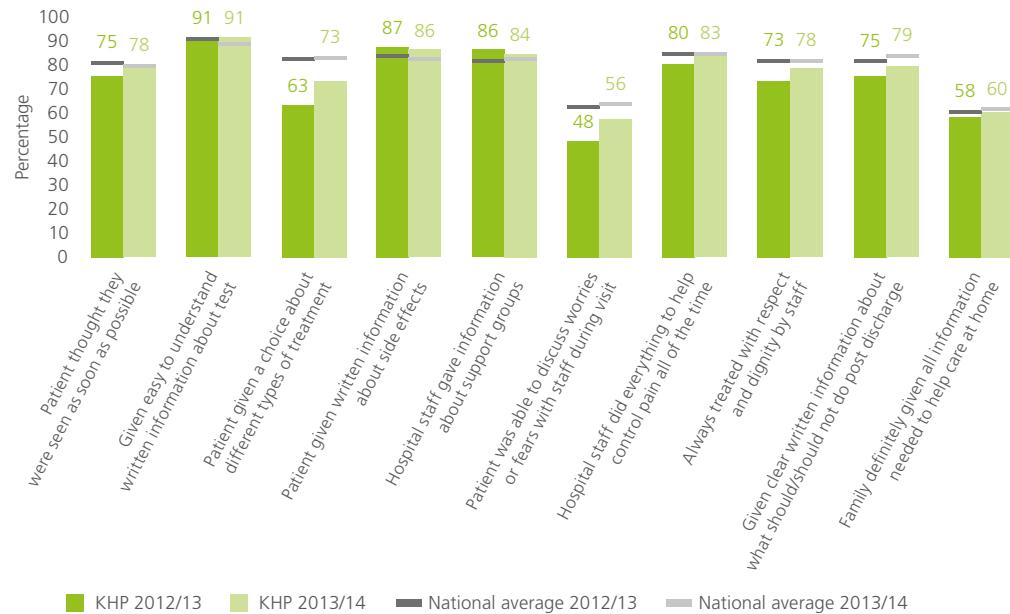
Activity

Figure 9 | Colorectal number of treatments 2013/14



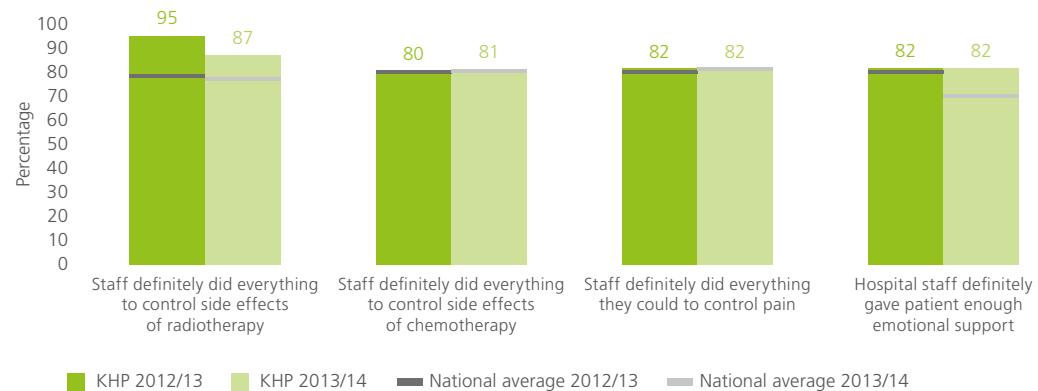
Patient experience

Figure 10 | Colorectal inpatient service 2012/13 and 2013/14



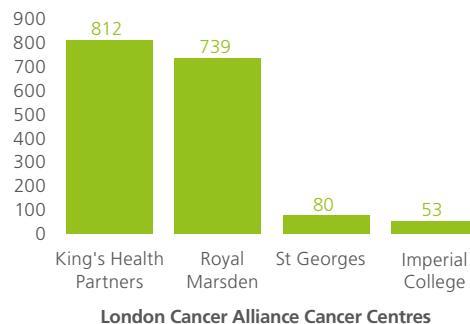
Patients undergoing radiotherapy reported a positive (95%) experience while the experience of patients requiring chemotherapy was not as good, and slightly behind the national average.

Figure 11 | Colorectal outpatient service 2012/13 and 2013/14



Gynaecological cancer

Figure 12 | Gynaecology
number of treatments 2013/14



We provide a comprehensive gynae-oncology service across King's Health Partners. St Thomas' Hospital is the gynaecology oncology centre for south east London serving King's College Hospital, Princess Royal, University Hospital and Queen Elizabeth Hospital.

Our services include a fully comprehensive diagnostic and treatment service for patients with gynaecological malignancies including cervical, endometrial, ovarian, vaginal and vulval cancers. Our diagnostic service includes a nurse consultant-led outpatient hysteroscopy service for patients with post-menopausal bleeding.

We are able to offer patients minimal access surgery for serous endometrial cancer treatment.

We are only one of four cancer centres in the UK to offer an implant technique known as interstitial HDR brachytherapy for some gynaecological malignancies.

Outcomes

Our survival rates (within one year of diagnosis) for gynaecology patients are 83.4% which is the same as the national average and slightly below the London Cancer Alliance average (86.0%).

There are various reasons why south east London falls behind other London sectors:

- the uptake for cervical screening in south east London remains lower than the 80% national target
- south east London has lower socioeconomic status and poorer health education than either north west London or south west London

We are working together with colleagues in primary care to address these problems. Gynaecology clinics are run at King's College Hospital, Princess Royal and St Thomas' Hospital with major surgery and radiotherapy undertaken at St Thomas'.

Patient experience

Results from the national patient experience survey are mixed across King's Health Partners although, in the majority of cases, women reported a better experience as both an outpatient and inpatient compared with the national average.

Women with gynaecological cancer reported that they were not always seen as quickly as they would have wanted (compared with the national average) however, the figures indicate that written

information (about possible side effects, test information and discharge support) was welcome (scoring consistently 90%+).

Although many responders scored us higher than national average some indicators have deteriorated compared with the 2012/13 survey. It is clear we need to do more to improve the experience of women who use our gynaecology services.

Figure 13 | Gynaecology service patient experience data 2012/13 and 2013/14

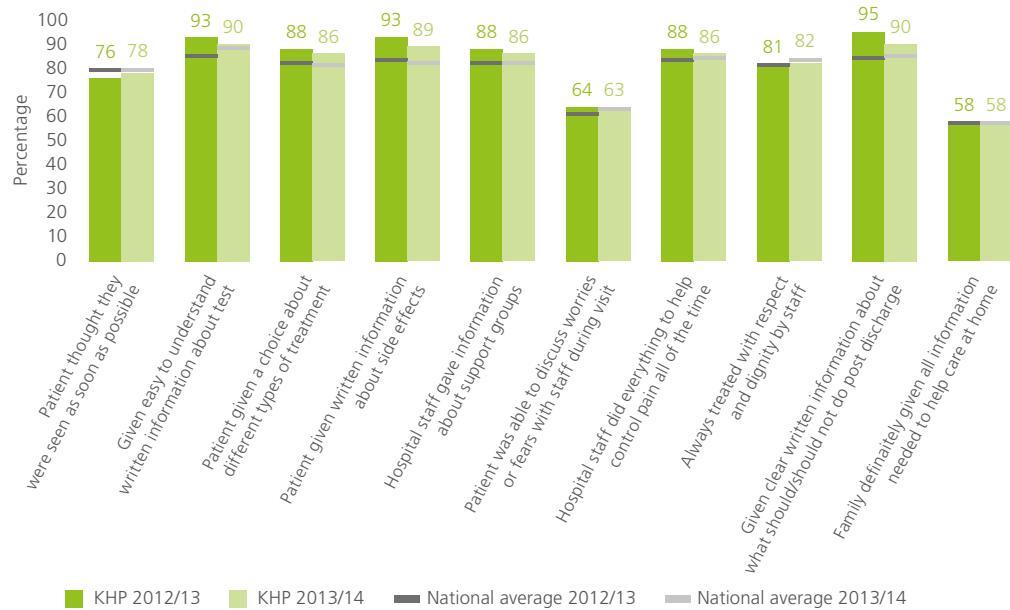
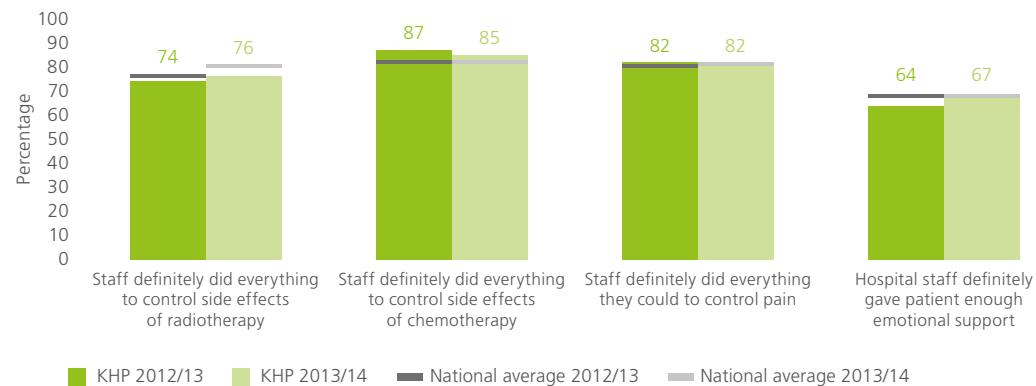


Figure 14 | Gynaecology service outpatient patient experience 2012/13 and 2013/14



Haematology

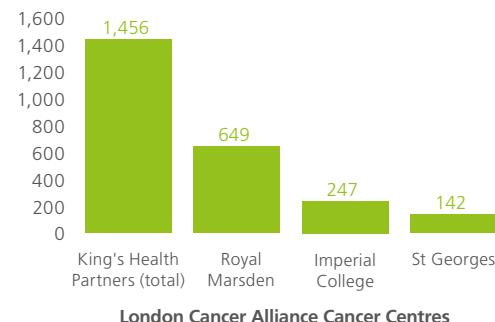
Our department of haematological medicine (including haemostasis¹ and thrombosis²) has an unrivalled reputation as one of the leading centres in the world. The service is based at both King's and Guy's and St Thomas' hospital sites. Some services are also offered at the Princess Royal Hospital.

Our service is the UK's largest and has an extensive referral base within the south east London, Kent, Sussex and Surrey areas with more than 75% of regional referrals coming to the two trusts.

The service is known internationally for developments in the treatment of myeloid conditions³ including leukaemia, myelodysplasia and myeloproliferative neoplasms with a pioneering programme of sub-specialty specific research coupled with a wide range of clinical trials. There are also internationally and nationally recognised non cancer haematological services including the largest comprehensive sickle cell disease⁴ (SCD) practice in Europe, national exemplar services for thrombosis and the national centre for bone marrow failure. We are proud that our services prioritise delivering excellent patient-centred care supported by cutting edge research.

We are also proud to support many patient advocacy groups and charities across the breadth of our disciplines.

Figure 15 | Haematology
number of treatments 2013/14



Haematological medicine

King's Health Partners haematology service is based within our CAG, but provides a wide range of cancer as well as non cancer services including:

- the largest comprehensive Sickle Cell Disease (SCD) practice in Europe (approximately 3,000 patients across both paediatric and adult practice accounting for almost a third of those living with SCD in the UK)

1. Haemostasis is the body's normal physiological response for the prevention and stopping of bleeding.
2. Thrombosis is the formation of a blood clot inside a blood vessel, obstructing the flow of blood through the circulatory system.
3. Myeloid conditions are blood cancers affecting myeloid cells in the bone marrow.

4. Sickle cell disease (SCD) is a serious, inherited condition affecting the blood and various organs in the body. It affects the red blood cells, causing episodes of sickling, which produce episodes of pain and other symptoms.

- the largest bone marrow transplant programme in the UK
- a specialist centre for myelodysplasia (a blood disorder that causes a drop in the number of healthy blood cells)
- three nationally funded specialist centres for the diagnosis and treatment of bone marrow failure syndromes, paroxysmal nocturnal haemoglobinuria (PNH – a rare, genetically acquired, life-threatening disease of the blood) and for porphyria (a group of disorders where there is a problem with the production of haem within the body)
- national and international reputation and referral base for expertise in all aspects of bone marrow failure and myeloproliferative neoplasms⁵ diagnosis and management
- a haemophilia reference centre and thrombosis centre which sees over 10,000 patients annually in anti-coagulation alone. We also provide national clinical and research leadership on the prevention and management of venous thromboembolism (VTE – which occurs when a blood clot breaks loose and travels in the blood) and antiphospholipid syndrome⁶

Supporting this programme is an organisational infrastructure that includes a state-of -the-art clinical research facility, a haemato-oncology tissue bank, a genomics facility and a high dimensional flow cytometry facility.

Bone marrow transplant (BMT) programme

Our bone marrow transplant service (also known as haemopoietic stem cell transplantation) is the largest in the UK delivering 202 procedures in 2013.

Allogeneic⁷ bone marrow transplantation (BMT) is an extremely effective treatment for haematological malignancies but its advantages are marred by a number of complications. Whilst the treatment generates a graft-versus-leukaemia (GvL) response which is crucial to eradicate the disease, in 40–50% of cases it is associated with graft-versus-host disease (GvHD), a condition with high morbidity and mortality. We have developed a number of strategies to boost GvL and control GvHD.

In pre-emptive donor lymphocyte infusions, new modalities of separating T cell populations are in progress to reduce the potential GvHD

-
5. Myeloproliferative neoplasms are a group of rare disorders of the bone marrow that cause an increase in the number of blood cells.
 6. Antiphospholipid syndrome (APS), also known as 'sticky blood syndrome', is a condition that causes blood clotting in arteries or veins and is also a major cause of recurrent miscarriage.

7. A procedure in which a person receives blood-forming stem cells (cells from which all blood cells develop) from a genetically similar, but not identical, donor. This is often a sister or brother, but could be an unrelated donor.

activity. With a view of developing criteria to guide prompt intervention, we are also testing the use of sensitive techniques to detect immune reconstitution and leukaemia relapse in patients.

We are currently developing two approaches for the treatment of GvHD. The first one is based on the use of mesenchymal stromal cells (MSC): we have run a nation-based clinical programme for the treatment of GvHD on a compassionate basis. Following this experience (more than 60 patients have been treated), we are now planning a clinical trial to analyse the gene expression profile of responder patients in order to obtain a signature to stratify patients for future treatment. Parallel trials are being conducted in other severe inflammatory conditions (multiple sclerosis and epidermolysis bullosa)⁸ which will provide crucial feedback to improve MSC therapies also in GvHD.

Our other approach is based on harnessing the immunomodulatory activity of regulatory T cells (Tregs). The use of Tregs is currently being tested in solid organ transplantation in clinical trials funded by the UK and European Union. Although currently tested for their ability to control graft rejection in liver and kidney transplantation, the experience is expected to pave the way for the use of Tregs to control GvHD.

Research activities

One of our greatest strengths of our department is the interdisciplinary nature of both our clinical and research strategy, encompassing world leading academic, clinical and laboratory practice. We have an outstanding international reputation in the field of research as evidenced by our recent REF results, with a Grade Point Average of 3.34, in excess of the King's College London overall score of 3.23. Despite being one of the 'smaller' specialties, we are continually demonstrating that we are at the cutting edge of medical advances in every aspect of haematological medicine – our significant clinical success is driven by academic excellence. This impact and scale is also reflected in our considerable research grant income (£41m in current active grants). Moreover, the breadth of clinical services and research on offer within King's Health Partners attracts many high quality doctors, scientists, allied professions and students keen to benefit from our educational expertise. Our department has almost 400 staff, including 11 professorships.

Our service includes an international centre for research into and treatment of myeloid neoplasms, leukaemias, lymphomas and myeloma, and has the first immune gene therapy programme for leukaemia approved by the UK Gene Therapy Advisory Committee (GTAC). The service also

8. An inherited connective tissue disease causing blisters in the skin and mucosal membranes which affects 1 in 50,000 people.

carries out numerous national and international studies which gives patients access to innovative treatments. The service has a cellular and gene therapy programme for myeloid disorders.

We were named as a centre of excellence by the national blood cancer charity Leukaemia and Lymphoma Research.

Clinical outcomes

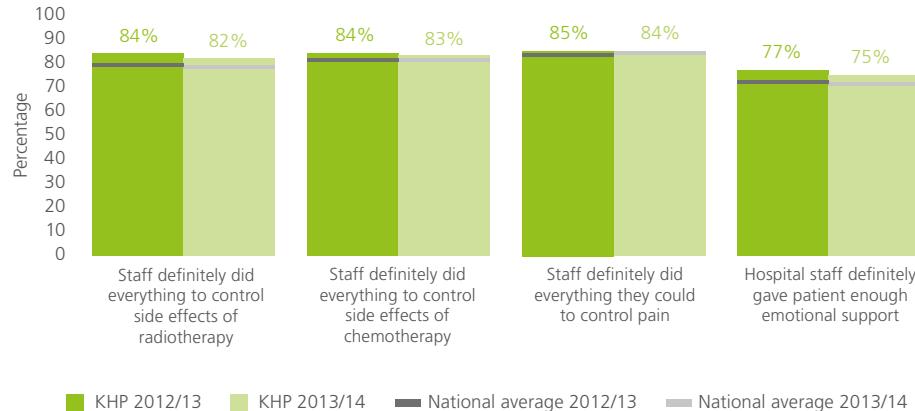
Our survival rates (82.8 % within one year) are better than London Cancer Alliance averages (and well above England average of 75.9%).

Our patients benefit from an excellent service that includes a state-of-the-art clinical research facility, a haemato-oncology tissue bank, a genomics facility and a high dimensional flow cytometry facility.

Patient experience

Our haematology outpatient service consistently scores higher than the national average in the annual national patient experience survey. We are focusing on improving levels of emotional support given to patients where the service has lower relative scores.

Figure 16 | Haematology outpatient service 2012/13 and 2013/14

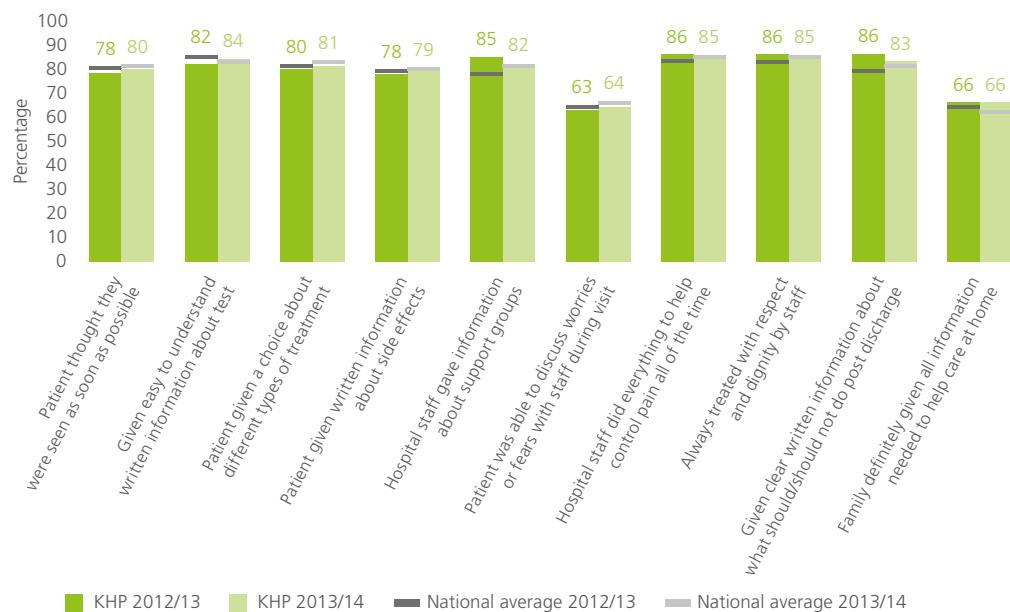


While the haematology outpatient service enjoyed positive patient feedback, the inpatient service has received more mixed scores.

We have higher than average scores for information about support groups, pain control, discharge information and treating with dignity and respect.

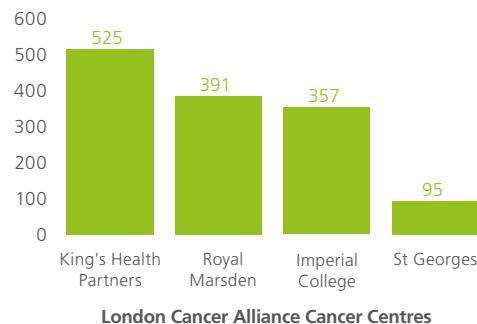
Conversely we have lower than average scores for access, test information and the opportunity to discuss worries or fears. The haematology inpatient service is provided at both Guy's and King's (Denmark Hill) so a joint plan is being developed to address these important areas of care.

Figure 17 | Haematology inpatient service 2012/13 and 2013/14



Head and neck

Figure 18 | Head and neck
number of treatments 2013/14



Our head and neck cancer service is one of the largest specialist centres in the UK.

Services are based at Guy's Hospital and include surgery, oncology, and a dedicated multidisciplinary rehabilitation team. Upper Aerodigestive Tract (UAT) cancer surgery is based at Guy's. Thyroid surgery continues at all three King's Healthcare Partners sites however all surgery will be consolidated (at Guy's) in approximately 18 months when capacity becomes available.

The Head and Neck multidisciplinary team see over four hundred patients each year. In addition our head and neck cancer clinic acts as a tertiary referral centre receiving referrals from units around the UK and overseas.

Features contributing to the high quality services include:

- our head and neck services have been identified as excellent by the National Institute for Health and Care Excellence (NICE) peer review team
- we provide dedicated specialist multidisciplinary rehabilitation services from the point of referral to the upper airways tumours (UAT) Cancer Centre, throughout the treatment pathway and into survivorship and or palliation
- we offer a comprehensive pre-treatment assessment service as well as having a fully integrated dedicated local support team which is unique within the London Cancer Alliance
- we have extrapolated the concepts of enhanced recovery to head and neck cancer management, by designing, trialling and introduction of interventions designed cumulatively to improve the outcomes of our patients. Our enhanced recovery programme for head and neck cancer patients is designed to positively impact the patient experience from the point of diagnosis to the point of discharge from our service, the first in England to do so
- our pilot on smoking cessation delivered enhanced quit rates in patients passing through the head and neck service

- we are a recognised centre for specialist training in the treatment of head and neck cancer with two recognised sub-speciality fellowships in Head and Neck Surgical Oncology, recognised by the Royal College of Surgeons in England and the head and neck interface training group for dedicated training of senior trainees and new consultants in all aspects of the management of patients with head and neck cancer
- we provide integrated sub-speciality training between surgeons, anaesthetists and the wider team
- integration of clinical care with the academic department of maxillofacial technology, has facilitated advances in surgical planning. Virtual reconstruction and virtual surgical planning with template formation reduce operative time for patients undergoing complex facial reconstruction. In addition such collaboration allows timely and planned provision of advanced facial prosthesis
- approximately 50% of all patients with head and neck cancer are referred to clinical oncology
- since 2011, all patients with locally advanced head and neck cancer to be treated with radical radiotherapy receive intensity modulated radiotherapy (IMRT), and treatment is delivered with the image-guided radiotherapy (IGRT) technique
- all patients are reviewed in a specialist dental oncology clinic in King's College London Dental School to optimise dental health prior to radiotherapy
- patients undergoing radiotherapy are reviewed in a weekly specialist head and neck cancer treatment review clinic staffed with an advanced practitioner therapy radiographer, oncology nurse and specialist head and neck cancer clinical nurse specialists (CNS), dieticians and speech and language therapists (SALT)
- in 2009, we became the first centre in the UK to have a dedicated Community Head and Neck cancer Team (CHANT), comprising of specialists nurses, dieticians, SALT and physiotherapists. The role of CHANT has developed to meet the specialist needs of patients with head and neck cancer closer to their homes
- CHANT undertake nurse-led follow up and support of patients who have completed treatment for head and neck cancer and provide this in the community setting. This has facilitated active rehabilitation programmes working towards restoring function, independence and other key survivorship issues
- we have an active research and development programme with collaborations between the clinical head and neck surgical, oncology, imaging and pathology teams and the basic

scientists at King's College London (KCL), in addition to good recruitment to local and national clinical studies

One stop Head and Neck Fine Needle Aspiration (FNA) service (Rapid access clinic)

Fine needle aspiration can help rule out or diagnose cancer. The procedure uses a thin, hollow needle to remove samples of tissue or fluid from an organ of the body, or a lump under the skin. Samples are sent then sent to a laboratory for further testing.

Our service has held two 'one stop' cytopathologist lead FNA clinics a week since 2009. Subsequently, diagnosis on first visit has improved from 45% to 79%. This has allowed definitive management plans, further specialist investigations and scheduling for surgical lists on first visit for $\frac{3}{4}$ of lumps and bumps patients.

A provisional diagnosis of lymphoma on first visit to the FNA clinic has led to a significant reduction in waiting time for a biopsy in lymphoma patients. The addition of a radiologist undertaking guided FNA for impalpable/thyroid lesions has further enhanced this service.

Two additional clinics a week are led by a specialist head and neck radiologist allowing for ultrasound guided FNA and core biopsy. Both of these clinics are assisted by a biomedical scientist,

who evaluates cellularity, allowing for an adequacy rate of 93.5%, and leading to a significant reduction in the number of patients needing a second diagnostic procedure.

Clinical outcomes

Survival rates

Another patient group where we are working hard to improve clinical outcomes are those with head and neck cancer.

London (83.3%) falls behind the national average for survival one year post diagnosis (83.7%) with south east London having the lowest rate (81.2%). This is primarily due to late presentation to the hospital.

Our smoking cessation teams know, for example, that in Lambeth, Southwark, Lewisham and Greenwich we have some very deprived boroughs with higher than average incidence of heavily dependent smokers who are reluctant to quit.

We are doing the following to improve outcomes:

- therapeutic smoking cessation consultation for all patients undergoing cancer treatment
- engaging patients in their post-operative surveillance, educating them to understand the underlying factors responsible for their cancer and how they can enhance their recovery and reduce the chance of recurrence. The development of an aftercare Survivorship Programme that includes a range of support groups and education workshops
- carbohydrate loading to reduce the stress of surgery
- new techniques for intra-operative fluid monitoring
- development and implementation of tumour site specific integrated multidisciplinary care pathways
- recruitment to an increasing number of clinical trials

Patient experience

Figure 19 | Head and neck inpatient service 2012/13 and 2013/14

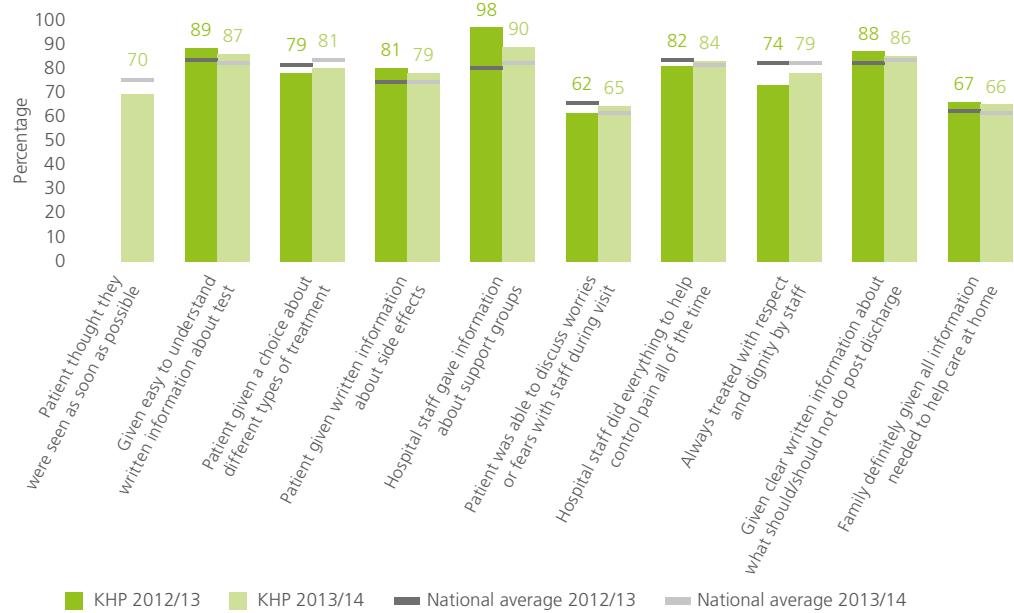
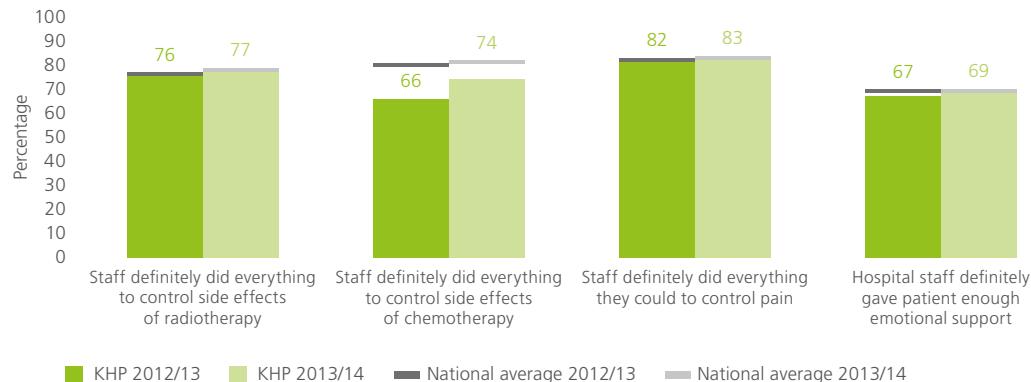


Figure 20 | Head and neck outpatient and day care 2012/13 and 2013/14

Figures 19 and 20 summarise our scores in the last two national cancer patient experience surveys for patients treated for head and neck cancers.

Figure 19 shows the results of the inpatient survey which are generally good with over 70% of patients reporting an experience better than national average. While patients consistently report that they receive good, clear information about the services, we accept that more needs to be done to see patients more quickly. Additional evening clinics are currently being piloted on the Guy's site to improve waiting times and ensure that patients do not have to wait long to be treated by the service (which moves to the new cancer centre in 2016).

Figure 20 indicates that the scores for the outpatient survey are not as strong as the inpatient results, with scores below national average.

The results do confirm however, that patients are telling us that their experience of outpatient breast cancer services is improving compared with the same time the previous year.

As a result of the patient experience survey, work will concentrate on alerting patients to the possible side effects of chemotherapy and radiotherapy and ensuring that psychological support services like Dimbleby Cancer Care are available to a wider group of patients treated for head and neck cancer.

Lung cancer

King's Health Partners provide tertiary diagnostic, staging and therapeutic services to the south east of England and beyond and treat more than seven hundred new lung cancer patients each year. We provide this service at King's College Hospital and Guy's and St Thomas'.

After being admitted to St Thomas's with pneumonia they ran many tests, this is how my cancer was found. If it had not been for these tests I would have been oblivious to it as I had no physical signs of it. Once again, thank you.

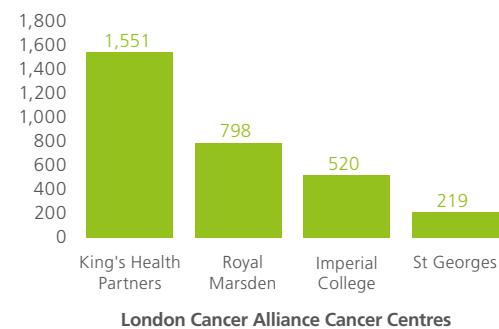
Distinguishing features of the service include:

- integration of Endobronchial Ultrasound Service (EBUS) for the diagnosis and staging of all thoracic cancers (now the largest unit in the UK and probably Europe)
- integration of phase I clinical trials in thoracic oncology service
- thoracic tissue storage and processing bank, providing vital research material for scientists

- leadership of national trials assessing the role of radical surgery in mesothelioma (the type of cancer that affects the membranes which cover the surface of the lungs and lines the inside of the chest that occurs in people who have been exposed to asbestos)

Activity

Figure 21 | Lung
number of treatments 2013/14



Clinical outcomes

Survival rates

Lung cancer has one of the lowest survival outcomes of any cancer largely because the disease is aggressive and over two thirds of patients are diagnosed at a late stage when curative treatment is not possible.

One reason lung cancer is so fatal is that it is hard to diagnose in its early stages. It may take years

for the lung cancer to grow and early on there are usually no symptoms. By the time a patient starts to notice symptoms, the cancer has often spread to other parts of the body and is therefore harder to treat. This problem is compounded because the average age of onset of lung cancer is high (approximately 70 years) and the majority of patients are smokers so there is a high incidence of co-morbidities.

Figure 22 | Percentage of adult smokers per 100,000 population 2011/12 age standardised

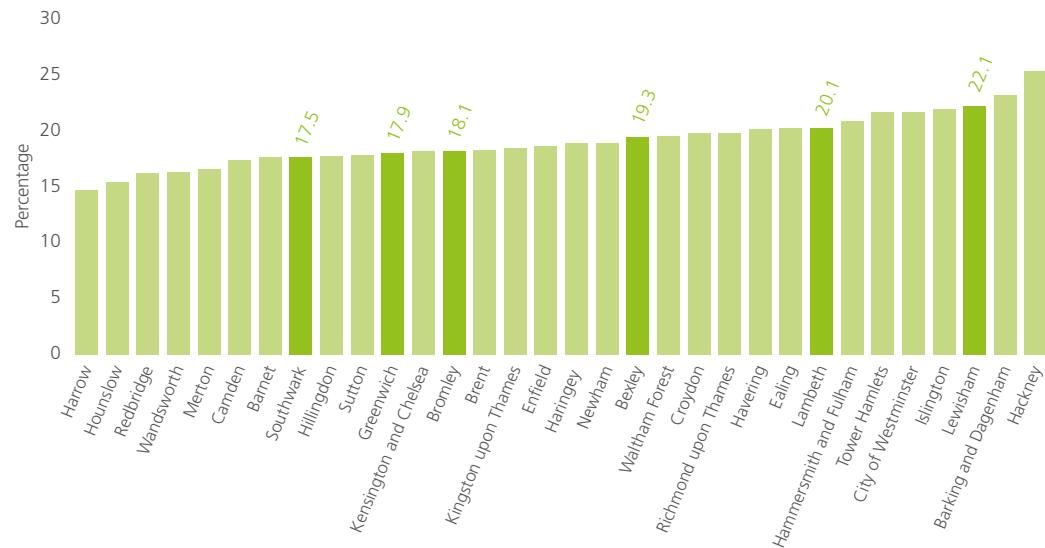
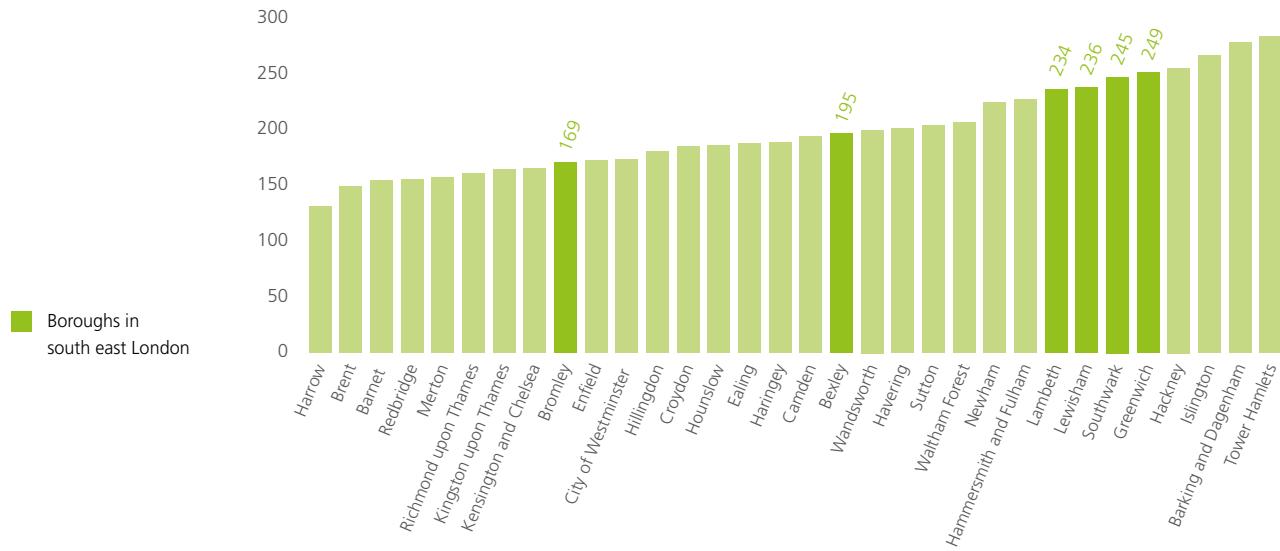


Figure 22 shows the percentage of adult smokers across the London boroughs. There is a wide spread but Lewisham and Lambeth are in the

top 10 worst boroughs. Despite this we have the best survival rates in London and remain ahead of national averages.

Figure 23 | Smoking related deaths per 100,000 population 2009–2011

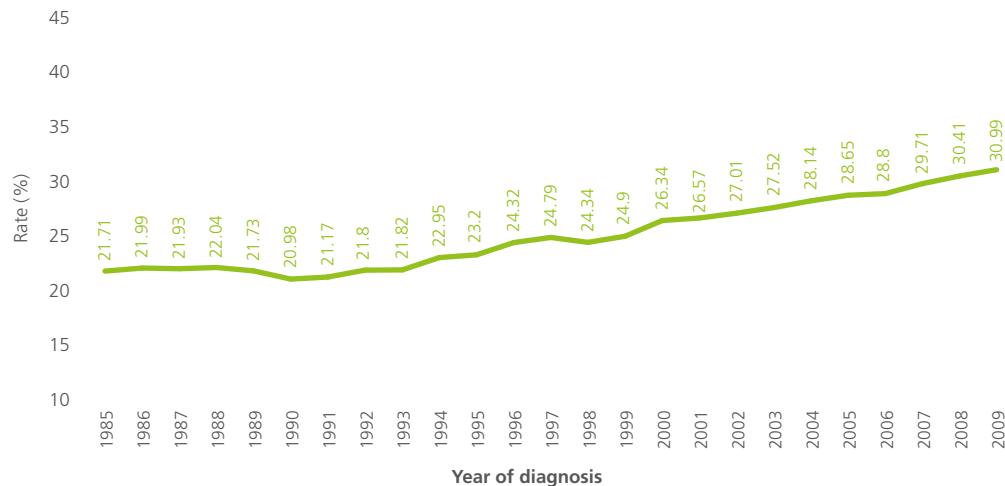


Indicator Value: Directly age-standardises rate per 100,000 population

Source: Public Health England

The number of smoking related deaths in south east London is even more stark. Figure 23 confirms that inner south east London accounts for half of the worst eight boroughs in London.

Although Figure 4 on page 28 demonstrates that patients with lung cancer have the least chance of survival (compared with other cancers), survival rates have been improving over the past 30 years, as shown in Figure 24.

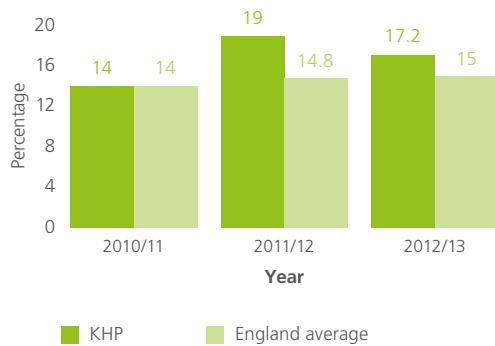
Figure 24 | One year survival rates for patients with lung cancer in south east London (1985–2009)

Source: UK-CIS

Compared with some European countries, England has low lung cancer survival and low use of surgical resection for lung cancer. A recent study has concluded that lung cancer survival in England could plausibly increase if a larger proportion of patients underwent surgical resection.

As illustrated in Figure 25, King's Health Partners is offering surgery on or above the national resection rate which is positive. Lung resections were centralised at Guy's in 2011, however patients will also be diagnosed at any one of our partner hospital sites.

Figure 25 | Lung resection rates for King's Health Partners compared with England average



Although there is clearly more that needs to be done, it is important to remember that we have the best survival rates for lung cancer in London, 35.9% (see Figure 4 on page 28) and some of the best nationally. There are a number of contributing factors to these good outcomes:

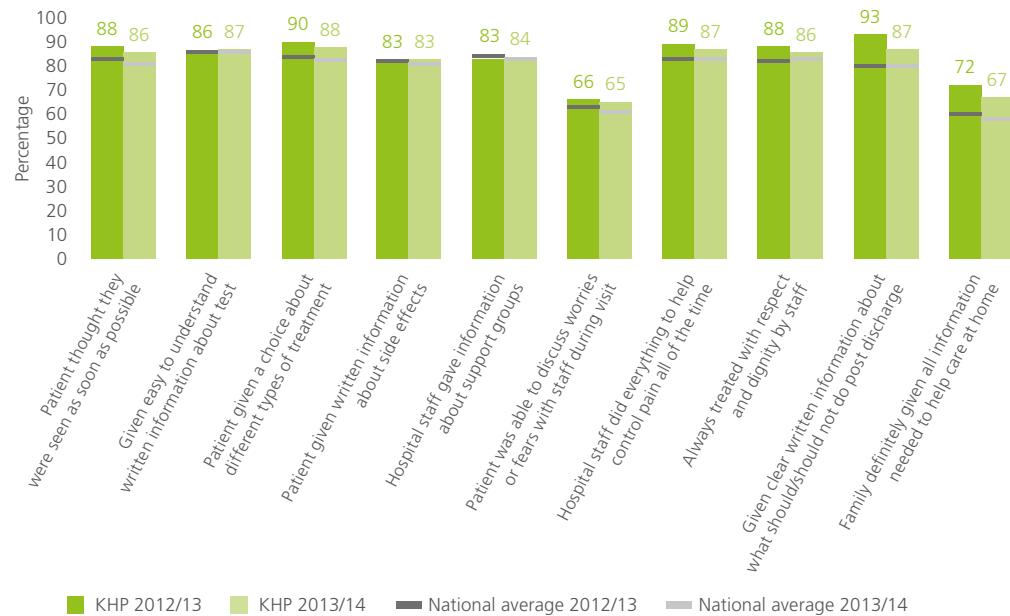
- King's Health Partners has readily available advanced diagnostic techniques such as PET-CT scanning and endobronchial ultrasound guided tissue sampling allowing us to quickly diagnose lung cancer and accurately assess how far the cancer has spread
- we obtain a tissue sample from the tumour in the vast majority of patients enabling us to classify the type of tumour and perform molecular diagnostic techniques to personalise therapy to each individual
- Guy's is one of the largest thoracic surgical units in the UK and our team of specialist thoracic surgeons have one of the highest surgical resection rates in the country
- Guy's offers advanced radiotherapy techniques such as stereotactic ablative body radiotherapy (SABR) and combined chemoradiotherapy
- King's Health Partners has an excellent team of clinical nurse specialists providing support to our patients, helping us to actively treat a greater proportion of our patients and running our extensive survivorship programme
- we make new therapies available to our patients via the Early Phase Research Centre

Patient experience

Like other cancer services, King's Health Partners inpatient lung service which is based at Guy's Hospital scores highly for written information at discharge as well as choice of treatment option.

Although the service is above average, as illustrated in Figure 26, more work is required to provide information to family members and allowing patients the opportunity to raise concerns during visits. This is a similar problem to that being tackled in urology.

Figure 26 | Lung inpatient service 2012/13 and 2013/14

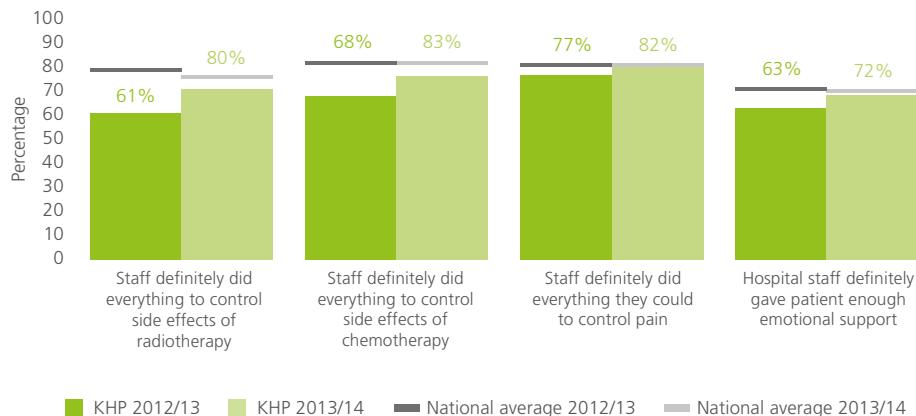


King's Health Partners results for the outpatient pathway in lung are less positive.

Figure 27 indicates the patient scores are lower than national averages for outpatient treatment.

To address this, we are basing our lung oncology services in the new cancer centre on the Guy's site.

Figure 27 | Lung outpatient service 2012/13 and 2013/14



Skin cancer

Care is provided either by the St John's Institute of Dermatology based at St Thomas' or at King's College Hospital at Denmark Hill. Specialist cancer care is provided at the St John's Institute which is a world renowned clinical and research unit.

At St John's Institute, patients are treated with a wide variety of common and rare skin cancers, including:

- basal and squamous cell carcinoma⁹
- melanoma¹⁰
- cutaneous lymphoma¹¹
- merkel cell carcinoma¹²
- rare vascular tumours such as Kaposi's sarcoma¹³

Our service, which is provided at both Denmark Hill and St Thomas is renowned for its Mohs

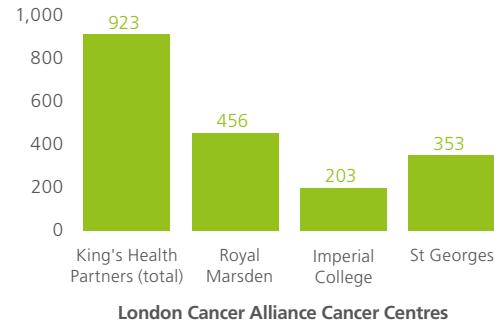
micrographic surgery¹⁴ (usually to treat complex non-melanoma skin cancer where tumour margins are difficult to see and/or tissue sparing is critical). It has one of the highest throughputs nationally. The St John's service is also one of a few centres which treat rarer tumours by this method such as dermatofibrosarcoma protuberans, microcystic adnexal carcinoma and sebaceous carcinoma. There are separate specialist weekly multidisciplinary meetings for melanoma, non-melanoma skin cancer and lymphoma offering the highest level of tertiary care.

At Guy's hospital, a weekly skin cancer screening clinic enables suspected skin cancers to be treated on the same day. There is also a dedicated clinic for recipients of solid organ transplants for skin cancer surveillance.

Our service is the largest in the London Cancer Alliance and one of the largest in England.

-
9. Basal and squamous cell skin cancer are types of skin cancer that are found on the outer layer of the skin.
 10. Melanoma is the most serious type of skin cancer affecting young adults as well as older people and is often caused by over exposure to the sun.
 11. Cutaneous T-cell lymphoma (CTCL) is a rare type of non-Hodgkin lymphoma that affects the skin. It's caused by white blood cells, called T-cell lymphocytes, growing in an uncontrolled way.
 12. Merkel cell carcinoma is a rare and highly aggressive skin cancer, which, in most cases, is caused by the Merkel cell polyomavirus (MCV).
 13. Kaposi sarcoma (KS) is a cancer that develops from the cells that line lymph or blood vessels. It usually appears as tumours on the skin or on mucosal surfaces such as inside the mouth, but tumours can also develop in other parts of the body, such as in the lymph nodes (bean-sized collections of immune cells throughout the body), the lungs, or digestive tract.
 14. The surgical technique was developed by Dr Frederick Mohs in the 1930s and is used for an ever widening variety of skin cancers.

**Figure 28 | Skin cancer
number of treatments 2013/14**



Clinical outcomes

One year survival rates for patients with skin cancer are very good. Our rates (97.3%) are slightly below the London Cancer Alliance (97.5%) and England 97.9% averages. The clinical team is calculating tumour thickness at diagnosis because if much higher in one sector, this might be a result of delayed access which would eventually contribute to a worse prognosis over three to five years.

Patient experience

Please note that although the King's Health Partners service is a busy one, insufficient patients completed the recent survey so no scores were published nationally for patients being treated for skin cancer. This is being addressed.

Upper gastrointestinal (GI) cancer

Our upper gastrointestinal cancer service covers the following cancers:

- oesophagus (the tube between the throat and stomach, sometimes called the gullet)
- stomach
- liver
- pancreas
- gall bladder
- biliary system (bile ducts)

The service is provided at the Guy's and St Thomas' and Denmark Hill sites. Major surgery of the stomach and oesophagus (often referred to as oesophago-gastric (OG) cancer) is based at St Thomas' Hospital and liver, pancreatic and biliary surgery (collectively known as hepatobiliary (HPB) care) is undertaken at Denmark Hill.

Oesophago-gastric services

Globally, there are 2.7 million new cases of OG tumours annually, which is more than breast and prostate cancer put together. The incidence of adenocarcinoma¹⁵ of the oesophagus is higher

in the United Kingdom than anywhere else in the world. Surgery is the cornerstone in the curatively intended therapy of these tumours.

Guy's and St Thomas' is the regional specialist centre for cancer of the oesophagus and stomach, offering full care for all OG cancers across south east London and Kent.

The Guy's and St Thomas' team includes:

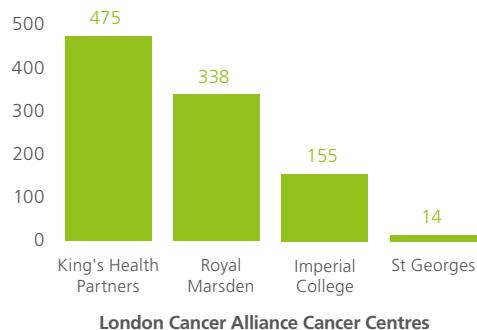
- surgeons
- oncologists (cancer specialists)
- cancer nurse specialists
- radiologists and radiographers
- gastroenterologists (specialists in the upper digestive system)
- palliative care specialists

The team work closely with the specialist regional centre for HPB cancer at Denmark Hill.

Our service also has strong academic links with research groups at the Karolinska Institute in Stockholm, Sweden.

15. Adenocarcinoma is a cancer that develops in the glandular tissues of the body.

Figure 29 | Oesophago-gastric number of treatments 2013/14



Hepatobiliary cancer

Denmark Hill's hepatobiliary (HPB) service provides a specialist, comprehensive HPB surgery and hepatology service with a local, regional and national referral base.

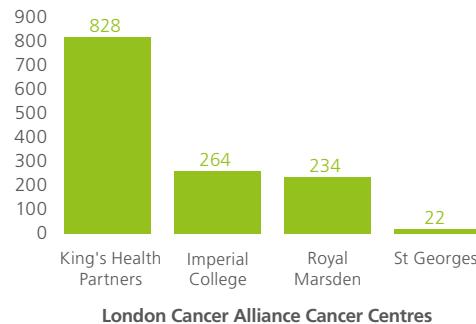
The HPB service is provided through a collaboration of the Institute of Liver Studies, the King's Centre for Surgery of the Liver, Bile Ducts and Pancreas and the King's Neuroendocrine/Carcinoid service. Extensive interventional radiology, endoscopy, dedicated histopathology and oncology services are available on site.

Denmark Hill's hepatocellular carcinoma (HCC) service is the largest in the UK offering all treatment modalities from liver transplant through interventional radiology to specialist palliative care for patients who have a dual diagnosis of cancer and underlying liver disease. Denmark Hill

is the designated specialist centre for patients with pancreatic cancer and patients with liver metastases from a colorectal primary, for both south east London and Kent.

One of the benefits of such a large centre is the opportunity for patients to participate in a range of clinical trials for novel therapies.

Figure 30 | Hepatobiliary number of treatments 2013/14



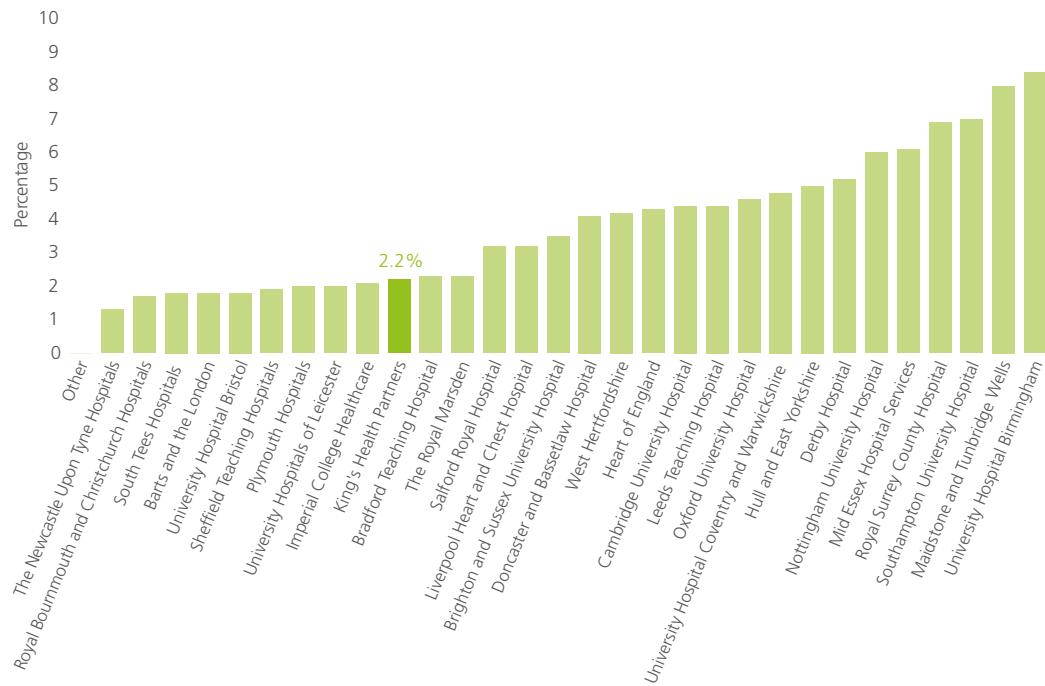
Outcomes

The long-term (five-year) survival rates for oesophageal, stomach and pancreatic cancer in England and Wales are just 9%, 12%, and 3%, respectively. These poor survival figures can be attributed mainly to the late stage at which the disease usually becomes apparent. However, the reported survival among patients in England are generally lower than in other comparable countries in Europe. This highlights the need for improved diagnosis and treatment of these cancers.

Curative surgery for oesophago-gastric cancers is complex and is therefore consolidated on a limited numbers of sites. This enables the analysis of survival rates by individual cancer centre, rather than by region or cancer network area.

Figures 31 shows the results of the 2013 National Oesophago-Gastric Cancer Audit. It was published by the Health and Social Care Information Centre and covers the quality of care given to patients with oesophago-gastric cancer.

Figure 31 | Surgical mortality rates (within 90 days of surgery) for oesophago-gastric cancers across NHS centres in England and Wales (the smaller the number the better)



Our surgical mortality rates are very good with no patients dying within 30 days after surgery and just 2.2% (adjusted) dying 90 days post-surgery.

There are number of reasons why we are better than our peers:

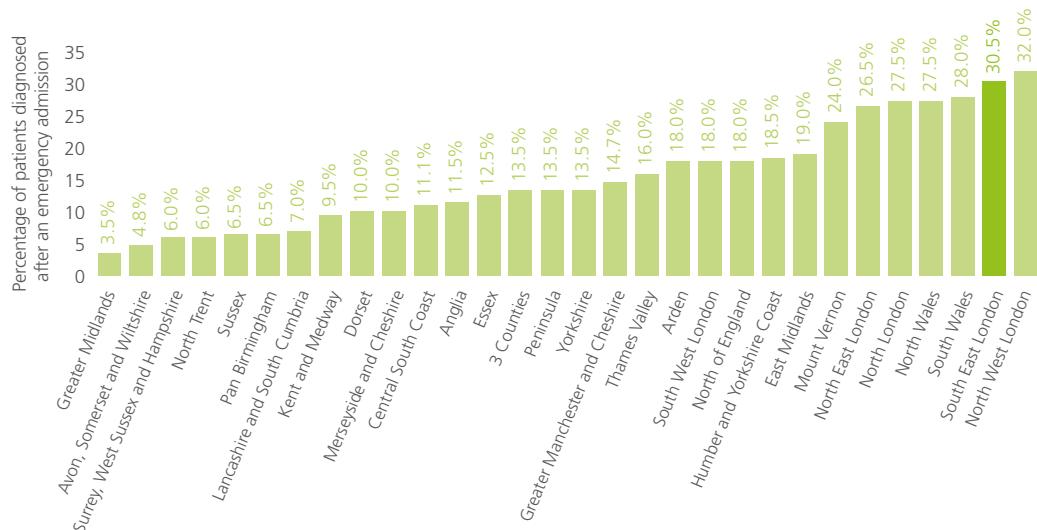
- our specialist team has extensive experience in complex upper GI problems with excellent surgical results
- the unit performs a high volume of cancer operations compared to other units in the country
- patients benefit from comprehensive multidisciplinary management including

a joint clinic, joint consultant operating and a one stop assessment unit

The same audit has confirmed, however, that all London regions have a higher proportion of patients who are diagnosed following an emergency admission. This usually means that there is less time for the hospital teams to begin curative treatment.

Figure 32 demonstrates that across the cancer networks, there is a wide degree of variation in the proportion of cases diagnosed as a result of an emergency admission with the south east network showing a very high percentage in particular (30.5%).

Figure 32 | Percentage of cases diagnosed after an emergency admission by Cancer Network (the lower the percentage the better)



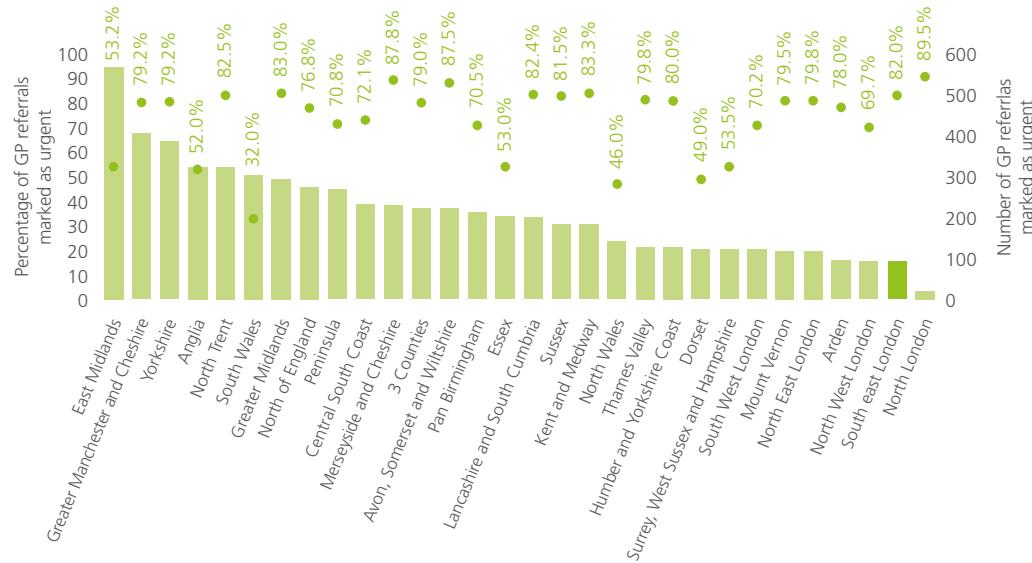
The five (former) London cancer networks reported the highest percentages of patients with A&E activity. This may be because of the close proximity Londoners have to an A&E department, compared to more rural areas of England and Wales. However experts agree it is better to diagnose patients electively (ie via a GP referral).

The proportion (of patients diagnosed post emergency admission) is higher for gastric than oesophageal cancer, and for older patients. This could be due to the fact that early symptoms of oesophageal cancer (e.g. difficulty in swallowing known as dysphagia) are easier to recognise, while gastric cancer tends to present later with less specific symptoms and signs (e.g. absence of hunger, anaemia and weight loss).¹⁶

This position is supported by the relatively low number of OG patients who are referred by their GP through the two-week urgent referral route. Figure 33 indicates that all five London networks have low two week wait referral numbers, suggesting that Londoners are using alternative routes to access appropriate healthcare. As mentioned above this means there is less time for the hospital to begin curative treatment.

The diagram shows a significant variation for the proportion of GP referrals marked as urgent ranging from 32% to 89%. The percentage in the south east is one of the highest (82%) although the number of referrals is low.

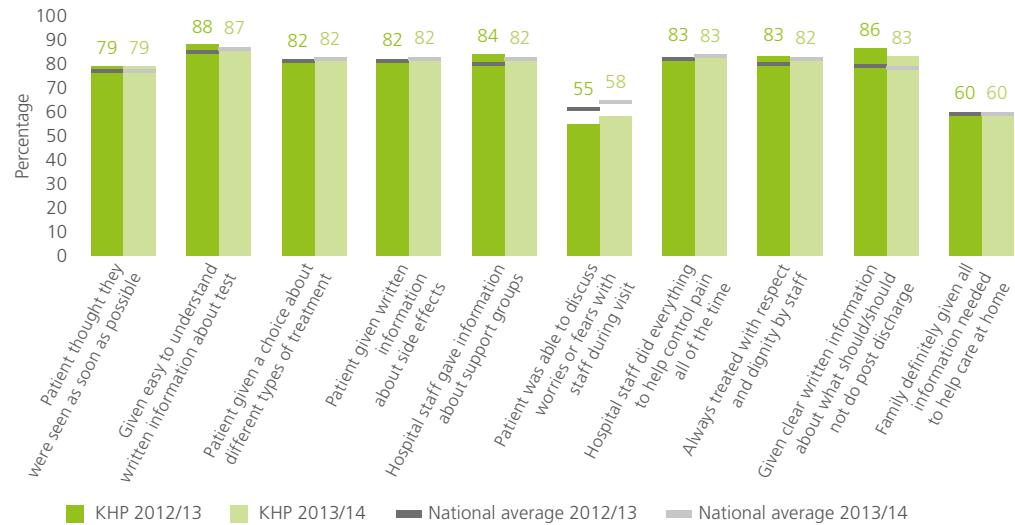
16. National Oesophago-Gastric Cancer Audit 2013.

Figure 33 | Percentage of GP referrals marked as urgent by Cancer Network in England and Wales

Patient experience

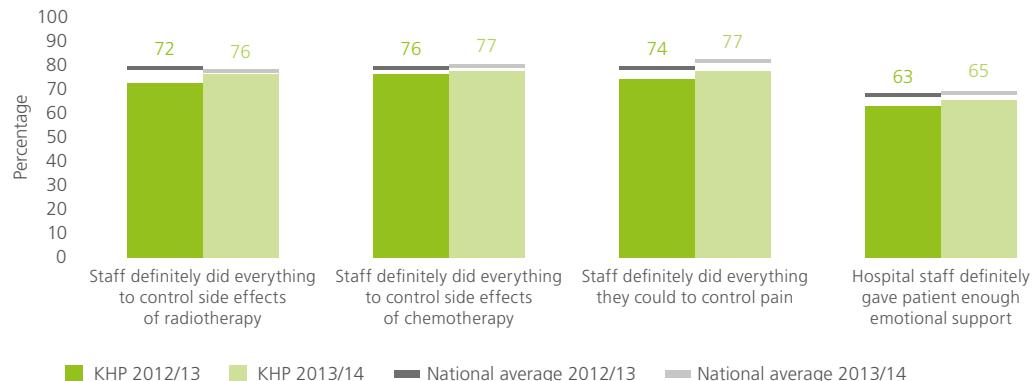
The charts below summarise our scores in the most recent national patient experience surveys. The inpatient scores confirm that in most areas patients are telling us that their experience of upper GI services (ie both OG and HPB services) is either in line or better compared with national

averages. The poorest scores (both nationally and for King's Health Partners) relate to the patient's ability to discuss worries or fears with staff. More work will be done to address this important concern.

Figure 34 | Upper GI inpatient service 2012/13 and 2013/14

Although the scores for the outpatient service have improved across all areas year on year, they remain lower than national averages.

The outpatient service will remain a key focus area until the outpatient scores improve.

Figure 35 | Upper GI outpatient service 2012/13 and 2013/14

Urology cancer

Urological cancers include malignancies of the bladder, kidney, prostate and testicles. Prostate cancer is the most common cancer in British men.

Our urology cancer service is renowned in Europe for pioneering new techniques and treatments, such as robotic assisted cystectomy. We are a key member of the International Robotic Cystectomy Consortium (IRCC). Among others we were quick to offer an outpatient service that delivers laser treatment to bladder tumours under local anaesthetic allowing frail elderly patients to be treated without general anaesthetic and as outpatients rather than as inpatients.

The urology service is provided both at King's and at Guy's and St Thomas, with major surgery performed at Guy's. Our prostate cancer services are provided jointly across King's Health Partners with the regional centre based at Guy's. The prostate service is one of the busiest in the country, with a large team of expertly trained surgeons, oncologists and nurses who look after thousands of prostate cancer patients each year.

All new diagnoses of prostate cancer are initially discussed in a specialist urology multidisciplinary team meeting. In addition, patients requiring

other treatment modalities such as hormone manipulation, radiotherapy and chemotherapy may also be seen by one of a large team of oncologists.

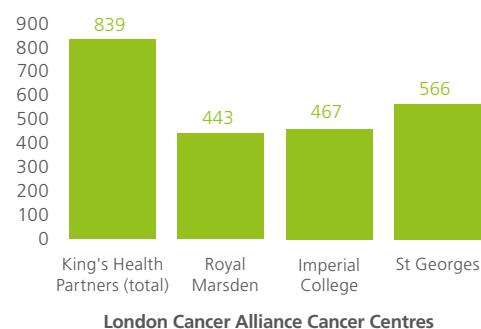
Due to the large and ethnically diverse population of prostate cancer patients and the focus on prostate cancer research, we are viewed by pharmaceutical and biotechnology companies as an important site for many of their global trials.

This is a vital relationship supporting our scientists in the discovery of new cancer drugs.

We have been pioneering robotic surgery in the UK for ten years and the next ten will be even more exciting. Robotic surgery has lots of advantages over traditional open surgery. The incisions are smaller so patients recover quicker and can go home sooner, and the risk of infection is lower.

Professor Prokar Dasgupta, consultant urological surgeon at Guy's and St Thomas and Chair of Robotic Surgery and Urological Innovation at King's College London

Figure 36 | Urology (excluding prostate)
number of treatments 2013/14



Clinical outcomes

Urology cancer

(includes bladder, kidney and testicular cancers but excludes prostate cancer which is reported separately)

The south east London one year survival rates (73.4%) are slightly below the London Cancer Alliance average (but above England average). This is primarily due to late presentation to the hospital – an issue that is now a national priority for the NHS with the establishment of a dedicated national taskforce headed up by Harpal Kumar, chief executive of Cancer Research UK.

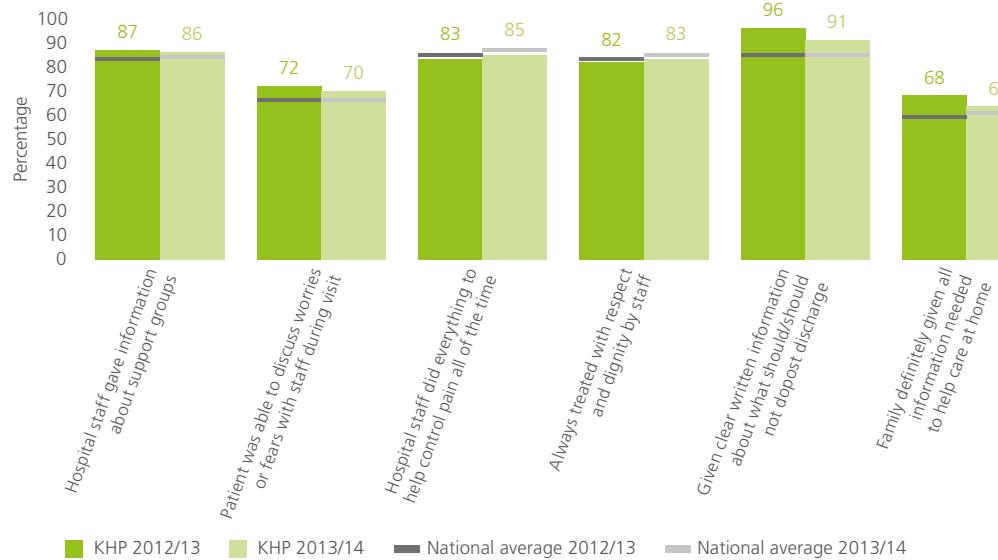
Prostate cancer

Patients with prostate cancer have better outcomes than those with other urological cancers. The south east London rates (96.5%) are on par with the London Cancer Alliance (but, like other urology cancers) are above England average.

Patient experience

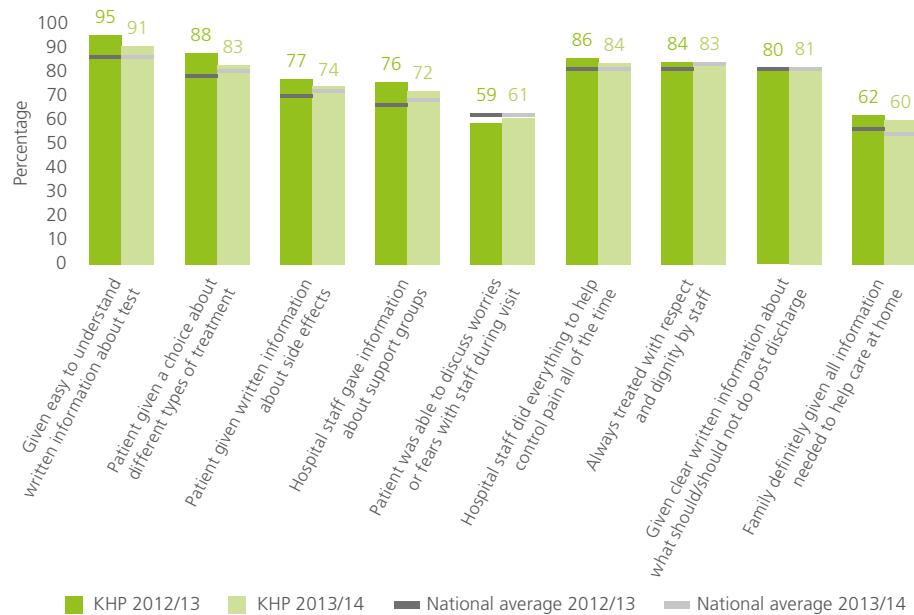
The following graphs show the results of the National Cancer Patient Experience Programme for 2012/13 and 2013/14. The scores compare King's Health Partners results with the national average. Given the fact that it is such a common cancer, patients with prostate cancers are scored separately from those with other urological cancers.

Figures 37 and 38 demonstrate that there is similar variation (in experience) for patients admitted with prostate and other urological cancer across King's Health Partners. Year on year performance is equally inconsistent, for example prostate patients reported that pain control was better than the previous year but that information (needed to help care at home) had deteriorated.

Figure 37 | Inpatient prostate service 2012/13 and 2013/14

We are proud that our urology inpatient service generally outperforms the national average for most areas. However year on year scores have actually deteriorated for all but two indicators (the ability to discuss worries with staff and clear

written information). King's Health Partners is working hard to ensure that this trend does not continue and that the scores from urological cancer patients remain well above national averages.

Figure 38 | Inpatient urology service 2012/13 and 2013/14

The outpatient scores are similarly mixed for urological and prostate cancer patients. Patients with prostate cancer reported better than average pain control and management of side effects

(following chemotherapy). Conversely patient scores for radiotherapy side effects and emotional support remain below England averages. They are however improving on a year to year basis.

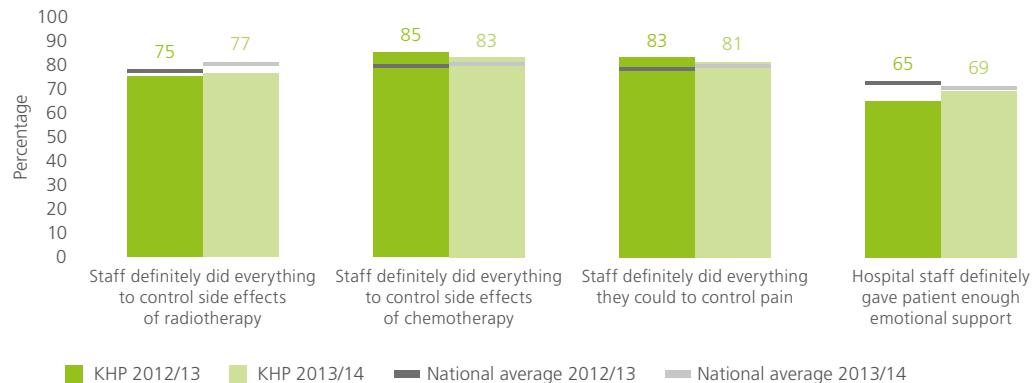
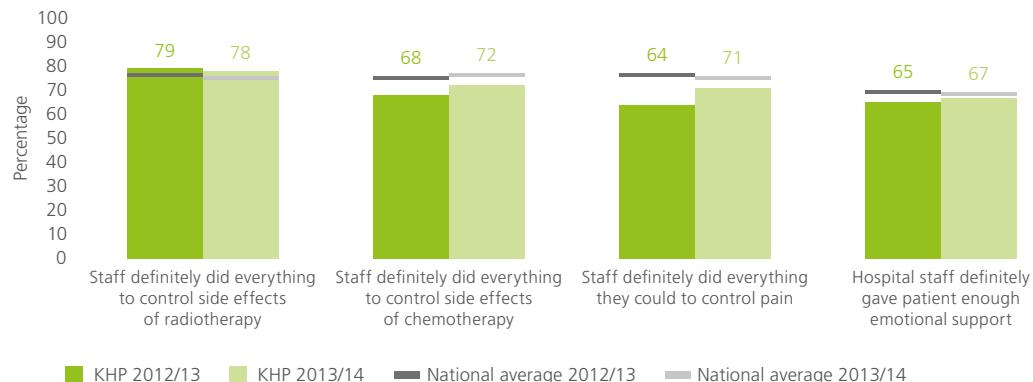
Figure 39 | Prostate outpatient service 2012/13 and 2013/14

Figure 40 demonstrates that more work needs to be done with the urology outpatient service in order to reach national averages. Patients again reported weaker scores for the availability of

emotional support. We have prioritised the need to improve access to psychological support for patients diagnosed as having cancer in an effort to improve the patient experience.

Figure 40 | Urology outpatient service 2012/13 and 2013/14



Services we offer

Chemotherapy services

Chemotherapy services are offered at all our King's Health Partners hospital sites. The chemotherapy service at Guy's and St Thomas' has been transformed in the last five years, delivering high quality care and striving to achieve world class status.

Inspired by a patient centred co-design approach in our purpose built nurse led Chemotherapy Day Unit (CDU), we have worked with patients, carers and health professionals to refine the pathway to the benefits of patients. All patients receive a structured pre-treatment consultation and holistic assessment, creating an individualised treatment plan.

This was recognised as exemplar by the National Cancer Peer Review team, when our service was graded as 100% compliant against national standards and quality.

Patients, who receive treatment in Guy's award-winning cancer day unit, are cared for by highly-skilled nursing staff. We have a range of support services available, including psychological support, complementary therapies from Dimbleby Cancer

Care, benefits advice, and the Headstrong wig advice service.

Comprehensive post treatment support is also available, with proactive telephone monitoring and 24/7 advice accessible via the acute oncology service. Patients at King's College Hospital are treated on the first floor of Cheyne Wing at Denmark Hill. King's College in particular looks after patients being treated for:

- breast cancer
- leukaemia
- lymphoma
- myeloma

Dimbleby Cancer Care

A cancer diagnosis and its treatment can be a traumatic experience, creating distress for the person with a diagnosis and those supporting them. A cancer diagnosis affects the mind and body and our relationships with others.

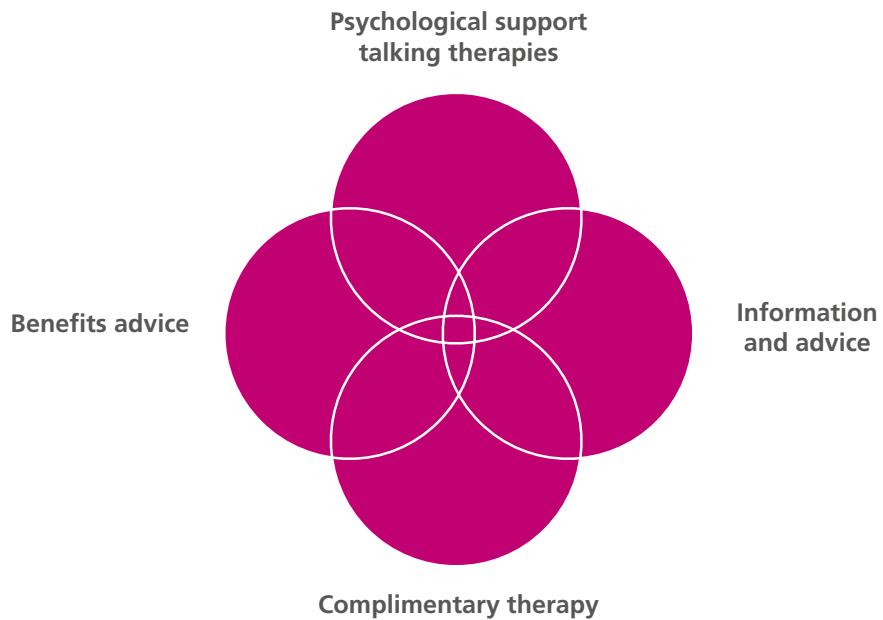
Embedded within King's Health Partners and complementing our medical system of cancer care is Dimbleby Cancer Care. The services are

free and available to anyone receiving treatment across King's Health Partners including friends, family, children, and partner of a person with a cancer diagnosis.

At Dimbleby Cancer Care patients are regarded as a person first and are provided with a unique service offering a range of support dedicated to providing individualised care according to their needs. Our service provides a listening ear and has been built from what people with cancer have said can help them. This includes:

- benefits advice
- psychological support/talking therapy for individuals, couples and families, including group therapy (a wide range of therapies are offered)
- complementary therapy (massage therapy, reflexology and aromatherapy)
- information advice (an expert nurse led service, face to face and telephone)

Figure 41 | Services offered by Dimbleby Cancer Care



Our range of services may be accessed at any point of a patient's care, from diagnosis to end of treatment.

Patient experience

People using our talking therapies service show a high satisfaction with what we provide, 85–90% of people rated us as 8/10 with their first appointment according to:

I felt understood and respected	90%
We worked on what I wanted to work on	84%
The therapist approach is a good fit	89%
Today's session was right for me	88%

Palliative care

Palliative care aims to identify and manage the physical, psychosocial and spiritual problems of patients and families facing progressive, incurable illness. It is an essential component of cancer services, and has been demonstrated to both improve patient-reported outcomes and reduce costs.

The Cicely Saunders Institute houses our world-leading clinical, academic and teaching palliative care teams, and our activities are underpinned by excellence in our research programme. The Institute is the UK's first purpose-built academic palliative care institution and provides patient and family support facilities, clinics, teaching facilities and the King's clinical and academic research

teams. The Institute also houses a Macmillan Information and Support Centre that provides a welcoming and relaxing environment for patients and families seeking information and support.

The Institute brings together multidisciplinary clinical palliative care services within King's Health Partners – King's College Hospital, and Guy's and St Thomas'. This integration includes a management team spanning academics, King's Health Partners clinical teams at King's College Hospital and Guy's and St Thomas', and the community and rehabilitation services at Northwick Park Hospital.

At the Institute, our research is focused on discovering and delivering better care for those with life-threatening incurable conditions. Our strands of global research include evaluating and improving care, research into symptoms, living and dying in society and person-centred outcomes and assessment measures.

Our Outcome Assessment and Complexity Collaborative (OACC) project aims to implement a set of outcome measures for clinical use in nine palliative care teams across south east London. The OACC team at the Institute is working closely with St Christopher's Hospice in south London amongst others, to support the implementation of a suite of palliative care outcome measures. The hospice hopes that capturing these outcomes routinely will help explore the impact of its services on patients and families and improve care in the future.



Cicely Saunders Institute

Education and training

We have a vibrant postgraduate education and training portfolio providing innovative education and training which includes:

- an established Masters programme in Palliative Care developed by the Cicely Saunders Institute and St Christopher's Hospice, rated as 'exemplary' at national inspection
- an MRes in Translational Cancer Medicine
- an MSc in Research Biobanking
- a Palliative Care PhD training programmes
- the Cancer Research UK/MRC/DH/EPSRC funded Comprehensive Cancer Imaging Centre(CCIC) offering three and four year PhD training programmes jointly with the Imaging CAG
- educational opportunities for GPs in respect of early cancer diagnosis and management

Education and training developments

Our education and training committee has identified the benefits in providing training opportunities across all cancer disciplines. For example, creating joint training initiatives across disciplines e.g. nursing, psychological care, pathology and therapies, cancer policy and global health, this will enable us to provide 'whole person' care to our patients which is one of the key attributes to King's Health Partners.

We are at the forefront of the Integrated Academic Training initiative and currently we have six Academic Clinical Fellows in Oncology, three Academic Clinical Fellows in Palliative Medicine, one Clinical Lecturer in Oncology and one in Palliative Medicine.

In the most recent round of competitive applications for renewed posts we succeeded in winning posts in Haemato-Oncology, Clinical and Medical Oncology.

More oncology posts were awarded to King's College London than any other academic training programme in London.

We are continually adding to our existing portfolio of training in order to build comprehensive, multi-professional, modular training programmes that will develop skills and provide career development opportunities for our employees.

Examples of our training include:

- a Masters of Research in Translational Cancer Medicine
- the introduction to bioinformatics and epidemiology training course, which is open to a wide range of health professionals and scientists, and supports the delivery of high quality translational research studies
- short courses in clinical epidemiology
- end of life care e-learning package enables training to be delivered at scale in a cost-effective, user-led way
- in line with our vision of developing international training programmes, three consultant oncologists from the Tata Memorial Hospital in Mumbai completed the King's College London Masters in Research in Translational Cancer Medicine in 2012 and two more are currently enrolled on the programme

Delivery of education programmes

We offer a wide range of training and professional qualifications which include:

- **Masters in Research**
the Masters in Research Translational Cancer Medicine available to fourth year MBBS students and postgraduate trainees has had three distinctions and four merits this year
- **PhD students**
we are actively exploring an exchange student programme (PhD), in the specific area of integrating imaging and genomics to stratify medicine, with Singapore
- **Academic Clinical Fellowships (ACFs)**
we offer a number of ACF posts. ACFs are NHS employees and spend 75% of their time in clinical work and 25% in academic work
- **Multi-professional/multidisciplinary/MSc**
the MSc in Palliative Care is one of our multi-professional courses offered to students

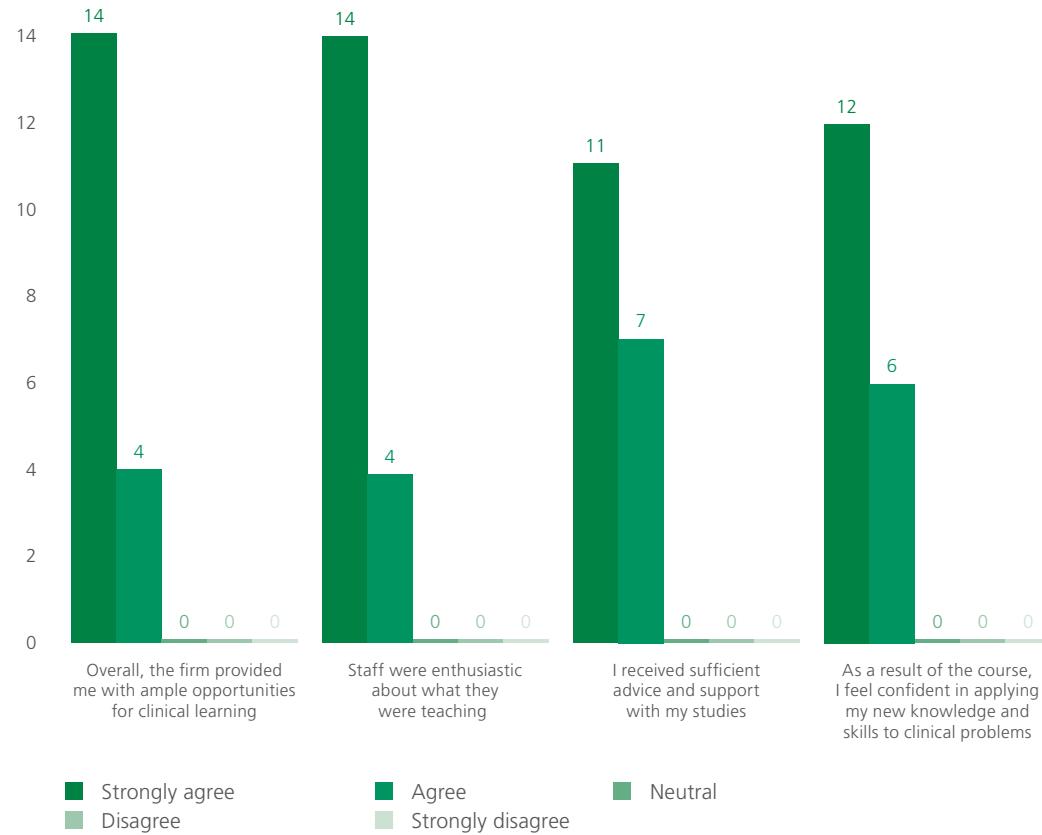
Global health education and training within the Cancer CAG

Our global health work is led by the Director of the Institute of Cancer Policy and this work involves:

- co-leading on the conflict and security module of the King's Health Partners Global Health Intercalated Bachelor of Science – iBSc (contributing lectures, tutorials and examination) and providing the cancer lead for the King's Sierra Leone Partnership including overseeing medical students and other education attachments
- teaching on the King's Health Partners MSc global health course focusing on cancer and other non-communicable diseases (NCDs) in emerging economies
- supervision of dissertations, library projects and work with student projects in Sierra Leone and other emerging economies
- development of international e-distance learning programmes on cancer
- we taught on the joint summer school with Peking University Health Science Centre, and Keio University, Japan in August 2014
- we will be teaching on the joint summer school with the Tata Memorial Cancer Centre in May 2015

Student satisfaction

Figure 42 | Responses from students on the overall learning experience in cancer studies



Feedback from students regarding the quality of our education programmes:

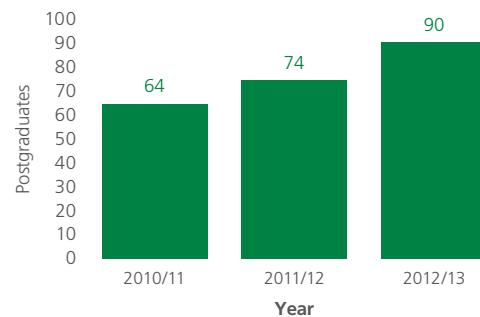
"Very happy with the university. Very good timetable with ample opportunity to be taught by staff of all levels and to see patients."

"Most organised of all my universities so far. Very thorough introductory information with details of all relevant contacts/clinics/theatres etc."

"Great teaching and great opportunities to practice examinations on rotation; lovely and enthusiastic teaching."

"Allocation of a ward doctor was incredibly helpful. The standard of on-ward teaching, the additional tutorials on data interpretation were all sublime."

Figure 43 | Number of postgraduate students over the last three years





Academic research and innovations

Our CAG's success is built on the breadth and depth of its research centres and programmes.

King's Health Partners brings together research expertise across a comprehensive range of scientific areas, clinical specialties and subspecialties. Its strengths in neuroscience, psychiatry and mental health, together with disciplines such as medical and molecular genetics, public health sciences and imaging, enables King's Health Partners to provide better 'whole person care' for our patients.

Placed in the heart of London, we have access to around 60% of the city's population, providing opportunities to translate research into improved patient outcomes for a large and diverse population.

We coordinate a comprehensive cancer centre developing innovations that improve care for

patients, with a cadre of world-class researchers.

Our researchers influence global cancer care and international research, producing over five hundred publications annually, contributing to over one hundred and fifty active trials and leading on over thirty clinical trials per annum.

Our research is based on four main themes:

- improving and evaluating care
- focused symptom research
- development and measurement of outcomes
- living and dying in society

We are engaged in the generation of evidence on which health policy, nationally and internationally is based, on the drafting of guidance from systematic appraisal of evidence, and on evaluation of new treatment and service improvement initiatives.

Cancer Biobank

The King's Health Partners Cancer Biobank is well established at both Guy's and King's. Our organisations have a long history of tissue and data use within the UK and Europe. We want to significantly enhance our resources to include biobanks for all types of cancer. These are essential in understanding what causes cancer, which treatment options are likely to be effective and how to improve patient care.

Our aim is to collect tissue and blood samples from all our patients who may have a diagnosis of cancer.

We have five ethically approved biobanks working as an integrated facility. They are breast, head and neck, thoracic, upper gastro-intestinal (UGI), prostate and other urology cancers. The biobanks meet current legal and ethical guidelines associated with tissue collection and use for research, and have a Human Tissue Authority licence and approval from a research ethics committee. At King's College Hospital there is the Liver unit tissue bank that includes cancers and the haemato-oncology biobank.

Cancer research programmes

Our research programmes embrace priority areas across the entire patient care pathway, from molecular epidemiology and prevention to innovation in treatment and palliative care.

Broadly, these areas cover tumour targeted research, cross-cutting themes and trials, all being informed by excellence in fundamental cancer biology.

Amongst this research repertoire we have well-established activities impacting internationally (breast cancer, haemato-oncology, imaging, cancer immunology, palliative care, epidemiology, cancer cell biology) and for those growing rapidly we are developing an international profile (prostate cancer, thoracic cancer, upper GI cancer policy).

Our research draws upon both our internal CAG programmes and the wider discovery science and experimental medicine excellence of King's Health Partners, as well as our strategic London partners and international collaborators.

Highlights include:

- we are actively engaged with the Francis Crick Institute with joint appointments and collaborations
- we have programmes jointly with the Institute of Cancer Research/Marsden, Imperial College and University College London
- we have established close working relationships with the Istituto Europeo di Oncologia in Milan, the Tata Memorial Cancer Centre in Mumbai, and are developing a research alliance with Peking University in Beijing

These partnerships bring great opportunities for us to develop areas of work that are central to our research priorities.

Beyond these institutional relationships, we also hold multiple bilateral collaborations and we publish a high percentage of international collaborative research studies.

Cancer insights, immunology and interventions

Our CAG fosters fundamental programmes of research that inform on disease mechanisms and provide opportunities for intervention. This is an area where there are particularly close working relationships within other discovery science within King's Health Partners and indeed beyond.

Our efforts are directed at mechanisms associated with the cell division (a process out of control in cancers), cell migration/invasion (a major cause of morbidity in cancer patients), with the principles and actions of particular cancer-altered signalling systems (systems that are highly mutated in cancer) and with epigenetics (a process frequently misdirected in cancer patients).

Maintaining a 'line of sight' into clinical activity, these areas provide specific targeting opportunities for new development intervention programmes (we have four development programmes at various stages deriving from our fundamental science effort).

The expertise associated with these programmes also underpins and informs much of our tumour-directed efforts.

It is notable that there is no distinction in the research seminar programmes and forums we operate such that we encourage a continued exchange of ideas and objectives within our broad research base.

We have a well-developed working relationship with King's Health Partners immunology programmes. This is increasingly important in cancer as we understand the critical role of immune-surveillance and the immunosuppressive aspect of tumour behaviour.

We are collaborating with the immunologists both on fundamental cancer biology and also in growing our cancer-immunology capabilities, seeking joint appointments of promising young researchers in this area. These appointments will be important to our strategy for Cancer Research UK Centre Status and for maintaining a pipeline of home grown immunotherapy based interventions.

Tumour specific research

A substantial part of our research effort is directed at unmet needs within specific tumour types. In **breast cancer** we have a series of programmes directed at: identifying those patients at risk of disease progression, defining novel informative markers of particular subtypes of breast cancer, identifying new targets for

intervention and establishing intervention development programmes.

The breast programme is home to the Breakthrough Breast Cancer Unit, which brings a substantial effort directed at triple negative breast cancer – this is closely linked to the Breakthrough Centre at the Institute of Cancer Research and we also have in development a series of imaging and surgical innovations under test within our breast cancer portfolio.

Our **haemato-oncology** research activity is well recognised as a Leukaemia Lymphoma Research Centre of Excellence.

There are particular strengths in myelodysplastic syndrome, chronic lymphocytic leukaemia, aplastic anaemia and their underlying causes. The haemato-oncology tumour bank developed has provided a wealth of information on the genetics and epigenetics of disease and provides an important resource in ongoing work including the collaboration with the Francis Crick Institute.

There is an associated wealth of expertise in transplantation and cell therapies providing routes to multiple trials for home grown interventions.

We have developed a strong working relationship with **respiratory medicine** where thoracic oncology research encompasses multiple programmes. In particular and of broad application there is ongoing work on circulating genetic biomarkers, disease models for probing functions and testing interventions, and associated lung cancer biology.

In **prostate cancer** we have a very close working relationship with urology and through active leadership have developed a strong network of prostate cancer researchers (based within and outside the CAG but joined by a common purpose).

The network brings together molecular and clinical science in a very productive manner. This network extends beyond King's Health Partners and has particularly strong links with Sweden and America with collaborations and jointly held grants. In **upper GI** we have developed a strong working relationship with Cambridge in the Occams programme with complementary squamous tumour work linked to the King's Health Partners genetics division.

Cross-cutting capabilities

Our cross-cutting areas of research embrace cancer epidemiology, cancer policy and imaging. In epidemiology we have work streams on clinical epidemiology of prostate and breast cancer, a work stream on the early diagnosis of cancer and two separate work streams in bioinformatics. In addition there are associated activities directed at infrastructure development in cancer informatics, research databases, and cancer prevention and health promotion in our hospitals.

We are seeking to develop a number of areas including strengthening collaboration with Public Health England through joint appointments and honorary contracts. We are establishing new

lines of collaboration with research groups in primary care and general medicine in England and Denmark. We are actively engaged with local initiatives including developments in quantitative cancer research which brings synergies to bear on understanding cancer.

The Institute for Cancer Policy (ICP) is closely aligned with King's Health Partners Global Health. Currently the ICP is conducting policy research into a wide variety of cancer global health issues from delivering affordable cancer care in high and emerging economies such as India, to assisting countries such as Sierra Leone and Georgia develop their National Cancer Control Plans. This area of research brings a strong international profile to our cancer work and to King's Health Partners.

We have established and recently renewed funding for our Comprehensive Cancer Imaging Centre. This is a joint initiative with University College London and has been at the forefront of developing non-invasive imaging modalities. The vision for the centre is a 'molecules to man' endeavour, bringing imaging into the widest possible usage informing on prognosis, prediction of responses and early response monitoring. The last of these is closely aligned with our early phase trials unit and imaging is increasingly being embedded in the design of our early phase trials.

Clinical trials

Clinical trials lie at the heart of our research activities. This is the interventional interface that delivers innovation in the clinic. We have invested in and developed a rich early phase trials pipeline comprising both proprietary in-house and commercial origin novel or repurposed interventions.

Our focus is on converting laboratory research into clinical trials quicker, for new treatments and improved practice. The faster we are able to do that, the sooner we can directly benefit the health and care of our patients.

Dr James Spicer, Reader in Experimental Oncology, King's College London, Honorary Consultant, Guy's & St Thomas' NHS Foundation Trust

We currently have active trials of two in-house developed interventions/procedures (immune-stimulatory AML trial and a sentinel lymph node imaging trial) with two other in-house developed interventions approved for trials to open this year.

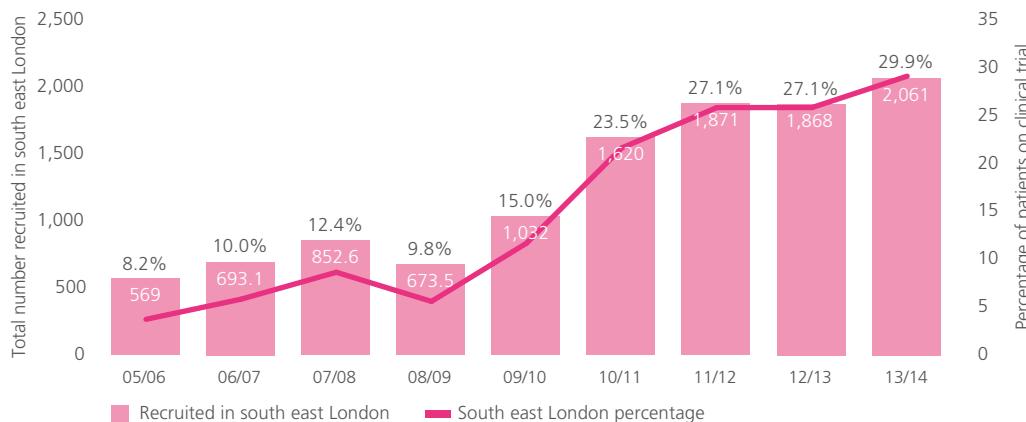
Our objective is to bring at least one King's Health Partner developed intervention to the clinic every year.

Despite the resource intensive nature of early phase trials, approximately half of all our cancer trials are phase I and II early phase trials reflecting the leadership we wish to take in patient centred innovation.

Conducting early phase trials also gives us a competitive edge when attracting commercial trials.

Late phase trials are also important to our portfolio and King's Health Partners is central to the south east London cancer network, playing a key role in increasing the number of patients enrolled in cancer trials locally.

Figure 46 demonstrates that the south east London network had the highest accrual rate in 2012/13 amongst comparable networks and over one in three patients were enrolled in cancer trials for this year. We both contribute to these substantial multisite trials as well as take leadership in implementing them.

Figure 44 | Percentage of all patients enrolled on cancer trials in south east London

Patients will be recruited to different types of clinical trial – by tumour group but also into either interventional or observational trials.

Cancer research studies by phase

Early phase trials are generally resource intensive and therefore it is usually only large institutes who conduct them.

At King's Health Partners we are able to conduct these which give us a greater competitive edge when attracting commercial trials (those sponsored and funded by pharmaceutical companies).

Our research studies attain national and international recognition with up to 67% of new trials having a national or international profile.

Building research capacity and capability

We understand the importance of continuous improvement and are always looking at how through our research we can enhance patient experience. Here are some examples of how we are currently doing this:

- renewal of the following centres – Experimental Cancer Medicine Centre, Breakthrough Breast Cancer Unit, Comprehensive Cancer Imaging Centre, and Biomedical Research Centre
- establishment of an Experimental Oncology Institute as a cancer research hub
- applying for Cancer Research UK Centre status in 2016

- secured strategic appointments, including joint international appointments and appointments aligned with the Francis Crick Institute

Cancer research at King's Health Partners is internationally renowned for its contributions in epidemiology, breast, lung and prostate cancer, melanoma, haemato-oncology, palliative care, cancer nursing, supportive cancer care and cell and molecular biology. With specific expertise in:

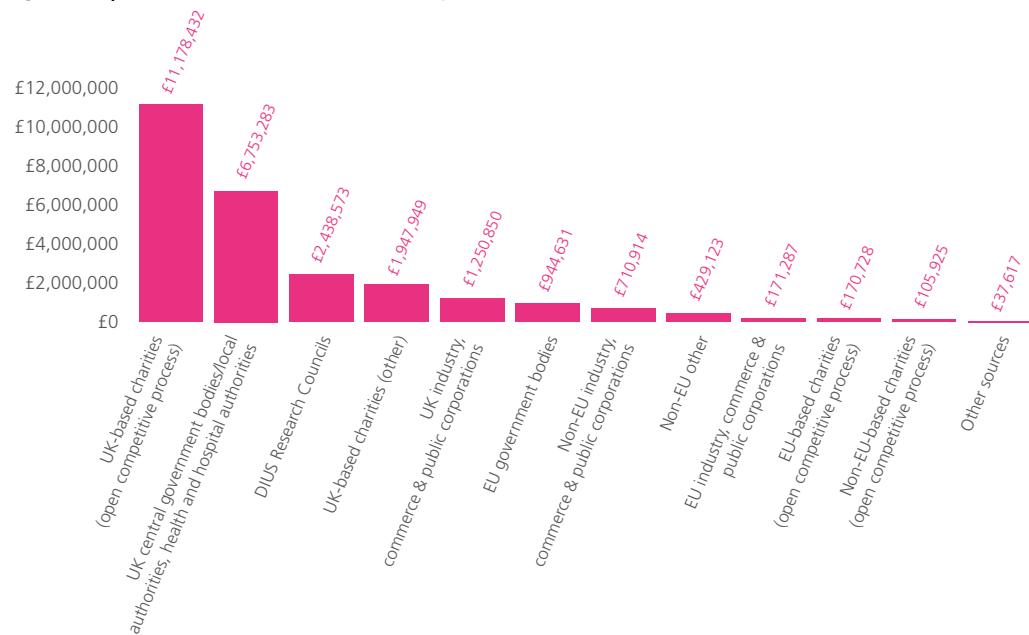
- personalised medicine and prevention
- bioinformatics
- intervention development
- intervention evaluation
- patient outcomes and patient experience
- specialist diagnostics

The activities that reside within our CAG embrace all cancer research derived from the King's College London Division of Cancer Studies and Florence Nightingale School of Nursing and Midwifery (FNSNM), alongside substantial and closely aligned cancer research in the Cellular Pathology CAG, and cancer elements of the Palliative Care/ Rehabilitation Medicine CAG.

Key support for cancer activities comes from the Experimental Cancer Medicine Centre, the Breakthrough Breast Unit, the Richard Dimbleby Laboratory and the Centre for Behavioural Research (cBRC). The infrastructure grants among these serve the entire Integrated Cancer Centre which sits as a virtual organisation spanning the CAG and all other CAGs which contain cancer activities.

Research income

Figure 45 | Research income over the last 3 years in total



We have been granted funding from a number of organisations for the 2012/2013 year to support our research some of which include:

Leukaemia and Lymphoma Research	£113,023
Leukaemia and Lymphoma Research	£139,480
Alexion Pharma UK	£150,000
British Lung Foundation	£88,576
GE Healthcare Ltd	£15,600
Leukaemia and Lymphoma Research	£50,180
Leukaemia and Lymphoma Research	£142,588
MRC	£152,698
MRC	£125,052



Collaborating with others

King's Health Partners Integrated Cancer Centre has a wide range of major global collaborations in research, care and training.

The Upper GI team at Guy's Hospital has been working closely with the Karolinska Institute, who are leading on research to enhance surgical recovery. Together with the Royal Marsden, the team has been exploring how to improve a clinical assessment to ascertain outcomes of surgery before any surgical intervention. Through the collaboration with the Karolinska Institute we have been analysing survival rates of patients and under what circumstances the chances are higher for long-term positive impact on patients.

The partnership work benefits from Guy's and St Thomas' diverse patient population and the Karolinska Institute's ability to process huge amounts of clinical data. As a result of the collaboration, the research team has established indicators to predict who will respond well to chemotherapy and which patients will not.

We have well established partnerships with both the Tata Memorial Centre, Mumbai, India and with over fifty centres across India through our membership of the National Cancer Grid of India. We continue to explore opportunities to strengthen these relationships and identify new cancer-related research collaborations.

Other major partnerships and collaborations are with the:

- National Cancer Forum of Chile and particularly Universidad de Católica, Santiago de Chile
- National Cancer Centre Singapore
- University of North Carolina
- Sydney Kimmel CCC, Baltimore
- European Institute of Oncology, Milan

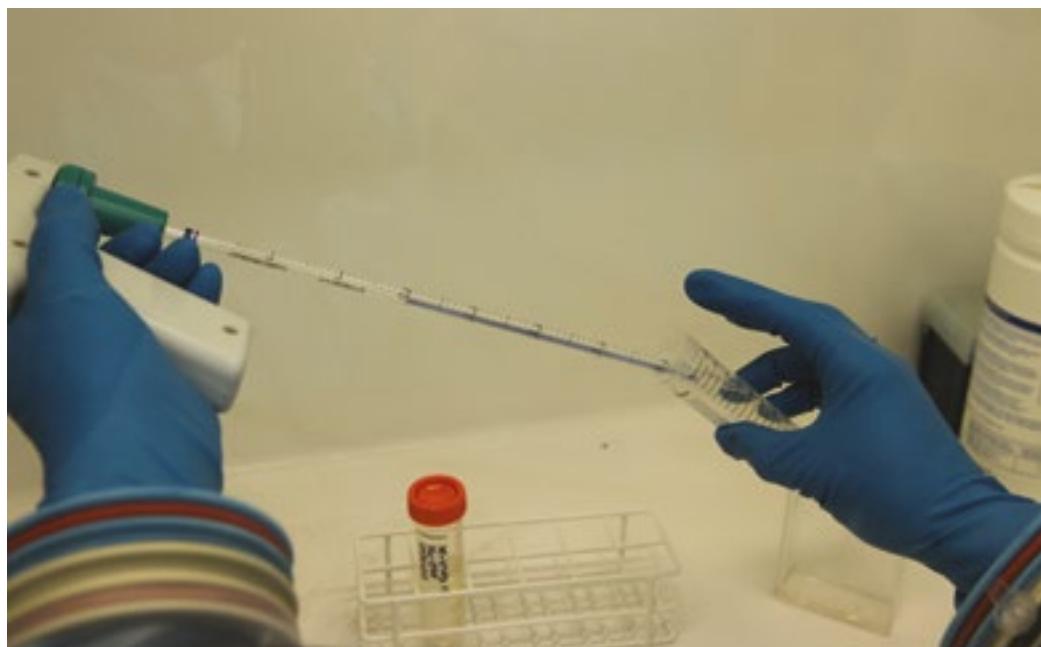
These collaborations are mutually beneficial, resulting in knowledge and skill enrichment of staff and greater opportunities for influencing and shaping the global cancer health agenda.

We also work with the Kings Centre for Global Health to provide policy and capability enhancement in key countries focusing at present on Sierra Leone and the development of cancer care pathways for Zaatri refugee camp, Jordan.

We have a strategic memorandum of understanding with the National Cancer Institute's Centre for Global Health and through them

collaborate with a wide variety of national partners to develop cancer control plans, e.g. Georgia and Burma.

Furthermore, we collaborate with a number of trans-national groups to enhance research and care, e.g. childhood cancer community research (ENCAA) and care (EXPO-r-NET) networks. We also collaborate with key philanthropic partners such as eCancer in developing our global technology enhanced learning platforms.



Selected publications

The combined research outputs of our Cancer CAG membership has contributed to the publication of over 1,200 research articles since its inception in 2010.

Topics covered include advances in genetic research, cell imaging, drug development and addressing the global issues facing healthcare providers and patients.

The publications listed here provide a flavour of our research published to date.

Mental health – considerations in diagnosis and treatment

The multifaceted approach to treatment incorporating both mind and body is a crucial component of King's Health Partners mission to improve patient healthcare and service. In cases where a patient may have underlying (or undiagnosed) mental ill-health it is important to understand how this could affect their treatment

and prognosis when diagnosed with cancer. These articles explore both the challenges and opportunities available to design new treatment strategies and policy.

Cancer diagnosis in people with severe mental illness: practical and ethical issues

The Lancet Oncology, 2010¹

There has been increasing recognition of the high physical morbidity in patients with severe mental illness, but little has been written about cancer in these patients. Therefore, we review the published work on risk of cancer in patients with severe mental illness, treatment challenges, and ethical issues.

Severe mental illness is associated with behaviours that predispose an individual to an increased risk of some cancers, including lung and breast cancer, although lower rates of other cancers are reported in this population.

Severe mental illness is also associated with disparities in screening for cancer and with

higher case-fatality rates. This higher rate is partly due to the specific challenges of treating these patients, including medical co-morbidity, drug interactions, lack of capacity, and difficulties in coping with the treatment regimen as a result of psychiatric symptoms.

To ensure patients with severe mental illness receive effective treatment, inequalities in care need to be addressed by all healthcare professionals involved, including those from mental health services and the surgical and oncology teams.

Cancer and mental health: a clinical and research unmet need

Annals of Oncology, 2010²

Background: Poor mental health is the largest single source of disability in the UK, and co-morbid health problems, particularly with cancer, raise total health care costs significantly.

Methods: This study examined what research is being conducted into the intersection between cancer and mental health.

Research papers captured by the intersection of sub-field filters – 'mental disorder' and 'cancer' – were studied from the Web of Science over a 10-year period (2002–2011).

Results: There were 1,463 papers dealing with the dual presence of cancer and mental disorder. They amounted to 0.26% of cancer research and 0.51% of mental health research over the

10-year period, indicating their intersection receives little research attention. 80% of papers were concerned with the effects of cancer on mental health rather than the reverse; a few (5%) looked at the post-traumatic stress suffered by carers of cancer patients. Of cancer types, breast dominated (21%), followed by prostate (5%), lung (3%), oral (2%) and colorectal (2%) cancer. The area of mental health most studied in cancer was unipolar depression.

Conclusions: The paucity of research that exists at the intersection of cancer and mental health requires attention from policymakers and funders in order to address an important trans-disciplinary gap in health care research.

Cellular imaging and discovery

By studying cellular behaviour both in isolation and within the body, it can provide critical information on how the interplay between cells affects the dynamics of tumour development. This in turn can lead to novel treatment pathways and means of identifying cancer groups.

Examined here are three articles presenting:

1. new findings on how a previously unknown shape of the cell partially affects the delivery of cellular signals which instruct cells to grow and divide (a critical component of cancer development)

2. how a key group of enzymes play a critical role in the body's immune response
3. how some tumours can create 'hostile conditions' thus dulling the immune response

Human Epidermal Growth Factor Receptor (EGFR) Aligned on the Plasma Membrane Adopts Key Features of Drosophila EGFR Asymmetry

Molecular and Cellular Biology, 2011³

The ability of epidermal growth factor receptor (EGFR) to control cell fate is defined by its affinity for ligand. Current models suggest that ligand-binding heterogeneity arises from negative co-operativity in signaling receptor dimers, for which the asymmetry of the extracellular region of the Drosophila EGFR has recently provided a structural basis.

However, no asymmetry is apparent in the isolated extracellular region of the human EGFR. Human EGFR also differs from the Drosophila EGFR in that negative co-operativity is found only in full-length receptors in cells. To gain structural insights into the human EGFR *in situ*, we developed an approach based on quantitative Forster resonance energy transfer (FRET) imaging, combined with Monte Carlo and molecular dynamics simulations, to probe receptor conformation in epithelial cells.

We experimentally demonstrate a high-affinity ligand-binding human EGFR conformation consistent with the extracellular region aligned flat on the plasma membrane. We explored the relevance of this conformation to ligand-binding heterogeneity and found that the asymmetry of this structure shares key features with that of the Drosophila EGFR, suggesting that the structural basis for negative co-operativity is conserved from invertebrates to humans but that in human EGFR the extracellular region asymmetry requires interactions with the plasma membrane.

A Targeted siRNA Screen Identifies Regulators of Cdc42 Activity at the Natural Killer Cell Immunological Synapse

Science Signalling, 2011⁴

Natural killer (NK) cells kill tumour cells and virally infected cells, and an effective NK cell response requires processes, such as motility, recognition, and directional secretion, that rely on cytoskeletal rearrangement. The Rho guanosine triphosphatase (GTPase) Cdc42 coordinates cytoskeletal reorganization downstream of many receptors. The Rho-related GTPase from plants 1 (ROP1) exhibits oscillatory activation behaviour at the apical plasma membrane of growing pollen tubes; however, a similar oscillation in Rho GTPase activity has so far not been demonstrated in mammalian cells.

We hypothesized that oscillations in Cdc42 activity might occur within NK cells as they interact with target cells. Through fluorescence lifetime imaging of a Cdc42 biosensor, we observed that in live NK cells forming immunological synapses with target cells, Cdc42 activity oscillated after exhibiting an initial increase. We used protein-protein interaction networks and structural databases to identify candidate proteins that controlled Cdc42 activity, leading to the design of a targeted short interfering RNA screen.

The guanine nucleotide exchange factors RhoGEF6 and RhoGEF7 were necessary for Cdc42 activation within the NK cell immunological synapse. In addition, the kinase Akt and the p85 alpha subunit of phosphoinositide 3-kinase (PI3K) were required for Cdc42 activation, the periodicity of the oscillation in Cdc42 activity, and the subsequent polarisation of cytotoxic vesicles toward target cells. Given that PI3Ks are targets of tumour therapies, our findings suggest the need to monitor innate immune function during the course of targeted therapy against these enzymes.

IgG4 subclass antibodies impair antitumor immunity in melanoma

*Journal of Clinical Investigation, 2013*⁵

Host-induced antibodies and their contributions to cancer inflammation are largely unexplored. IgG4 subclass antibodies are present in IL-10-driven Th2 immune responses in some inflammatory conditions. Since Th2-biased inflammation

is a hallmark of tumour microenvironments, we investigated the presence and functional implications of IgG4 in malignant melanoma. Consistent with Th2 inflammation, CD22+ B cells and IgG4(+)-infiltrating cells accumulated in tumours, and IL-10, IL-4, and tumour-reactive IgG4 were expressed in situ. When compared with B cells from patient lymph nodes and blood, tumour-associated B cells were polarised to produce IgG4. Secreted B cells increased VEGF and IgG4, and tumour cells enhanced IL-10 secretion in cocultures.

Unlike IgG1, an engineered tumour antigen-specific IgG4 was ineffective in triggering effector cell-mediated tumour killing in vitro. Antigen-specific and nonspecific IgG4 inhibited IgG1-mediated tumourcidal functions. IgG4 blockade was mediated through reduction of Fc γ RI activation. Additionally, IgG4 significantly impaired the potency of tumourcidal IgG1 in a human melanoma xenograft mouse model.

Furthermore, serum IgG4 was inversely correlated with patient survival. These findings suggest that IgG4 promoted by tumour-induced Th2-biased inflammation may restrict effector cell functions against tumours, providing a previously unexplored aspect of tumour-induced immune escape and a basis for biomarker development and patient-specific therapeutic approaches.

Childhood cancer – addressing the global issue

Though childhood cancer accounts for only a small percentage of total cancer sufferers, it is of pressing concern, requiring a coordinated and focussed global approach. With many conflicting global factors affecting both treatment and initial diagnosis, these articles delve into current policy and look to create new recommendations to tackling childhood cancer.

Children with cancer: driving the global agenda

The Lancet Oncology, 2013⁶

In the global effort to prevent, cure, and control cancer, the specific needs of children and young people with cancer are often overlooked, perhaps because they represent less than 2% of the global cancer burden. However, childhood cancer is very different from cancer in adults, both in terms of the types of cancer that affect different age groups and of the effect of anticancer treatments on growing children and adolescents. Specific management and research strategies that take account of the different subtypes of childhood cancers are needed to ensure that high-quality care and continuous innovations are safely and effectively delivered, with equitable access wherever possible.

New policies to address the global burden of childhood cancers

The Lancet Oncology, 2013⁷

Childhood cancer is a major global health issue. Every year, almost 100,000 children die from cancer before the age of 15 years, more than 90% of them in resource-limited countries. Here, we review the key policy issues for the delivery of better care, research, and education of professionals and patients.

We present a key list of time-limited proposals focusing on change to health systems and research and development. These include sector and system reforms to make care affordable to all, policies to promote growth of civil society around both cancer and Millennium Development Goals, major improvements to public health services (particularly the introduction of national cancer plans), improved career development, and increased remuneration of specialist healthcare workers and government support for childhood cancer registries.

Research and development proposals focus on sustainable funding, the establishment of more research networks, and clinical research specifically targeted at the needs of low income and middle income countries. Finally, we present proposals to address the need for clinical trial innovation, the complex dichotomy of regulations, and the threats to the availability of data for childhood cancers.

Genetic breakthroughs

Advances in genetic research have allowed scientists and clinicians for the first time to not only work on the development of targeted medical therapies to treat cancer, but also to evaluate the potential risk of development. With several high profile cases of women undergoing double mastectomies due to carrying the BRCA-1 Gene, these three articles provide insight into the complexity of breast cancer and help to enlighten as to its many 'faces'.

The genomic and transcriptomic architecture of 2,000 breast tumours reveals novel subgroups

Nature, 2012⁸

The elucidation of breast cancer subgroups and their molecular drivers requires integrated views of the genome and transcriptome from representative numbers of patients. We present an integrated analysis of copy number and gene expression in a discovery and validation set of 997 and 995 primary breast tumours, respectively, with long-term clinical follow-up. Inherited variants (copy number variants and single nucleotide polymorphisms) and acquired somatic copy number aberrations (CNAs) were associated with expression in ~40% of genes, with the landscape dominated by cis- and trans-acting CNAs.

By delineating expression outlier genes driven in cis by CNAs, we identified putative cancer

genes, including deletions in PPP2R2A, MTAP and MAP2K4. Unsupervised analysis of paired DNA–RNA profiles revealed novel subgroups with distinct clinical outcomes, which reproduced in the validation cohort. These include a high risk, oestrogen-receptor-positive 11q13/14 cis-acting subgroup and a favourable prognosis subgroup devoid of CNAs. Trans-acting aberration hotspots were found to modulate subgroup-specific gene networks, including a TCR deletion-mediated adaptive immune response in the 'CNA-devoid' subgroup and a basal-specific chromosome 5 deletion-associated mitotic network. Our results provide a novel molecular stratification of the breast cancer population, derived from the impact of somatic CNAs on the transcriptome.

The landscape of cancer genes and mutational processes in breast cancer

Nature, 2012⁹

All cancers carry somatic mutations in their genomes. A subset known as driver mutations, confer clonal selective advantage on cancer cells and are causally implicated in oncogenesis, and the remainder are passenger mutations.

The driver mutations and mutational processes operative in breast cancer have not yet been comprehensively explored. Here we examine the genomes of 100 tumours for somatic copy number changes and mutations in the coding exons of protein-coding genes. The number of

somatic mutations varied markedly between individual tumours. We found strong correlations between mutation number, age at which cancer was diagnosed and cancer histological grade, and observed multiple mutational signatures, including one present in about 10% of tumours characterized by numerous mutations of cytosine at TpC dinucleotides.

Driver mutations were identified in several new cancer genes including AKT2, ARID1B, CASP8, CDKN1B, MAP3K1, MAP3K13, NCOR1, SMARCD1 and TBX3. Among the 100 tumours, we found driver mutations in at least 40 cancer genes and 73 different combinations of mutated cancer genes. The results highlight the substantial genetic diversity underlying this common disease.

Genetic Predisposition to In Situ and Invasive Lobular Carcinoma of the Breast

PLoS Genetics, 2014¹⁰

Invasive lobular breast cancer (ILC) accounts for 10–15% of all invasive breast carcinomas. It is generally ER positive (ER+) and often associated with lobular carcinoma in situ (LCIS). Genome-wide association studies have identified more than 70 common polymorphisms that predispose to breast cancer, but these studies included predominantly ductal (IDC) carcinomas.

To identify novel common polymorphisms that predispose to ILC and LCIS, we pooled data from 6,023 cases (5,622 ILC, 401 pure LCIS) and

34,271 controls from 36 studies genotyped using the iCOGS chip. Six novel SNPs most strongly associated with ILC/LCIS in the pooled analysis were genotyped in a further 516 lobular cases (482 ILC, 36 LCIS) and 1,467 controls. These analyses identified a lobular-specific SNP at 7q34 (rs11977670, OR (95%CI) for ILC = 1.13 (1.09–1.18), $P = 6.0 \times 10^{-10}$; P-het for ILC vs IDC ER+ tumours = 1.8×10^{-4}). Of the 75 known breast cancer polymorphisms that were genotyped, 56 were associated with ILC and 15 with LCIS at $P < 0.05$. Two SNPs showed significantly stronger associations for ILC than LCIS (rs2981579/10q26/FGFR2, P-het = 0.04 and rs889312/5q11/MAP3K1, P-het = 0.03); and two showed stronger associations for LCIS than ILC (rs6678914/1q32/LGR6, P-het = 0.001 and rs1752911/6q14, P-het = 0.04). In addition, seven of the 75 known loci showed significant differences between ER+ tumours with IDC and ILC histology, three of these showing stronger associations for ILC (rs11249433/1p11, rs2981579/10q26/FGFR2 and rs10995190/10q21/ZNF365) and four associated only with IDC (5p12/rs10941679; rs2588809/14q24/RAD51L1, rs6472903/8q21 and rs1550623/2q31/CDCA7). In conclusion, we have identified one novel lobular breast cancer specific predisposition polymorphism at 7q34, and shown for the first time that common breast cancer polymorphisms predispose to LCIS.

We have shown that many of the ER+ breast cancer predisposition loci also predispose to ILC, although there is some heterogeneity between

ER+ lobular and ER+ IDC tumours. These data provide evidence for overlapping, but distinct etiological pathways within ER+ breast cancer between morphological subtypes.

International activity

Unlike a virus or bacterial infection, cancer is not limited to geographical boundaries, it requires a global 'call to arms' to first understand its complexity and origins and then to develop preventative and treatment strategies in order to create the infrastructure needed to support the diversity of patient groups.

The first three articles here explore the prevalence and treatment of cancer in one of King's Health Partners most populous strategic partner countries, India. These articles represent the third major series of cancer reports forthcoming from the group and highlight the critical opportunity that the country has to revolutionise cancer treatment and service, not only to aid the one million people diagnosed in India, with cancer, but to become a global leader in treatment and research.

The final article examines the relationship of expenditure in cancer treatment and research outcomes to incidence and mortality, within the European Union.

The growing burden of cancer in India: epidemiology and social context

The Lancet Oncology, 2014¹¹

Cancer can have profound social and economic consequences for people in India, often leading to family impoverishment and societal inequity. Reported age-adjusted incidence rates for cancer are still quite low in the demographically young country. Slightly more than 1 million new cases of cancer are diagnosed every year in a population of 1.2 billion. In age-adjusted terms this represents a combined male and female incidence of about a quarter of that recorded in western Europe.

However, an estimated 600,000–700,000 deaths in India were caused by cancer in 2012. In age-standardised terms this figure is close to the mortality burden seen in high-income countries. Such figures are partly indicative of low rates of early-stage detection and poor treatment outcomes.

Many cancer cases in India are associated with tobacco use, infections, and other avoidable causes. Social factors, especially inequalities, are major determinants of India's cancer burden, with poorer people more likely to die from cancer before the age of 70 years than those who are more affluent. In this first of three papers, we examine the complex epidemiology of cancer, the future burden, and the dominant socio-political themes relating to cancer in India.

Cancer research in India: national priorities, global results

The Lancet Oncology, 2014¹²

Over the past twenty years, cancer research in India has grown in size and impact. Clinicians, scientists, and government and state policy makers in India have championed cancer research, from studies to achieve low-tech, large-scale health outcomes to some of the most advanced areas of fundamental cancer science. In this paper, we frame public policy discussions about cancer with use of an in-depth analysis of research publications from India.

Cancer research in India is a complex environment that needs to balance public policy across many competing agendas. We identify major needs across these environments such as those for increased research capacity and training and protected time for clinical researchers; for more support from states and enhanced collaborative funding programmes from government; for development of national infrastructures across a range of domains (ie. clinical trials, tissue banking, registries, etc); and for a streamlined and rational regulatory environment. We also discuss improvements that should be made to translate research into improvements in cancer outcomes and public health.

Delivery of affordable and equitable cancer care in India

The Lancet Oncology, 2014¹³

The delivery of affordable and equitable cancer care is one of India's greatest public health challenges. Public expenditure on cancer in India remains below US\$10 per person (compared with more than US\$100 per person in high-income countries), and overall public expenditure on health care is still only slightly above 1% of gross domestic product. Out-of-pocket payments, which account for more than three-quarters of cancer expenditures in India, are one of the greatest threats to patients and families, and a cancer diagnosis is increasingly responsible for catastrophic expenditures that negatively affect not only the patient but also the welfare and education of several generations of their family.

We explore the complex nature of cancer care systems across India, from state to government levels, and address the crucial issues of infrastructure, manpower shortages, and the pressing need to develop cross-state solutions to prevention and early detection of cancer, in addition to governance of the largely unregulated private sector and the cost of new technologies and drugs. We discuss the role of public insurance schemes, the need to develop new political mandates and authority to set priorities, the necessity to greatly improve the quality of

care, and the drive to understand and deliver cost-effective cancer care programmes.

Discrepancies in cancer incidence and mortality and its relationship to health expenditure in the 27 European Union member states

Annals of Oncology, 2013¹⁴

Background: The European Union (EU) is a confederation of twenty seven member states, the institutions of which work according to negotiated decisions. The EU has implemented similar legislation and a common market, and has adopted the same currency in most of its member states. Although financing health systems is a responsibility of the national governments, the EU has enacted the Charter of Fundamental Rights to standardise public health policies.

However, for historical reasons, health policy and health expenditure is not uniform across the 27 EU member states (EU-27).

Material and methods: We hypothesised that increased health expenditure would be associated with better cancer outcome and that this would be most apparent in breast cancer, because of the availability of effective screening methods and treatments.

Using publicly available data from the World Health Organisation, the International Monetary Fund, and the World Bank, we assessed associations between cancer indicators and wealth

and health indicators. To do so, we constructed scatter plots and used the Spearman's rank correlation coefficient.

Results: A marked difference in wealth and health expenditure indicators was observed between Eastern and Western European countries, with Western European being the higher. Higher wealth and higher health expenditures were associated both with increased cancer incidence and decreased cancer mortality. In breast cancer, the association with incidence was stronger. We created mortality/incidence ratios and observed that the more spent on health, the fewer the deaths after a cancer diagnosis.

Conclusions: Despite the initiatives to standardise public health policies of the EU-27, health expenditure continues to be higher in Western European countries and this is associated with better cancer outcome in these countries.

Palliative care and patient support

The caring and support structure provided to the patient is critical in the recovery process and it is therefore important to consider the mental wellbeing of not only the patient but those who look after them outside of the clinical setting. In cases where treatment is no longer possible, understanding the final desires and wishes of the patients can help to ensure that this final phase can be treated with both dignity and respect.

What are the perceived needs and challenges of informal caregivers in home cancer palliative care? Qualitative data to construct a feasible psycho-educational intervention

Supportive Care in Cancer, 2012¹⁵

Background: Tailored and specific interventions for informal caregivers in palliative care are rare. We aimed to generate evidence to inform a subsequent appropriate intervention based on caregivers' experiences. Methods: Single, semi-structured qualitative interviews were undertaken with 20 informal cancer caregivers of home cancer palliative care.

Results: Carers reported the need to be prepared for their caring role, to be visible to professionals, to receive clear and specific information about the patient's condition, and to be emotionally supported. They described challenges as uncertainty, distress at witnessing disease progression and the daily struggle with financial issues, personal time, own health and sleep problems.

Conclusions: Considering the time pressures and restricted caregiver time, the intervention should be brief and should aim to enhance their visibility as service recipients, patient-specific information giving, preparation for their role, and emotional support.

End-of-life care – what do cancer patients want?

Nature Reviews Clinical Oncology, 2014¹⁶

Patients with cancer frequently suffer from debilitating physical symptoms and psychological distress, particularly at the end of life. Interventions to help alleviate these problems are often complex and multifactorial.

Palliative care services and therapeutic interventions have developed in a variable manner, often with limited evaluation of clinical effectiveness and affordability, resulting in a relatively weak evidence base. The health care provided to patients with advanced stage cancer does not always correlate with what is known about their preferences for care.

In this review, we discuss the preferences of patients with cancer regarding their end of life care, including the importance of early provision of palliative care, and the central role of advance care planning in meeting patients' preferences. It has been shown that many patients with cancer wish to die at home.

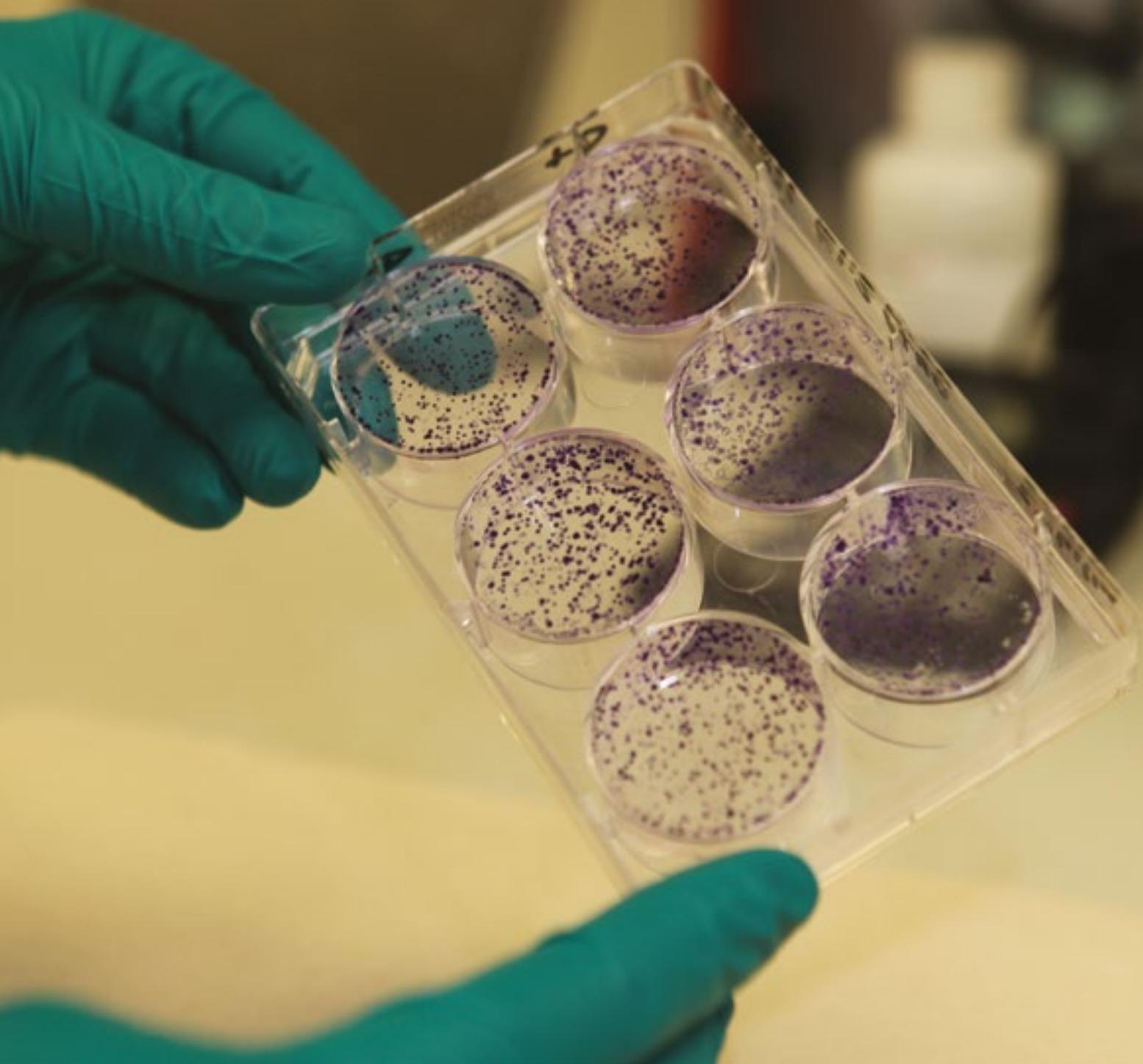
We discuss the factors that contribute to the place of death, including environmental factors, disease specific issues, and the availability of resources. There has been a recent upward trend in the number of patients with cancer who die in their preferred place of care, and important contributors – such as community palliative care, advance care planning, and improvements

in palliative care services as a result of robust research studies-are considered.

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Global cancer

The King's Health Partners Integrated Cancer Centre (ICC) has a global vision for ensuring that its research, education and care reaches beyond national boundaries, particularly and uniquely in terms of improving outcomes in low and emerging economies. We are one of the most internationally research active cancer centres in Europe with 25% of our work in collaboration with European partners and 16% in partnership with cancer researchers in the USA. We also have developed a strong portfolio of global health research and policy partnerships, particularly in epidemiology, palliative care through the Cicely Saunders Centre, haematology and global health. KHP ICC has led some of the most important Lancet and Lancet Oncology Commissions into major cancer global health issues, for example Delivering Affordable Cancer Care in High Income Countries. In 2015 KHP ICC are part of the Lancet Commission on Global Surgery and Health, Equity and Women's Cancers. We are also leading the Lancet Oncology Commission into Global Cancer Surgery. KHP ICC is the only cancer centre with a dedicated group (Institute of Cancer Policy) to global cancer.

Central to this success is our strong international partnerships, particularly with emerging powers and low-income countries. In the latter we are working through King's Centre for Global Health and our NHS Foundation Trusts in Zambia, Sierra Leone and DR Congo to improve service capability. Over the last five years we have developed major strategic partnerships (with formal MOU) with other emerging powers. In Chile we have been the key partner in their development of the National Cancer Forum. Perhaps our most important strategic relationship has been with India. Starting in 2010 with a research and bilateral education partnership with Tata Memorial Centre, Mumbai we have now grown the relationship through our invitation to the Indian National Cancer Grid (the only non-Indian member) with major programs of research and education engagement. 2014 saw the start of significant new partnerships with China through Peking University Health Science Center, which will continue to be expanded.

KHP ICC has also developed significant partnerships with global cancer organisations. Cicely Saunders Centre for Palliative care is a WHO Collaborating Centre, and KHP ICC have secured a strategic MOU with the NCI's Centre for Global Health, as well as membership of the executive board of Union for International Cancer Control and the International Atomic Energy Agency's global radiotherapy program.

To strengthen our international benchmarking we have also undertaken and been awarded accreditation as a key centre for the European Organisation for Research into Cancer (EORTC) as part of their Network of Core Institutions (NOCI) initiative. This is part of a wider strategy to take the successful late phase clinical trial and translational work of the centre into a much more international context. Furthermore, we are one of the lead European cancer centres

undertaking a major and formal accreditation program through the Organisation of European Cancer Institutes (OECl) to become a designated European Comprehensive Cancer Centre in 2015. Our expertise in both the development of cancer centres and national cancer care systems has meant that KHP ICC faculty are involved in a wide variety of contexts to help other countries develop models of cancer care and research.

The expansion of our internationally research active academic faculty as well as the creation of the Institute of Cancer Policy has strongly positioned KHP ICC as a major institutional partner in the global cancer community.

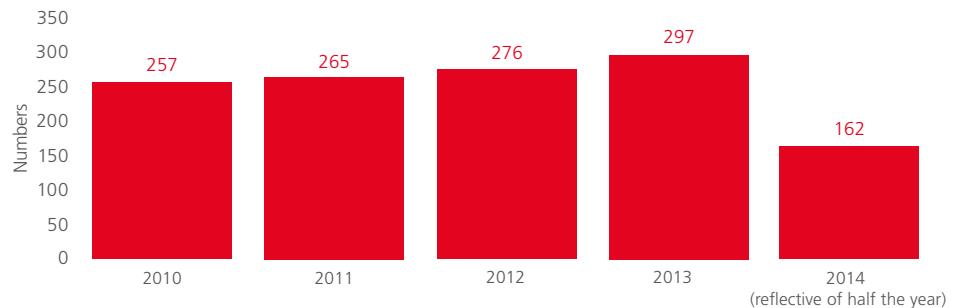
Publications

How well are we doing?

Aligned to our extensive research programmes, is our focus on helping to advance knowledge in the science and treatment of cancer through the publication of research papers. These papers contain original research articles, review and discuss existing literature and present new innovations. We monitor our research database to see where we have been performing well in relation to our peers, and where we could improve.

The table here shows our publications from four years of research separated into tumour group. It is compared to the UK's four year publication outputs. Our publications, of which over 1,250 are represented, exclude abstracts, editorials and letters. The cells highlighted green and yellow denote areas of strength for King's Health Partners, the Integrated Cancer Centre and our CAG.

Site	Percentage of CAG outputs	Percentage to UK based on bibliographic report
Total	100.00	5.00
Breast	14.58	5.96
Colorectal	1.91	1.31
Leukaemia	6.69	6.04
Prostate	6.14	6.04
Lymphoma	3.35	4.04
Lung	5.98	7.76
Brain	1.99	3.18
Melanoma	0.80	1.29
Oral & Maxillofacial	3.82	6.23
Stomach	0.72	1.29
Liver	1.35	2.49
Ovarian	0.48	0.91
Kidney	1.83	4.95
Pancreas	0.56	1.70
Cervical	0.64	2.01
Bladder	0.48	2.00
Bone	0.40	2.07
Uterine	0.16	0.83
Oesophageal	4.62	30.21
Other cross cutting areas	43.5	N/A

Figure 46 | The number of publications produced by the CAG over the last 4 years

Books

Author	Title	Publisher
FP O'Malley, SE Pinder & AM Mulligan	Breast Pathology: A Volume in the Foundations in Diagnostic Pathology series. (2011)	Routledge Taylor & Francis Group

Publications

Author	Title	Publication
Holmberg L, Sandin F, Bray F, Richards M, Spicer J, Lambe M et al (2010)	National comparisons of lung cancer survival in England, Norway and Sweden 2001–2004: differences occur early in follow-up	Thorax
Kraman M, Bambrough PJ, Arnold JN, Roberts EW, Magiera L, Jones JO et al (2010)	Suppression of Antitumor Immunity by Stromal Cells Expressing Fibroblast Activation Protein-α	Science
Kyriakou C, Canals C, Sibon D, Cahn JY, Kazmi M, Arcese W et al (2010)	High-Dose Therapy and Autologous Stem-Cell Transplantation in Waldenstrom Macroglobulinemia: The Lymphoma Working Party of the European Group for Blood and Marrow Transplantation	Journal of Clinical Oncology

Author	Title	Publication
Rosse C, Linch M, Kermorgant S, Cameron AJM, Boeckeler K, Parker PJ (2010)	PKC and the control of localized signal dynamics	Nature Reviews Clinical Oncology
Stebbing J, Ellis P, Tutt A (2010)	PARP inhibitors in BRCA1-/BRCA2-associated and triple-negative breast cancers	Future Oncology
Van Hemelrijck M, Adolfsson J, Garmo H, Bill-Axelson A, Bratt O, Ingelsson E et al (2010)	Risk of thromboembolic diseases in men with prostate cancer: results from the population-based PCBaSe Sweden	The Lancet Oncology
Bill-Axelson A, Holmberg L, Ruutu M, Garmo H, Stark JR, Busch C et al (2011)	Radical Prostatectomy versus Watchful Waiting in Early Prostate Cancer	New England Journal of Medicine
Cuzick J, Sestak I, Pinder SE, Ellis IO, Forsyth S, Bundred NJ et al (2011)	Effect of tamoxifen and radiotherapy in women with locally excised ductal carcinoma <i>in situ</i> : long-term results from the UK/ANZ DCIS trial	The Lancet Oncology
Giardine B, Borg J, Higg, D, Peterson K, Philipsen S (2011)	Systematic documentation and analysis of human genetic variation in hemoglobinopathies using the microattribution approach	Nature Genetics
Lagergren J (2011)	Influence of obesity on the risk of esophageal disorders	Nature Reviews Gastroenterology and Hepatology
Morris EJA, Sandin F, Lambert PC, Bray F, Klint A, Linklater K et al (2011)	A population-based comparison of the survival of patients with colorectal cancer in England, Norway and Sweden between 1996 and 2004	Gut
Sullivan R, Peppercorn J, Sikora K, Zalcberg J, Meropol NJ, Amir E et al (2011)	Delivering affordable cancer care in high-income countries	The Lancet Oncology
Carlton JG, Caballe A, Agromayor M, Kloc M, Martin-Serrano J (2012)	ESCRT-III Governs the Aurora B-Mediated Abscission Checkpoint Through CHMP4C	Science
Jerez A, Gondek LP, Jankowska AM, Makishima H, Przychodzen B, Tiu RV et al (2012)	Topography, Clinical, and Genomic Correlates of 5q Myeloid Malignancies Revisited	Journal of Clinical Oncology
Lee SM, Khan I, Upadhyay S, Lewanski C, Falk S, Skiles G et al (2012)	First-line erlotinib in patients with advanced non-small-cell lung cancer unsuitable for chemotherapy (TOPICAL): a double-blind, placebo-controlled, phase 3 trial	The Lancet Oncology

Author	Title	Publication
Litiere S, Werutsky G, Fentiman I, Rutgers E, Christiaens M-R, Van Limbergen E et al (2012)	Breast conserving therapy versus mastectomy for stage I-II breast cancer: 20 year follow-up of the EORTC 10801 phase 3 randomised trial	The Lancet Oncology
Montoto S, Shaw K, Okosun J, Gandhi S, Fields P, Wilson A et al (2012)	HIV Status Does Not Influence Outcome in Patients With Classical Hodgkin Lymphoma Treated With Chemotherapy Using Doxorubicin, Bleomycin, Vinblastine, and Dacarbazine in the Highly Active Antiretroviral Therapy Era	Journal of Clinical Oncology
Nik-Zainal S, Alexandrov LB, Wedge DC, Van Loo P, Greenman CD, Raine K et al (2012)	Mutational processes molding the genomes of 21 breast cancers	Cell
Nik-Zainal S, Van Loo P, Wedge DC, Alexandrov LB, Greenman CD, Lau KW et al (2012)	The life history of 21 breast cancers	Cell
Riaz SP, Linklater KM, Page R, Peake MD, Moller H, Lüchtenborg L (2012)	Recent trends in resection rates among non-small cell lung cancer patients in England	Thorax
Williams GT, Farzaneh F (2012)	Are snoRNAs and snoRNA host genes new players in cancer?	Nature Reviews: Cancer
Alexandrov L, Nik-Zainal S, Wedge D, Aparicio S, Behjati S (2013)	Signatures of mutational processes in human cancer	Nature
Coupland VH, Lagergren J, Lüchtenborg M, Jack RH, Allum W, Holmberg L et al (2013)	Hospital volume, proportion resected and mortality from oesophageal and gastric cancer: a population-based study in England, 2004–2008	Gut
Day E, Dear PH, McCaughan F (2013)	Digital PCR strategies in the development and analysis of molecular biomarkers for personalized medicine	Methods
Goss PE, Lee BL, Badovinac-Crnjevic T, Strasser-Weippl K, Chavarri-Guerra Y, Louis JS et al (2013)	Planning cancer control in Latin America and the Caribbean	The Lancet Oncology

Author	Title	Publication
James RD, Glynne-Jones R, Meadows HM, Cunningham D, Myint AS, Saunders MP et al (2013)	Mitomycin or cisplatin chemoradiation with or without maintenance chemotherapy for treatment of squamous-cell carcinoma of the anus (ACT II): a randomised, phase 3, open-label, 2x2 factorial trial	The Lancet Oncology
Lagergren J, Lagergren P (2013)	Recent developments in esophageal adenocarcinoma	CA – A Cancer journal for clinicians
Luengo-Fernandez R, Leal J, Gray A, Sullivan R (2013)	Economic burden of cancer across the European Union: a population-based cost analysis	The Lancet Oncology
San Miguel J, Weisel K, Moreau P, Lacy M, Song K, Delforge M et al (2013)	Pomalidomide plus low-dose dexamethasone versus high-dose dexamethasone alone for patients with relapsed and refractory multiple myeloma (MM-003): a randomised, open-label, phase 3 trial	The Lancet Oncology
Seymour MT, Brown SR, Middleton G, Maughan T, Richman S, Gwyther S et al (2013)	Panitumumab and irinotecan versus irinotecan alone for patients with KRAS wild-type, fluorouracil-resistant advanced colorectal cancer (PICCOLO): a prospectively stratified randomised trial	The Lancet Oncology
Stanworth SJ, Estcourt LJ, Powter G, Kahan BC, Dyer C, Choo L et al (2013)	A No-Prophylaxis Platelet-Transfusion Strategy for Hematologic Cancers	New England Journal of Medicine
Iannelli F, Collino A, Sinha S, Radaelli E, Nicoli P (2014)	Massive gene amplification drives paediatric hepatocellular carcinoma caused by bile salt export pump deficiency	Nature Communications
Coutinho R, Pria AD, Gandhi S, Bailey K, Fields P, Cwynarski K et al (2014)	HIV status does not impair the outcome of patients diagnosed with diffuse large B-cell lymphoma treated with R-CHOP in the cART era	Aids
Iannelli F, Collino A, Sinha S, Radaelli E, Nicoli P, D'Antiga L et al (2014)	Massive gene amplification drives paediatric hepatocellular carcinoma caused by bile salt export pump deficiency	Nature Communications
Lippitz B, Lindquist C, Paddick I, Peterson D, O'Neill K, Beaney R (2014)	Stereotactic radiosurgery in the treatment of brain metastases: The current evidence	Cancer Treatment Reviews

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