Scoping the future

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An evaluation of endoscopy capacity across the NHS in England

Written by the Health Services Management Centre at the University of Birmingham and the Strategy Unit at NHS Midlands and Lancashire Commissioning Support Unit

September 2015
Commissioned by Cancer Research UK

CANCER RESEARCH UK

A report for Cancer Research UK

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Executive summary

Around half of us will be diagnosed with cancer in our lifetimes[i]. There are around 280,000 new cancer diagnoses in England every year[ii] and this is set to increase considerably as we live longer. Cancer survival is at its highest ever level, but the NHS in England is under considerable pressure. The '62-day wait' target - which states that 85% of cancer patients should receive treatment within 62 days of being urgently referred for suspected cancer by their GP – has now been breached for six consecutive quarters. This is indicative of pressures across the pathway – from seeing a specialist, to receiving a test, to getting results, and ultimately commencing treatment. New NICE guidelines on referral for suspected cancer are likely to exacerbate demand, as are changes to the bowel cancer screening programme. Action is now needed to ensure services are equipped to cope with rising demand.

Cancer Research UK commissioned this research to understand the pressures facing endoscopy services in England as a result of rising demand and to identify solutions for addressing these issues. Managing future demand and ensuring diagnostics can cope will be essential to improve cancer outcomes through early diagnosis. When cancer is diagnosed at an early stage, treatment options and chances of a full recovery are greater.

A number of challenges facing endoscopy services were identified through this research. These included:

- Rising demand for endoscopy services and a lack of capacity to respond to this increasing demand;
- More than 750,000 additional endoscopy procedures a year will be undertaken by 2020 – this is more than the population of Leeds and represents a 44 per cent increase on current activity;
- Workforce issues, including recruitment, retention, evening and weekend working and training and development;
- A need to improve productivity and efficiency, but a lack of 'headspace' to do so;
- Issues with data availability, quality and use.

Background

Endoscopy plays a vital role in the diagnosis of, and ongoing surveillance for gastrointestinal cancers, including bowel and oesophageal cancer. Endoscopy is also performed for the diagnosis, surveillance and treatment of a wide range of conditions and diseases that are not cancer-related. This study therefore considers the entire endoscopic service, and not just the ability of units to respond to increased demand for endoscopies related to cancer diagnoses or surveillance.

Demand for lower gastrointestinal endoscopies i.e. colonoscopy and flexible sigmoidoscopy has been reported as doubling between 2012 and 2017[iii]. In a financially constrained environment (the NHS is required to find £22bn in efficiency savings) increased demand will inevitably place pressure on endoscopy units.

A significant amount of work has been undertaken in the last 20 years to develop endoscopy services in order to improve quality, productivity and patient experience. However, in spite of these improvements, a more recent rapid review by the NHS Improvement Agency (2012) concluded that services were still encountering some key challenges in planning for increased demand and increasing capacity.

Research aims

Given the importance of endoscopy services within the cancer pathway it is critical that the organisation of this aspect of diagnosis, surveillance and treatment

delivers the capacity required. In light of this context and evidence, Cancer Research UK commissioned a research team from the Health Services Management Centre, University of Birmingham and the Strategy Unit at NHS Midlands and Lancashire Commissioning Support Unit to undertake an evaluation of endoscopy capacity across the NHS in England to address the following key aims:

- Improve knowledge of current upper and lower gastrointestinal (G.I) endoscopy capacity in England;
- Ascertain by how much demand is likely to grow;
- Identify levels of resource (including staffing, equipment and facilities) necessary to meet growing demand;
- Estimate shortfalls in these resources, and;
- Understand what is causing this and how it can be addressed.

The findings of this report were shared with the Independent Cancer Taskforce, to inform the recently published cancer strategy, *Achieving World-Class Cancer Outcomes: a Strategy for England 2015-2020*. While this report shows a considerable gap between current capacity and demand for endoscopy services, if the Government and NHS bodies act to implement the recommendations of *Achieving World-Class Cancer Outcomes*, significant progress will be made towards delivering world class diagnostic services.

Recommendations

Meeting rising demand

Though many units described the steps they had already taken to respond to rising demand, the overriding impression from interviewees and survey respondents is of a service under increasing pressure. While units appear to have been managing waiting times to cope with increases in demand this has often meant putting on regular waiting list initiative sessions at weekends and in the evenings, or bringing in external staff through private companies to use their facilities during these times. These arrangements come with attendant additional costs which are ultimately unsustainable.

1. The Government should increase investment in diagnostic services, as set out in *Achieving World-Class Cancer Outcomes*, to ensure the NHS can meet rising demand and that our cancer outcomes become the best in the world. This should include a dedicated £125 million diagnostics fund over five years. For endoscopy specifically, investment will be needed to recruit and train new members of the workforce and replace ageing equipment.

2. NHS England and Public Health England should ensure learnings from the bowel screening programme are applied across the symptomatic pathway so there is not a two-tier system and patients receive a consistently high level of care regardless of their route into the health system.

Workforce

Staff shortages were commonly cited as the biggest barrier for units in managing demand. Though there were some issues mentioned in specific areas about a lack of physical space, many units have addressed this in recent years. However, using this additional capacity requires the appropriate workforce, including Consultant Gastroenterologists, Consultant GI Surgeons, Non-medical Endoscopists (including Nurse Endoscopists) and Senior Endoscopy Nurses.

There is some degree of variation between units as to where on the pay-scale Nurse Endoscopists sit which appears to be unwarranted in some cases. There were also concerns about staff experiencing stress and 'burn out' along with the potential for physical problems to develop, such as repetitive strain injury, as a result of

increasing the extent to which staff scope patients.

3. Strategic planning around workforce should happen at the national level, as stated in *Achieving World-Class Cancer Outcomes*. Health Education England is working with NHS England to deliver a training and development programme for Non-medical Endoscopists; this work should also include a robust assessment to determine the required number of trainees based on rising demand. Similar steps should be taken to ascertain the required level of new Consultant Gastroenterologists, Consultant GI Surgeons and Senior Endoscopy Nurses.

4. Commissioners should work with local services to ensure the protection of training lists so that staff are adequately trained.

5. Leadership teams should ensure the unwarranted variation between units in Nurse Endoscopists' pay is eliminated.

6. NHS England and the Department of Health should work to ensure all staff involved in the delivery of endoscopy services are prepared for the transition to 7-day working. This should involve the management of expectations from the recruitment stage, and the provision of appropriate compensation. In addition, local services should ensure job plans are appropriately balanced to encourage retention and avoid burn out.

Service Development and Improvement

The work of the Joint Advisory Group on Gastrointestinal Endoscopy (JAG) and its accreditation process are internationally recognised as improving quality and productivity within endoscopy services as a whole, while strong clinical leadership was also highlighted as an important factor in ensuring the endoscopy service has a strong profile within its own organisation.

NHS IQ has recently produced the 'Productive Endoscopy' toolkit to support productivity and efficiency. This is now available to all units though its use is not yet widespread. However, many units felt that the 'low-hanging fruit' had already been addressed in their units and that any other improvement activities would require further resource. For example, a number of survey respondents commented that their Trusts were delaying replacing ageing equipment because of financial restraints.

The toolkit recommends the introduction of GP direct access to endoscopy where this does not already exist. The ACE (Accelerate, Co-ordinate, Evaluate) Programme is expected to produce evidence on best practice for innovative pathways, including GP direct access, which is mandated by both *Improving Outcomes: a Strategy for Cancer* and *Achieving World-Class Cancer Outcomes*. Respondents highlighted that the quality of GP referrals was variable and in places could be improved. Similarly, consultant-to-consultant referrals were also highlighted as a potential area for improvement.

7. NHS England should support services to achieve and maintain JAG accreditation. Services should also be encouraged and enabled through the commissioning process to make use of appropriate productivity tools.

8. Commissioners should consider innovative ways to meet rising demand, including alternative pathways and processes, such as supporting Straight to Test access to endoscopy through telephone triage/pre-assessment which would help to speed up diagnosis. In addition, increased collaboration between endoscopy units and strengthening links at the interface

between primary and secondary care could help to improve the quality and appropriateness of referrals.

Data Quality and Access

The datasets relating to endoscopy need improving so that it is possible to ascertain the reason why a patient has been referred for endoscopy (i.e. for surveillance, screening or symptomatic reasons). A National Endoscopy Database is in development, overseen by the JAG.

The data published on the activity and outcomes of the National Bowel Cancer Screening Programme is not as comprehensive as the data routinely published for other Cancer Screening Programmes (Breast and Cervical). Public Health England is working to produce data returns for publication, with the first return available in December 2015 (KC73) and a further return (KC72) by 2016. Data returns in their final form, will be developed by 2020. The process of assessing and processing information requests for researchers, which would not disclose patient identifiable information, could be streamlined.

9. The Health and Social Care Information Centre (HSCIC) should work with endoscopy providers to ensure that Hospital Episode Statistics (HES) contains a complete and accurate record of all NHS commissioned endoscopies, making changes to data specifications to identify whether a procedure is for surveillance, screening or symptomatic purposes.

10. Public Health England should work to ensure data on the activity and outcomes of the Bowel Cancer Screening Programme is routinely published in a format consistent with the breast and cervical screening programmes. Public Health England should also work to ensure there is timely access for researchers to appropriate data about the Bowel Cancer Screening Programme.

New Technologies

Given the scale of the anticipated increase in demand for endoscopy services (see Figure 1. below), it is essential that any new technologies that are likely to increase demand in the future are properly planned for. One such example which is likely to increase demand on services is the introduction of the Faecal Immunochemical Test (FIT) to replace the Faecal Occult Blood Test (FOBT) as the primary test in the Bowel Cancer Screening Programme.

11. Public Health England (PHE), NHS England and the National Screening Committee (NSC) should undertake a strategic planning process to ascertain how best to manage the pressures which will inevitably be created in endoscopy services by the introduction of the Faecal Immunochemical Test (FIT) into the Bowel Cancer Screening Programme. Similarly, the ongoing rollout of Bowel Scope into the Screening Programme should take into account the pressures services are currently facing. Services should be supported to roll out these tests as swiftly as possible.

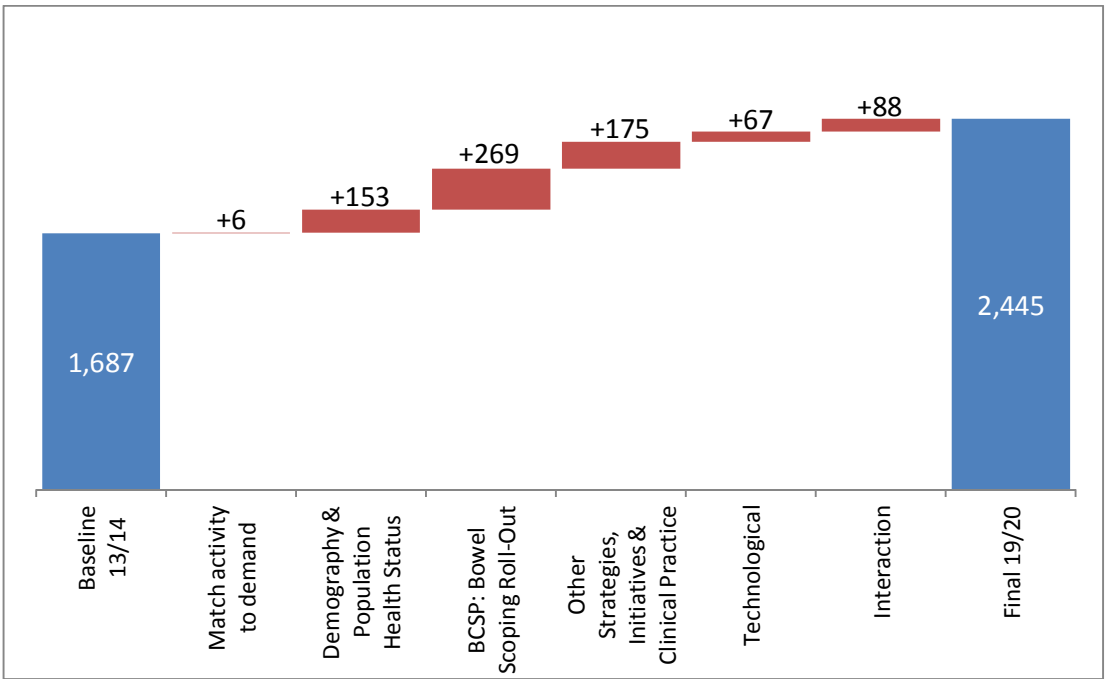

Figure 1: Modelled changes in endoscopy activity 2013/14 to 2019/20 (figures shown in thousands)

1. Introduction

Around half of us will be diagnosed with cancer in our lifetimes[iv]. There are around 280,000 new cancer diagnoses in England every year[v] and this is set to increase considerably as we live longer. Cancer survival is at its highest ever level, but the NHS in England is under considerable pressure. The '62-day wait' target - which states that 85% of cancer patients should receive treatment within 62 days of being urgently referred for suspected cancer by their GP – has now been breached for six consecutive quarters. This is indicative of pressures across the pathway – from seeing a specialist, to receiving a test, to getting results, and ultimately commencing treatment. Action is now needed to ensure services are equipped to cope with rising demand.

Endoscopy plays a vital role in the diagnosis of, and ongoing surveillance for gastrointestinal cancers, including bowel and oesophageal cancer. An endoscope is a long, thin, flexible tube with a light source and video camera at one end to relay images from the inside of the body. An endoscope can be used to remove a small sample of tissue for biopsy and can also be used therapeutically to carry out certain surgical procedures such as the removal of polyps from the bowel. Endoscopic tests are therefore used:

- To assess symptomatic patients referred by their GP on the urgent 'two-week wait' pathway,
- To assess symptomatic patients presenting through other routes;
- To assess non-symptomatic patients as part of the National Bowel Cancer Screening Programme in England;
- For surveillance of people who exhibit risk factors for lower and upper GI cancers such as Crohn's disease, ulcerative colitis and Barrett's Oesophagus;
- In emergency situations when in-patients develop a gastrointestinal (GI) bleed that requires immediate investigation.

The exact nature of the service provided by endoscopy units and their configuration varies across the country. Some acute-based units are stand-alone units while others operate as part of a Day Surgery unit. There are a number of NHS endoscopy units based outside of hospitals within the community and a number of independent units that deliver NHS endoscopic services. Many acute-based units also deliver a wider range of procedures than Upper GI and Lower GI endoscopic tests alone, such as cystoscopies[1] and bronchoscopies[2], though the primary focus of this study is GI endoscopy. Endoscopic tests, and other activity undertaken within endoscopy units, are not just provided for patients with, or suspected of having, cancer. Endoscopic tests are performed for the diagnosis, surveillance and treatment of a wide range of conditions and diseases that are not cancer-related. This study therefore considers the entire endoscopic service, and not just the ability of units to respond to increased demand for endoscopies for cancer pathways.

Historically, endoscopy services were perceived to be performing below expected standards with reports of low caecal intubation rates, insufficient training and long waiting times. The establishment of the Joint Accreditation Group for GI Endoscopy (JAG)[3] in 1994 saw the start of a significant amount of work to develop endoscopy services in order to improve quality, productivity and patient experience. This included the rigorous

[1] A cystoscopy is a procedure that examines the inside of the bladder
[2] A bronchoscopy is a procedure that examines the lungs
[3] The Joint Advisory Group on GI Endoscopy

process of accreditation[4] that units now aspire to achieve and maintain, as well as initiatives to support training and quality improvement such as programmes led initially by the Modernisation Agency and later, NHS Improvement and NHS Improving Quality.

However, in spite of the improvements witnessed in endoscopy services as a result of these efforts, a more recent rapid review of endoscopy services by the NHS Improvement Agency[vi] concluded that endoscopy services were still encountering some key challenges in planning for increased demand and increasing capacity.

It is expected that the number of endoscopic procedures required in the UK will increase significantly over the next few years. For example, demand for lower gastrointestinal endoscopies i.e. colonoscopy and flexible sigmoidoscopy has been reported as doubling between 2012 and 2017[vii] while it is estimated the increase would be in the region of an extra 400,000 flexible sigmoidoscopy procedures and 20,000 colonoscopies each year[viii]. There are a number of factors which will contribute towards this increase. These include:

- The prevalence and incidence of diseases: The prevalence of bowel cancer is increasing and is anticipated to reach 188,000 cases in men and 152,000 cases in women by 2020[ix];
- Demographic factors: The UK population is projected to increase to 68 million by mid-2022, equivalent to an annual growth rate of 0.6%[x]; the proportion aged 65 or over is projected to be around one fifth to one quarter of the population across all regions of the UK;
- National screening programmes: The National Bowel Cancer Screening Programme (BCSP) has expanded in reach since its introduction in 2006 when it offered biennial Faecal Occult Blood testing (FOBT)[5] screening to 60-69 year olds. In 2009 roll out began to include 70-74 year olds. The introduction of the bowel scope screening programme in 2013 offers a one-off flexible sigmoidoscopy screening test for people over 55. The national rollout of the Bowel Scope Screening Programme is expected to increase the number of flexible sigmoidoscopy procedures by 325,000 procedures a year by 2016/17[xi]
- National campaigns, such as Be Clear on Cancer, have sought to increase public awareness of the signs and symptoms of various forms of cancer;
- Current national policy and guidance: (National Institute for Health and Care Excellence) NICE guidance includes recommendations for types of test and referral guidelines, including indicators for urgent and 2-week pathway referrals; new guidance on suspected cancer is in progress, which may impact primary care referrals, and
- Surveillance protocols for people at enhanced risk[xii].

In a financially constrained environment, (the NHS is required to find £22bn in efficiency savings by 2020 to contribute towards the £30bn identified funding gap[xiii]) this will inevitably place pressure on endoscopy units to manage the increased demand. The median waiting time in England substantially decreased between 2006 and 2009 for the four endoscopy diagnostic tests, especially colonoscopy. However, since 2009, the median waiting time for all tests has increased[xiv]. There is also evidence to suggest that patients on surveillance programmes are experiencing

[4] JAG accreditation is the formal recognition that an endoscopy service has demonstrated that it has the competence to deliver against the measures in the endoscopy GRS (Global Rating Scale) Standards. The GRS also includes a knowledge management system which allows good practice to be shared.

[5] The guaiac FOBT or faecal occult blood test

delays in their diagnostic tests, due to the requirement to see new patients within monitored target times[xvxvi].

This report aims to ascertain the barriers to meeting rising demand for endoscopy services and offers solutions for how best these can be overcome. It complements the 2020 Delivery report for Cancer Research UK, '*Horizon scanning: an evaluation of imaging capacity across the NHS in England*' which undertook a similar assessment of diagnostic imaging services. Taken together, these reports describe a picture of England's diagnostic services facing considerable strain and requiring significant action if patient outcomes are to improve and not deteriorate.

1.1 National policy and guidance

National policy and guidance on endoscopy is important to ensure there is a clear vision for the service and so that services know what best practice entails. This is especially important in the light of new technologies being introduced into the bowel cancer screening programme and to eradicate unacceptable variation where this exists.

Table 1 lists current NICE guidance and quality standards which include recommendations on gastrointestinal endoscopy. The guidance outlines the indicators for immediate and urgent referrals (e.g. upper gastrointestinal bleeding) and 2-week pathway referrals for suspected cancer. For diagnostic endoscopy, colonoscopy and flexible sigmoidoscopy are recommended, with CT colonography as an alternative for patients not suitable for colonoscopy. Barium enema is not recommended in the diagnosis and management of cancer.

Table 1 – current NICE guidance

	Guidance document
Cancer	Referral guidelines for suspected cancer CG27[xvii]
	Colorectal cancer CG131[xviii]
	Colorectal cancer QS20[xix]
Coeliac Disease	Coeliac disease CG86[xx] (*To be updated Sep 2015)*
Dyspepsia and GORD	Dyspepsia and GORD CG184[xxi]
	GORD in children and young people NG1[xxii]
Gallstones	Gallstones CG188[xxiii]
Barretts Oesophagus	Barretts Oesophagus CG106[xxiv]
Inflammatory bowel disease	Inflammatory bowel disease QS81[xxv]
	Colonoscopic surveillance CG118[xxvi]
Irritable bowel syndrome	Irritable bowel syndrome CG61[xxvii]
Acute upper GI bleeding	Acute upper gastrointestinal bleeding CG141[xxviii]
	Acute upper gastrointestinal bleeding QS38[xxix]

An update of the referral guidance for suspected cancer was published in June 2015. The new guidance includes a number of changes, which may impact the number of referrals from primary care, including:

- The duration of symptoms has been removed for both lower and upper gastrointestinal suspected cancers (previously 6 weeks);
- GPs should be offered urgent direct access to upper gastrointestinal endoscopies;
- The surveillance of Barrett's Oesophagus is no longer recommended in cases where the risks of the procedure may outweigh the benefits.

In addition to NICE, guidance is also issued by professional bodies, for example, the British Society of Gastroenterology's guidelines on the diagnosis and management of Barrett's Oesophagus[xxx]; the Association of Upper Gastrointestinal Surgeons of Great Britain and Ireland's guidelines for the management of oesophageal and gastric cancer[xxxi]. There are also international guidelines, including position statements from European Society of Gastrointestinal Endoscopy (ESGE) on quality in screening colonoscopy[xxxii].

There is some concern in the literature regarding adherence to such guidance. The Atlas of Variation for Diagnostic Services[xxxiii] shows a 172-fold variation in the use of barium enema, which is no longer considered an effective test for detecting cancer. Bowel Cancer UK[xxxiv] found that one third of patients who had a barium enema test had to return later for another

test (in a survey of 708 people). It is suggested that this variation may be due to insufficient access to CT and optical colonoscopies. CT colonography is accepted as an alternative where colonoscopy is not appropriate[xxxv] but it is noted that further investigations may be required to confirm diagnosis, which could lead to variation. Nationally, steps are being taken to address the continued use of barium enema.

A clinical audit conducted across the Kent and Medway Cancer Network[xxxvi] assessed compliance with guidance from the Association of Coloproctology of Great Britain and Ireland (ACPGBI) and the British Society of Gastroenterology (BSG) on colorectal cancer screening and surveillance. The review of 3,020 case notes identified that whereas 22% of planned surveillance colonoscopies were in line with guidance, 51% could be cancelled from the list and 27% could be given a revised date. Each of the endoscopy services who participated was given their results with the recommendation that they update their waiting lists accordingly and offer patients whose procedures were cancelled the opportunity to attend a consultation to discuss this. Before the audit, the mean waiting time was 76.8 days; following the audit and its recommendations, this was reduced to 56 days.

In another study[xxxvii], a survey of ACPGBI and BSG members to assess knowledge of current guidance, showed that whilst clinicians were confident of their knowledge - for example 39.8% recalled the criteria for the surveillance of colonic polyps correctly and 53.5% assessed family risk correctly - 46.5% would recommend 5-yearly colonoscopies for familial risk whereas the guidance suggests a single colonoscopy at age 35 and a further colonoscopy at age 55.

The evidence does suggest a potential risk that awareness of national guidance is not optimal and this may result in unnecessary procedures which, as well as being unpleasant for patients, can present unnecessary risk. For endoscopy services, there are risks of avoidable costs and the impact on waiting lists as well as the opportunity costs of delays in diagnosing urgent cases.

The National Bowel Cancer Screening Programme

As would be expected, evaluations of the National Bowel Cancer Screening Programme show an increase in demand for endoscopy tests. The evaluation of the pilot[xxxviii] noted the impact on workload and capacity, recommending that an examination of existing activity and capacity would be required to manage the impact of the rollout of national screening. The second round evaluation[xxxix] noted an increase in endoscopy workload of 14% in one hospital and 28% at a second hospital. Alongside the additional screening activity, increased demand for non-screening colonoscopies has been observed; there are also reported variations in waiting times for screening and elective patients, with elective patients having to wait longer for tests. In addition to the direct impact on endoscopy services, workload unsurprisingly increased in pathology and radiology services[xl].

Bowel Cancer UK[xli] discusses the impact of changes to the bowel screening programme on endoscopy services, quoting a Department of Health estimate in 2011 to expect a 10-15% year on year increase in demand for endoscopies. This translates into 110 extra clinical sessions for a medium Trust (a clinical session is defined as 4 hours typically comprising 10-12 units[6] of activity). It was estimated that the number of endoscopy rooms would need to increase from

[6] A point is a unit of time approximately equal to 18 minutes.

620 to 670 by 2015. It was also suggested that demand and capacity should be considered in the context of waiting list initiatives, NHS reforms, Quality, Innovation, Productivity and Prevention (QIPP) efficiency schemes and the lack of capital spend budgets. The impact of increased demand affects patients, not only directly, through delays in diagnosis but through the bottlenecks created in the system, which affect patients' flow. The impact is felt by patients on the 2-week pathway, on the standard waiting list and on surveillance lists.

The increased demand from the national screening programme seems to be reflected in other countries with national programmes, although there are differences in uptake and the extent of the impact; for example, in Italy[xlii], the rollout of a screening programme increased colonoscopy activity over a five year period by 118% and increased demand in laboratory services for FOBT testing by 40%; in the Netherlands[xliii], the number of colonoscopies increased by 46% over a five year period whereas the number of endoscopists had risen by only 4.6%. Across Europe, there are moves to establish further national screening programmes and to establish a joint committee to oversee implementation[xliv].

The uptake of the bowel cancer screening programme in England is comparable to colorectal cancer screening programmes in other countries[xlv]; in 2014/15, overall uptake for FOBT bowel screening was around 58%. However, uptake for bowel cancer screening is lower than for other screening programmes and there is a commitment to address this - for example, the evaluation of the third round of the programme[xlvi] suggests that it is possible to convert up to 10% of non-responders, through repeated invitations.

In the UK, the ASCEND study[7] is exploring strategies to reduce the social gradient in bowel cancer screening. Funded by the National Institute for Health Research, the study is a collaboration between University College London, Imperial College London, Queen Mary's University London and all five screening hubs in England. The study is testing four interventions in randomised controlled trials: the 'Essentials' leaflet, providing information about bowel cancer screening; the 'People's Stories' leaflet, which shares patient stories; a GP endorsement with the current invitation letter; and a revised reminder letter.

There is evidence of lower uptake in low socioeconomic groups; one study suggests more needs to be done to address uptake to avoid increasing health inequalities[xlvii]. However, there are some regional differences – for example, higher uptake in the North of England – which cannot be explained solely by variations in deprivation. Uptake tends to be higher in women than men and it is suggested this may be due to greater familiarity with screening, through cervical and breast screening programmes. An evaluation of the uptake of the screening pilot[xlviii] found low uptake of FOBT testing and low uptake of colonoscopy for individuals from ethnic groups. There have been experiments[xlix] (in the US) to offer colorectal screening alongside mammography screening for women as a way of expanding uptake among ethnic minority groups.

The National Bowel Cancer Screening Programme has run awareness campaigns to encourage uptake of screening and the National Screening Committee has commissioned an evidence review into best practice to increase uptake, which will report by the end of 2015.

National awareness campaigns

The National Awareness and Early Diagnosis (NAEDI) Be Clear on Cancer (BCoC) campaigns - which aim to increase symptom awareness and presentation among members of the public -

[7] http://www.ucl.ac.uk/dahr/research-pages/ascend

have also resulted in increased activity. The bowel campaign ran nationally twice in 2012 and an oesophageal campaign which has the potential to drive up demand for upper GI endoscopy ran in 2015. The evaluation of this campaign is underway. An evaluation of the pilot bowel awareness campaign[l] showed an increase in elective waiting lists for colonoscopy in the East and South West Strategic Health Authorities (pilot sites) during February and March 2011. The analysis shows an increase in activity to respond to increased demand in March; however, as activity levels could not be sustained, there was an impact on waiting lists. Alongside the increase in the number of procedures, the evaluation estimates an increase in adverse events, estimating an increase of 5-6 bowel perforations as a result of the additional colonoscopy activity, from February to June 2011, compared to the same period in 2010.

A comparative analysis[li] in the University Hospitals Coventry and Warwickshire NHS Trust measured impact before (February to July 2011) and after (February to July 2012) the national Be Clear on Cancer bowel awareness campaign. The number of 2-week wait referrals increased by 47% (from 882 before the campaign to 1297 after the campaign). There was a 6.5% increase in the uptake of screening and a 62.5% (from 17 to 9) decrease in the number of patients with colorectal cancer presenting as an emergency.

2. Modelling Potential Changes in Gastro-Intestinal Endoscopy Activity in England between 2013/14 and 2019/20

Background to the model

The primary objective of the analysis is to estimate the levels of activity required to meet demand for NHS commissioned gastro-intestinal endoscopy services in 2019/20. The analysis also aims to identify and quantify the contribution of key drivers to demand growth and to describe any variation in demand growth by test type, purpose (screening, symptomatic and surveillance) and medical condition.

The model focuses on diagnostic and therapeutic endoscopy of the gastro-intestinal tract commissioned for adults by the NHS in England. The model is extended to include barium enema[8] and CT colonoscopy. Independent sector activity is included only where it is commissioned by the NHS. Endoscopies of the hepato-pancreato-biliary (HPB) system are also included.

Although waiting time data (DM01 statistics) suggests that supply side factors constrain endoscopy activity, the model assumes no supply-side constraints to allow conclusions to be drawn about the level of staffing and infrastructures required to meet demand.

A detailed account of the methodology used can be found in Appendix 1.

2.1 Model Results

Baseline activity estimates – 2013/14

We estimate that the NHS commissioned approximately 1.7 million GI endoscopy procedures in 2013/14. The vast majority of these procedures (1.37m) were conducted because patients were exhibiting specific symptoms requiring either diagnosis or treatment. A further 260

[8] Although not a form of endoscopy, barium enema activity is included in the model to allow for estimates of the impact of anticipated decommissioning of this activity in favour of lower GI endoscopy or CT colonoscopy.

thousand endoscopies were carried out as part of surveillance programmes. The remaining 60 thousand procedures were conducted as part of the bowel screening programmes.

There were approximately 890 thousand lower GI, 740 thousand upper GI and 60 thousand HPB endoscopies conducted in 2012/13. Of the lower GI procedures, colonoscopy was the most common (c. 530k) followed by flexible sigmoidoscopy (c. 300k), CT colonoscopy (c. 60k) and barium enema (c. 2k). Approximately 6 thousand of the upper GI procedures and 10 thousand of the HPB procedures used endoscopic ultra-sonography.

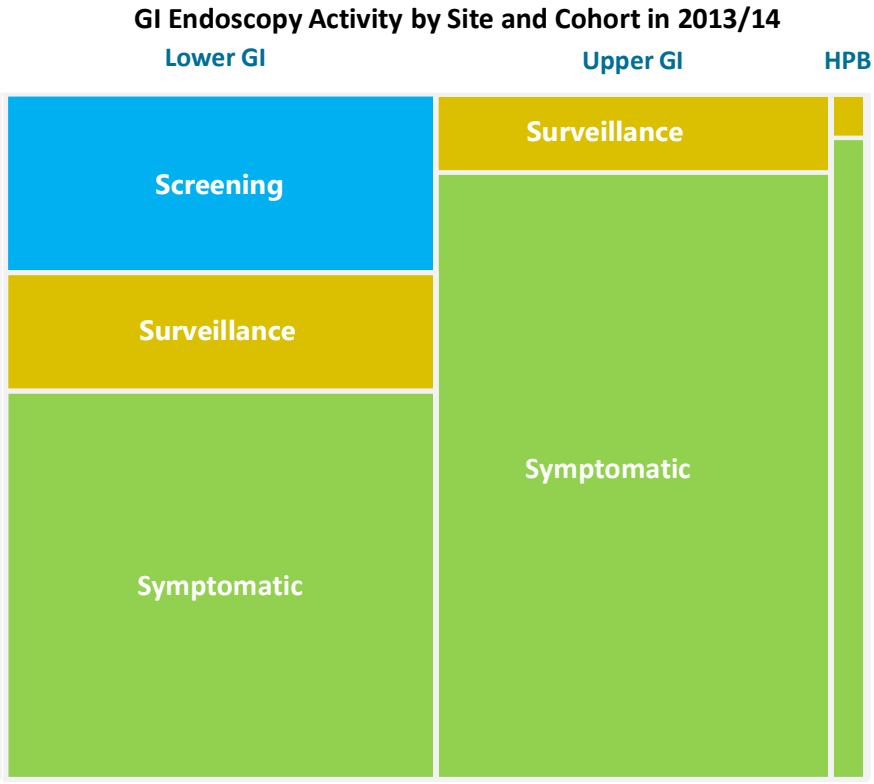

Figure 2: GI Endoscopy Activity by type

Forecast activity estimates – 2019/20

The model (See Fig 3) forecasts that by 2019/20, the demand for GI endoscopy will exceed 2.4 million procedures per annum. This represents a growth of 44% over the baseline position and a growth rate of 6.5% per annum, substantially greater than historical growth rates in DM01 GI endoscopy activity (2.8% per annum between 2006/7 and 2013/14).

The model suggests that approximately one quarter of the forecast growth (c. 1.5% per annum) arise as a function of changes in demography and population health status; factors that might be considered to be outside of the immediate control of the health system. The remaining growth is driven by deliberate strategies to improve population health or through the roll-out of new technologies. The single largest contributor or growth in endoscopy activity is the roll-out of the bowel scope programme.

Figure 3: Modelled Changes in Endoscopy Activity 2013/14 to 2019/20 (figures in thousands)

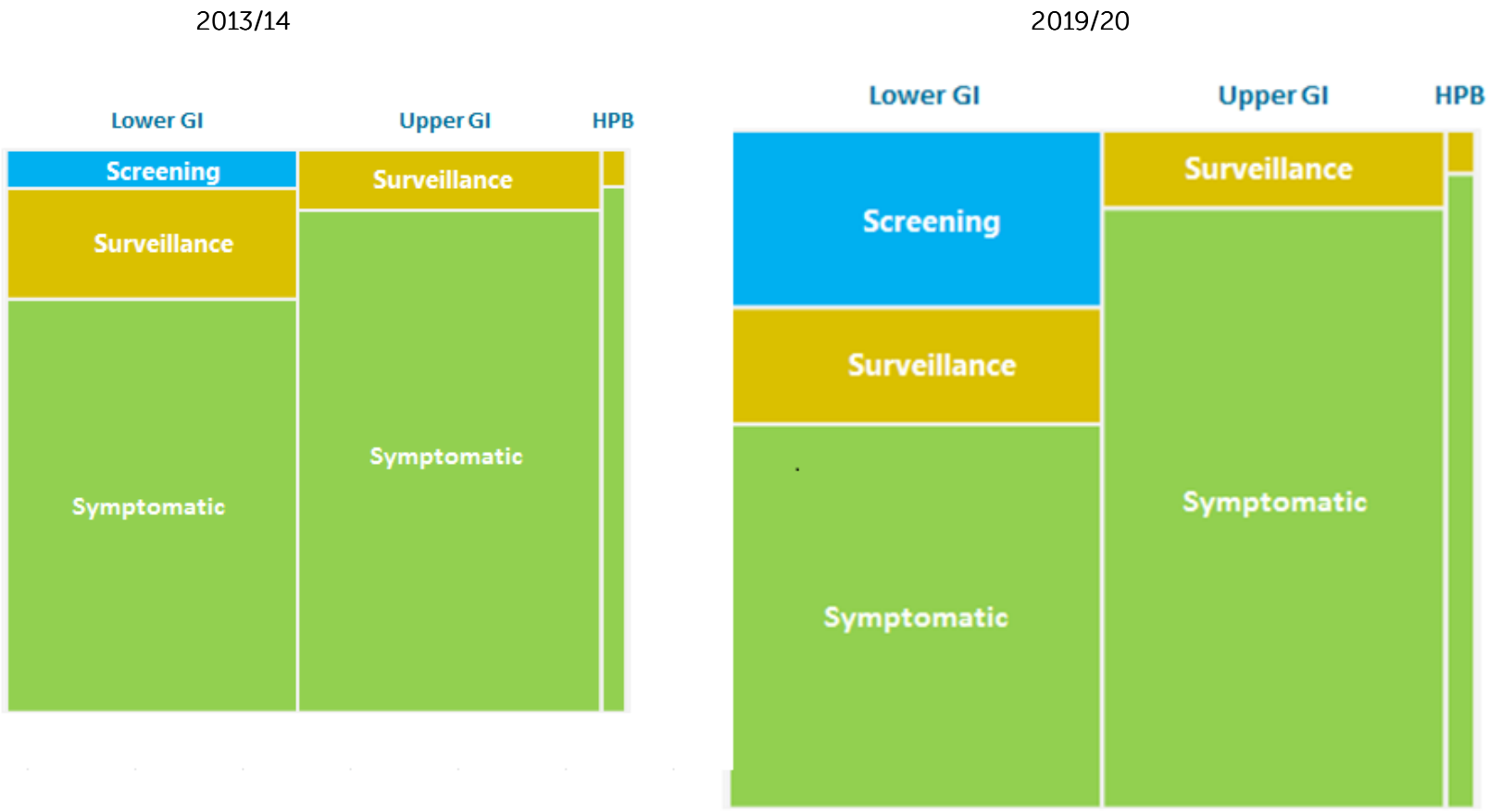

Figure 4: Change in GI Endoscopy Activity by Site and Cohort

		Total	Purpose			Procedure							
			Screening	Symptomatic	Surveillance	Flexi Sigmoidoscopy	Colonoscopy	CT Colonoscopy	Barium Enema	Upper GI Endoscopy	Upper GI EUS	HPB ERCP	HPB EUS
	Baseline 2013/14	1,687	61	1,367	258	298	528	60	2	736	6	46	10
	Match activity to demand	6	0	6	0	1	2	0	0	4	0	0	0
Demography & Population Health Status	Population Size	70	3	57	11	12	22	2	0	31	0	2	0
	Population Age Profile	68	3	53	12	11	19	4	0	31	0	3	0
	Cancer Incidence	2	0	2	0	1	3	0	0	-2	0	0	0
	Cancer Survivorship	8	0	0	8	2	5	0	0	1	0	0	0
	Barrett's Oesophagus Incidence	3	0	3	0	0	0	0	0	3	0	0	0
Strategies / Initiatives / Clinical Practice	Screening > Surveillance	37	0	0	37	9	27	1	0	0	0	0	0
	BCSP : FOBT > FIT	102	87	0	15	7	91	4	0	0	0	0	0
	BCSP : Raise FIT Positivity Threshold	-96	-87	0	-9	-6	-86	-4	0	0	0	0	0
	BCSP : Bowel Scoping Roll-Out	269	265	0	4	256	13	0	0	0	0	0	0
	Increase & reduce variation in 2WW referral	45	0	45	0	8	13	2	0	21	0	1	0
	Barrett's Surveillance	10	0	0	10	0	0	0	0	10	0	0	0
	New NICE Cancer Referral Guidelines	24	0	24	0	8	14	2	0	0	0	0	0
	Public Awareness Campaigns	53	2	51	0	7	14	0	0	30	0	1	1
Technological	Decommissioning Barium Enema	0	0	0	0	0	0	3	-3	0	0	0	0
	Increasing CT Colonoscopy	67	7	54	6	0	6	61	0	0	0	0	0
	Interaction	87	50	24	13	52	15	14	0	7	0	0	0
	Final 2019/20	2,445	391	1,689	364	665	685	148	0	873	7	54	12
	Growth	758	329	321	106	367	157	89	-2	137	1	8	2
	% Growth	45%	537%	24%	41%	123%	30%	149%	-100%	19%	16%	16%	17%

Figure 5: Factors influencing growth in GI endoscopy activity by cohort and procedure type (figures shown in thousands)

Activity Changes Subgroup Analysis

Lower GI activity is expected to grow at a faster rate than upper GI & HPB activity (69% and 19% respectively), with flexible sigmoidoscopy, colonoscopy and CT colonoscopy growing by 123%, 30% and 149% respectively between 2013/14 and 2019/20. Forms of upper GI and HPB endoscopy are expected to grow by between 15% and 20%.

Although symptomatic endoscopies remain the most common, screening initiated endoscopies are anticipated to grow at the fastest rate; from c. 60,000 procedures in 2013/14 to c. 330,000 procedures in 2019/20 (see Fig 3). This growth in screening also serves to increase surveillance endoscopies.

In the 2013/14 the age group generating the greatest demand for endoscopies is 60-69 year olds (See Fig 6 below). By 2019/20, 50-59 years olds generate the greatest demand (as a result of the roll-out of the bowel scope programme), followed by 70-79 years olds (as a result of the aging population and the increased availability of CT colonoscopy).

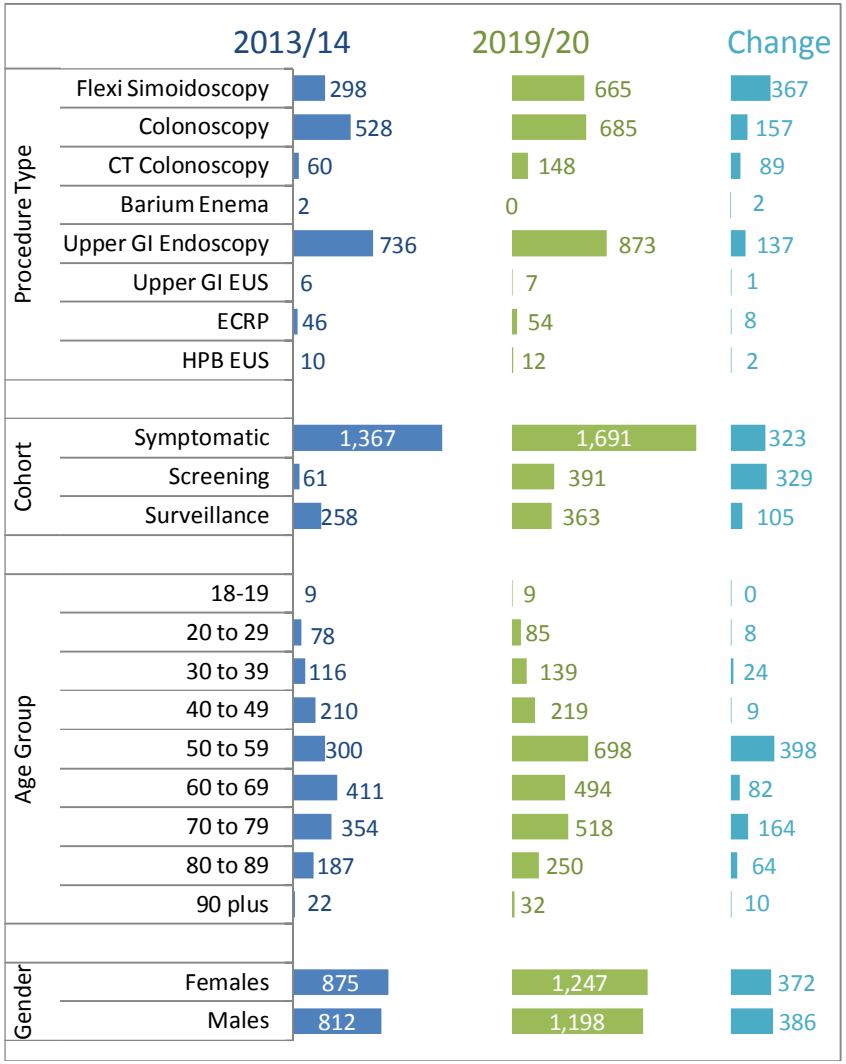

Figure 6: GI Endoscopy activity in 2013/14 and 2019/20 by procedure type, cohort, age and gender (figures shown in thousands)

Sub-national Geographical Analysis

Absolute variation in activity rates by CCG in 2013/14 is greater for lower GI endoscopies than for upper GI & HPB endoscopies, although relative rates of variation are similar[9] (See Fig 7). By 2019/20 the model suggests that variation between CCGs will have reduced[10], most notably for lower GI endoscopy.

Growth rates for lower GI endoscopies between 2013/14 and 2019/20 are expected to be particularly high in certain parts of the East Midlands and London.

[9] Coefficient of variation 2013/14 : Lower GI 0.23; Upper GI & HPB 0.23
[10] Coefficient of variation 2019/20 : Lower GI 0.18; Upper GI & HPB 0.22

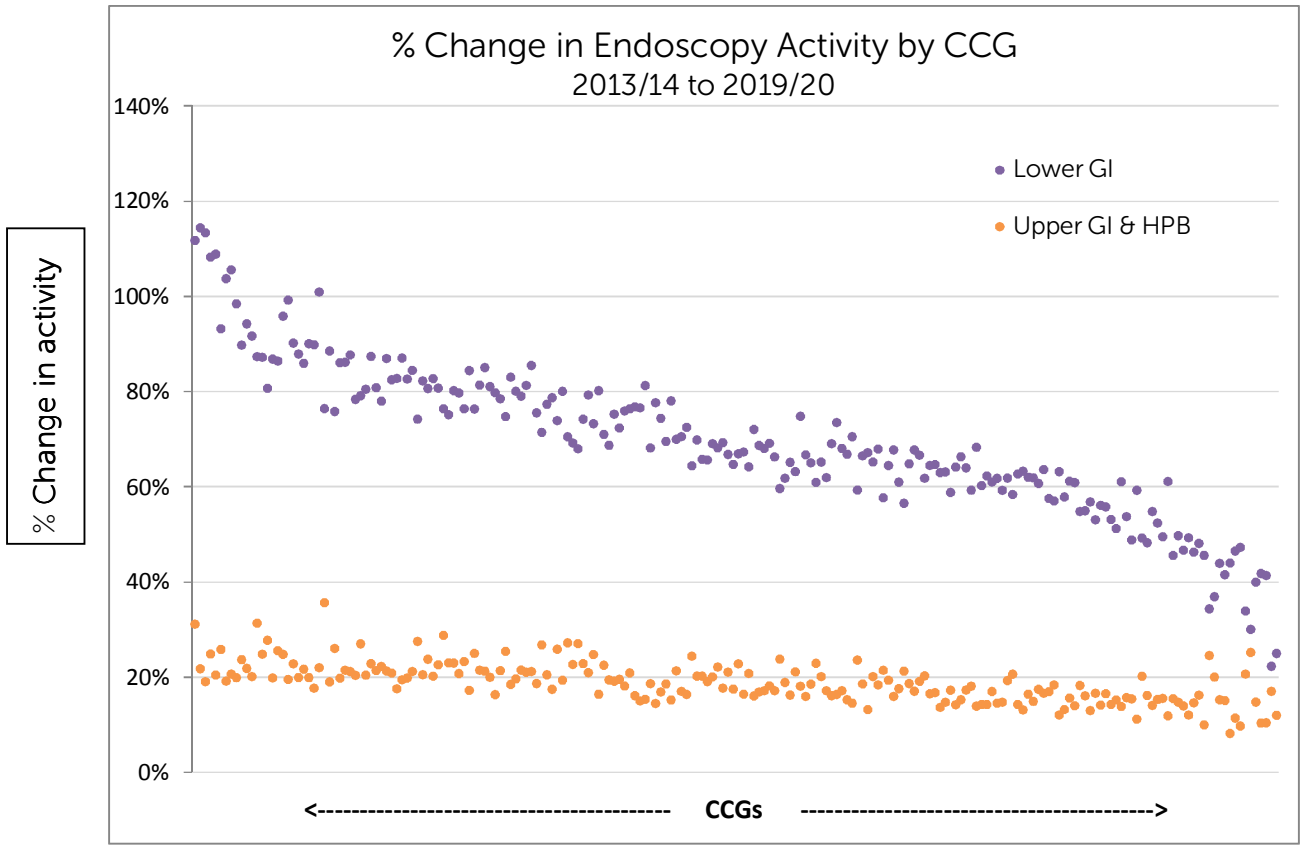

Figure 7: Modelled changes in endoscopy activity by CCG between 2013/14 and 2019/20

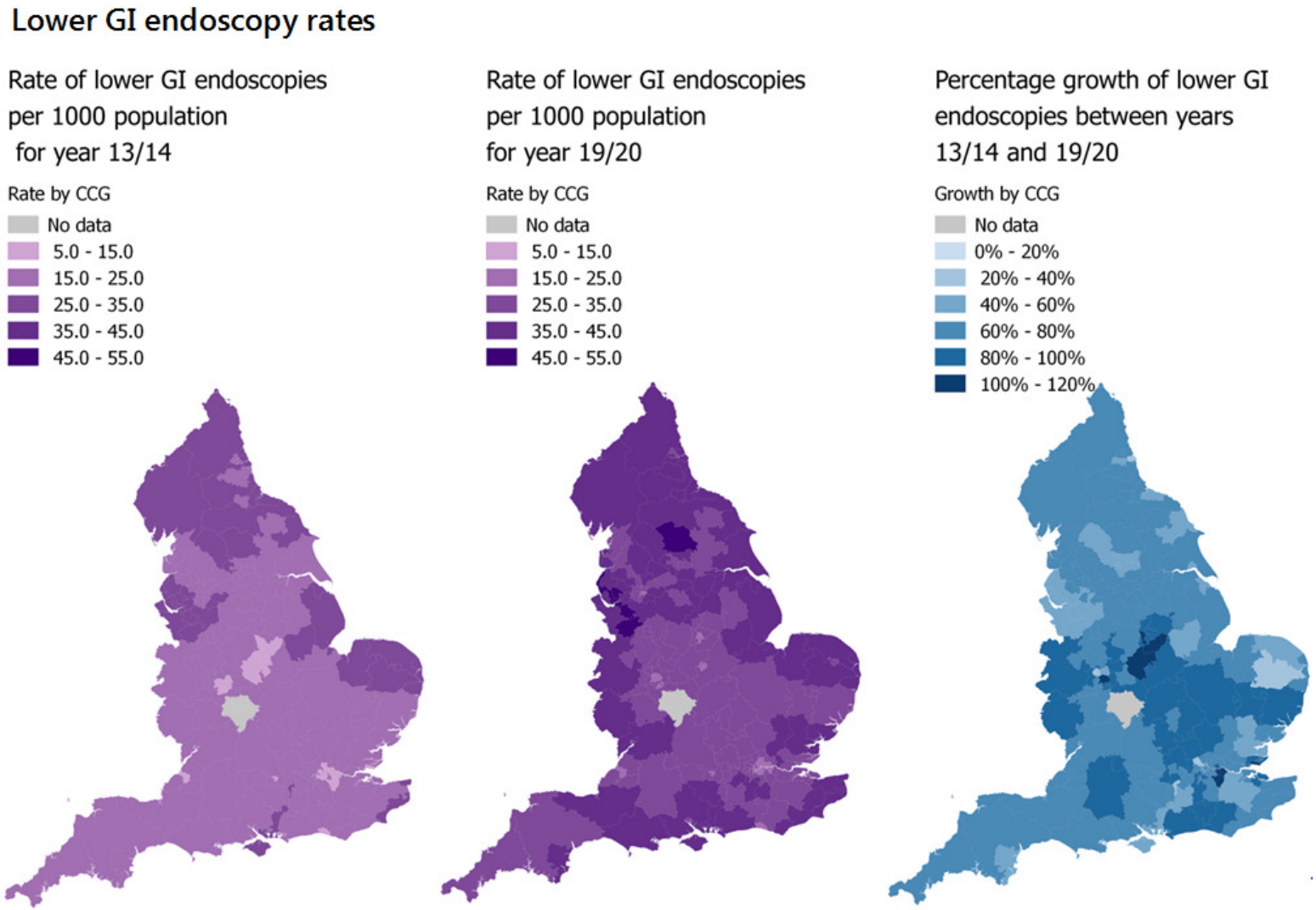

Figure 8: Geographical variation: lower GI endoscopy rates

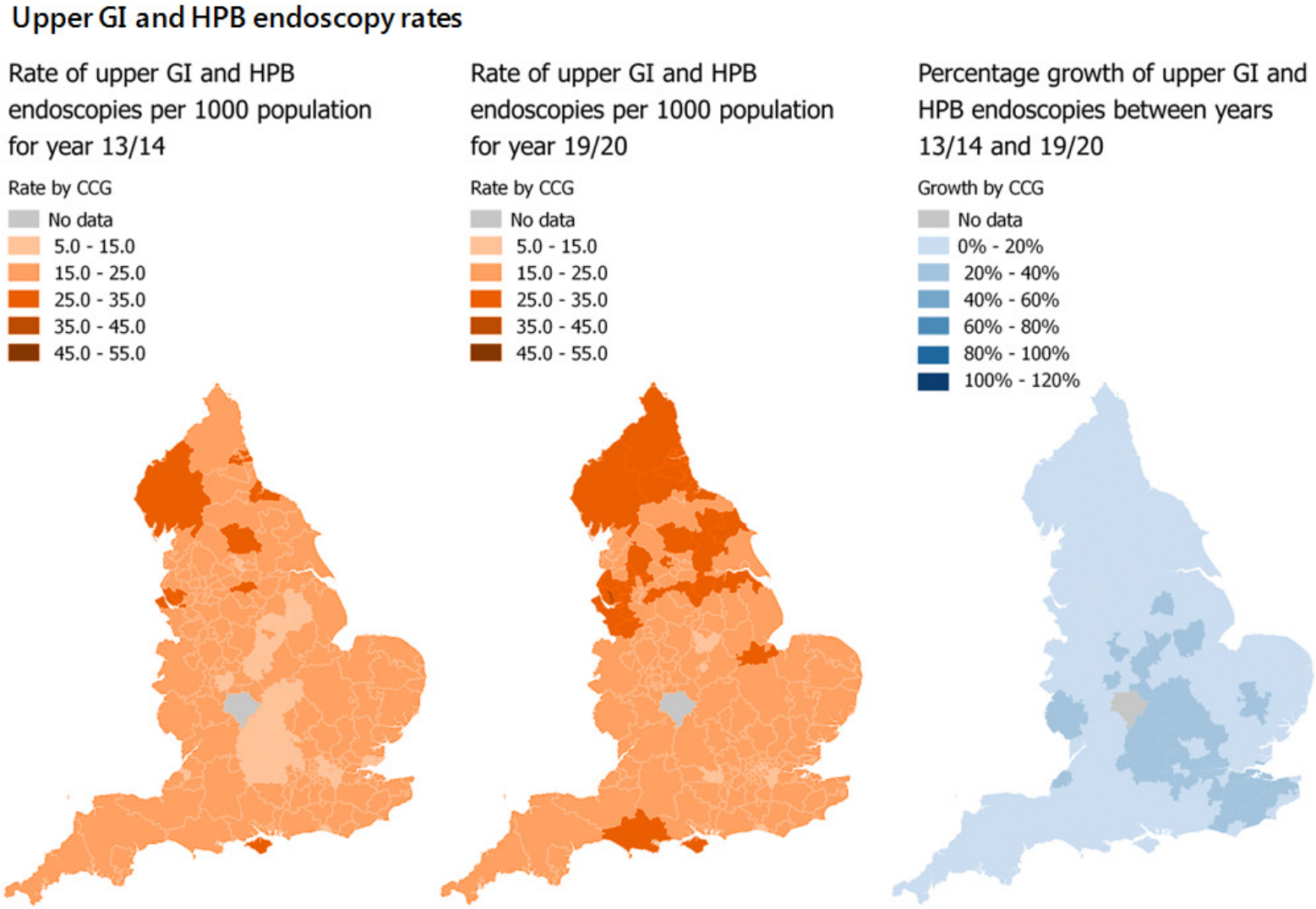

Figure 9: Geographical variation: upper GI and HPB endoscopy rates

Other Considerations

This model provides an estimate of the growth in GI endoscopy between 2013/14 and 2019/20 based on a range of agreed change factors. The model suggests moderate growth in demand for upper GI and HPB endoscopies and substantial growth in lower GI endoscopies.

Change Factors Not Addressed within the Model

The reliability of these growth forecasts is in part a function of the accuracy of the baseline activity estimates and of the quality of the data, methods, evidence and opinion used to represent the agreed change factors. These are set out in full in Appendix 1 and can be assessed transparently. However, the absence of potential change factors may also influence the reliability of the growth forecasts. We highlight seven potential change factors below and we encourage the reader to consider the likelihood of these factors when considering the model results.

Table 2 – Change factors not addressed within the model

Changes in patient expectations	It is often reported that patient's expectations of the NHS are rising. Direct measurement of this effect is difficult and data on trends in patient expectations is limited.
Patient self-referral	The notion of patient self-referral was raised during initial scoping meetings for the demand model. This term is used to describe a scenario in which patients could refer themselves directly to secondary care for an endoscopy without the sanction of a GP or consultant. We could find little published evidence of the impact of this strategy on endoscopy referral rates in the UK or elsewhere.
Supply side constraints	The model estimate changes in demand rather than activity, assuming in effect that supply-side factors will not constrain activity. Simplistically, one might expect supply-side constraints to result in increases in waiting lists. It is possible however, that supply-side constraints might influence demand-side factors.
Technological advances	The model considers the impact of decommissioning barium enema activity and the wider roll-out of CT colonoscopies. Other technological advances such as the increased use of genomics are likely although the impact of these factors over the time horizon of the model is debatable.
Substantial changes in modifiable risk factor prevalence	The model assumes some marginal change in age-specific incidence of cancer and Barrett's oesophagus based on historical trends. Inherent within this approach is an assumption that trends in modifiable risk factors (e.g. smoking prevalence, obesity etc.) will continue on their current trajectory. Any substantial change in risk factor prevalence will have an impact on disease incidence and prevalence although it is likely that the lagged impact of any such changes will be negligible over the time horizon of the model.
Screening impact on symptomatic referrals	Whilst the model estimates the impact of screening on surveillance activity, it makes no assumption about the impact of screening on symptomatic activity. If effective and if uptake is high, one might reasonably expect screening activity to lead to a reduction in symptomatic referrals and emergency endoscopies. Estimating the scale and lag of such an effect would not be trivial.
Other population / demographic / social effects	Whilst the model assumes changes in population size, age/gender profile and health status, no assumption are made about changes in the population structure by other factors such as ethnicity, migration status and deprivation. Estimating the future population structure in these terms or indeed estimating the influence of any such changes on demand for endoscopy is not straightforward.

Other Models of Future Endoscopy Demand / Activity

A number of other models of future endoscopy activity or demand were considered prior to or during the design and implementation of the demand model for this report. Whilst the objectives, scope, focus, and time horizons for these models differ, the high level conclusion is consistent; i.e. substantial growth in demand over the medium term for lower GI endoscopies and moderate growth in upper GI endoscopies

Table 3 – Other activity and demand models considered

Model	Objective
Department of Health - Lower GI Endoscopic Activity Forecast (2011)	This national model was designed to explore the commitments in the Cancer Strategy, expansion of the screening programme and underlying pressures on lower GI endoscopic activity up to 2016/17.
Anglia Cancer Network - Endoscopy Demand Forecast Models (2012)	These models were designed and built in order to assist Trusts and Commissioners in the Anglia Cancer Network to plan for the delivery of endoscopy procedures up to and including 2016/17, taking into account known central initiatives to increase or extend routine bowel screening, as well as local aims to reduce variations in practice across the network.
Wessex AHSN and Strategic Clinical Network (2014/15)	Using skills from a number of academic disciplines (population demography, geographic mapping, mathematical modelling and management science) this group are studying the impact of introducing the bowel scope test into the screening programme to support hospitals and commissioning area plan service effectively
NHS England – Endoscopy Modelling (2015)	The aim of this work was to produce a summary of current trends in endoscopy capacity and waiting times, delivery against the commitment to deliver 99% of diagnostic tests within 6 weeks, and to project the future situation should no action be taken.
CCG Activity Modelling - London Endoscopy Strategy (2015)	The Transforming Cancer Services Team for London developed an activity and costing model for CCGs based on the roll out of the Best Practice Commissioning Straight to Test Pathway over two years for the low risk, not no risk patient group.

3. Findings and recommendations

3.1 Meeting rising demand

Recommendations

- The Government should increase investment in diagnostic services, as set out in *Achieving World-Class Cancer Outcomes*, to ensure the NHS can meet rising demand and that our cancer outcomes become the best in the world. This should include a dedicated £125 million diagnostics fund over five years. For endoscopy specifically, investment will be needed to recruit and train new members of the workforce and replace ageing equipment.
- NHS England and Public Health England should ensure learnings from the bowel screening programme are applied across the symptomatic pathway so there is not a two-tier system and patients receive a consistently high level of care regardless of their route into the health system.

Background

As mentioned above, demand for endoscopy services is rising sharply for a number of reasons. The NHS will be expected to deliver more than 750,000 more endoscopies per year by 2020, and steps must be taken now to ensure services are equipped to cope with this rising demand so they can deliver the best care and that patients receive their diagnosis and treatment in a timely manner.

Findings

Though many units talked of the steps they had already taken to respond to rising demand such as increasing their physical space and recruiting additional staff, the overriding impression from interviewees and survey respondents is of a service under increasing pressure.

> *'And so it very much feels like we're sort of full to bursting at the moment and people are doing lots of things to try and keep on top of things'*- National interviewee

This pressure was apparent to the research team when trying to schedule interviews. Though individuals and units expressed a real interest in the project when they were contacted and invited to take part, many were unable to do so as a result of service pressures. Units are therefore just about coping, or 'keeping their heads above water' as one interviewee put it.

For units to cope with rising demand within the waiting times determined by current targets, this has often meant putting on regular waiting list initiative sessions at weekends and in the evenings, or bringing in external staff through companies that provide such services. These arrangements come with attendant additional costs which are ultimately unsustainable.

> *'Up until last September … we were running with waiting lists initiatives for consultants on an ongoing basis. We also had actually asked Medinet to come in. But there is a significant cost to that. …But this summer because I've employed a locum endoscopist and I've got my Nurse Endoscopists, … for the first time ever our waiting times without any extra waiting list* sessions *are within our normal workforce really.'* – Service line manager

It is also unrealistic to expect existing staff to work additional hours on a regular basis to cover weekend and evening lists.

> *'There'll be some Saturdays when we don't get anybody. I would say the consultants are very reluctant to because they're exhausted after a full week.'* - Gastroentorologist

It is worth noting that the JAG timeliness scores[11] as reported in April 2015 appear to have reduced significantly from those reported in April 2014. At that point, 78% of units were scoring an 'A' grade for timeliness – this has reduced to just 60% of units in the April 2015 census.

Awareness campaigns

The impact of the cancer awareness campaigns has been felt quite strongly by many units that responded to the survey, and as reported by interviewees. One unit noted that they were receiving about 22 urgent Upper GI referrals a day as a result of the campaign but were only able to undertake 18 such procedures in a day, so their lists were continually growing.

> *'We knew it was coming, we were given a few weeks' warning, but it was just at the wrong time of the year, January is always manic because everybody's overindulged in December, so it's always a very, very busy month and also it's flu season as well, but our 2 week referrals doubled, so we had to put on quite a lot of extra lists to help and we've also outsourced to the ISTC as well to help deal with the capacity.'* – Lead endoscopy nurse

A number of clinicians questioned the pick-up rate through the two week referrals driven by awareness campaigns.

> *The bowel cancer NAEDI produced nothing in terms of increasing cancer diagnosis … but it created a …blip and then a sustained rise in the demand for colonoscopy as a result … data from my own organisation (shows)… the ever-inexorable increase in two-week-rule referrals, with a lovely upslope over five years, consistently, and an absolute flat line in the number of cancers diagnosed.* – National interviewee

Several interviewees suggested investment should be in bowel screening awareness instead of symptom awareness campaigns as they thought the pick-up rate would be better and it would deliver better value for money.

The Bowel Cancer Screening Programme

The BCSP is seen as promoting best practice and improving quality and there are different operating standards and time-to-treatment targets for those individuals with positive test results than for symptomatic patients coming through other pathways. It was described as the 'gold standard' by a number of those people we interviewed.

[11] A JAG timeliness score of A means that a unit is self-reporting that it is answering yes to all measures relating to timeliness, this includes managing to keep waits below two weeks for urgent procedures and six weeks for routine procedures

> *'From the bowel cancer screening programme point of view, the way the patients are managed; the way the numbers are limited on the list is superior to our normal list.'* – Nurse Endoscopist

Participants are given a 'key worker', or 'case manager' – known as a specialist screening practitioner who guides participants through the whole process and provides continuity of support and advice. It is likely that this kind of support is a major factor in achieving non-attendance rates on the Screening Programme which are much lower than for non-screening procedures – a mean of 0.3% compared to 4.6% for standard activity[12]. However, it comes with an attendant cost in terms of resource. Currently the cost of screening activity is covered by Public Health England. The symptomatic pathway could learn from the success of the screening pathway to reduce non-attendance rates.

Bookings for the screening programme and instructions and arrangements for bowel preparation are made from the screening hubs and this can cause some difficulties for units as communication is not within their control. For example, in order to ensure slots are not left empty, the screening hubs may overbook available slots. This means that on occasions more people might attend than had been anticipated and people are required to re-book. It is possible that this will have a detrimental effect on future attendance.

The NHS Bowel Cancer Screening Programme began piloting the flexi-sigmoidoscopy (flexi-sig) test, or bowel scope in 2013 and roll out is now in its second phase. Though geographical coverage may be on schedule, absolute capacity is not, as units enrolled in the programme have not yet established their full complement of lists. Endoscopists have to be specifically accredited in order to undertake bowel scope screening, and the process for achieving this is perceived as logistically onerous. A number of medical endoscopists that were interviewed suggested that the nature of the work is not seen as particularly stimulating because there are strict limitations on what can be done during the procedure in terms of therapeutic interventions. They also suggested that the polyp deduction rate (in BSS) is also lower than anticipated.

A number of interviewees and survey respondents alike commented that the screening work reduces the symptomatic and surveillance service capacity and puts pressure on diagnostic services.

> *'The screening service operates to a higher standard than the symptomatic service and I think that can make life very difficult for the providers having to carve out resource as well for screening patients which isn't a very efficient way of working.'* – National interviewee

In some areas, there is a high degree of co-ordination and flexibility between the screening and non-screening services so that lists can be re-allocated if needed between the two.

> *'We are constantly in communication with the endoscopy waiting list managers so that if we have an increase in numbers coming through, we try and take any dropped lists off them so … we can use those lists, …, and similarly if we've got lists that are empty then we would try and hand them back in a timely fashion so that the endoscopy department can use our screening time for their symptomatic lists so*

[12] Figures calculated from JAG April 2015 GRS census returns

> *that everybody's trying to keep on top the waiting times and the waiting lists.'* – Lead specialist screening practitioner

However, there were also reports of staff being reluctant to provide cross-cover across the two activities.

> *'When screening first started the clinicians were very keen to cross cover. Being part of a national screening programme was quite prestigious and motivation was very high … we don't get the willingness to cross cover (now)… and that's probably because of the pressures within the symptomatic service.* – Lead specialist screening practitioner

The introduction of bowel scope lists in some units, and the increase in demand from two week wait referrals in response to the recent Upper GI awareness campaign have meant that either more lists have had to be found at weekends and in the evenings, or existing lists are being squeezed. In some instances this means that training lists are being compromised. There is also concern that quality will be compromised too.

> *'We've got to think about the future and … I struggle to work out where I can put people to train … when people need to be trained they need to have at least one dedicated list, and right now I think we're just squeezing in people where we can rather than dedicated lists, and that's my biggest worry.'* – Clinical lead

> *'Between 2% and 12% of people are having their cancer missed or not prevented and the figures for upper GI cancer are about 93%/94% so 6% of 7% of people are having a cancer diagnosed six months to a year later after a negative endoscopy. And the reason is that people aren't doing endoscopies properly and if you flood the system with more endoscopies you'll just have more bad endoscopies done and more cancer missed.'* – National interviewee

Complexity of procedures and non-endoscopic activity

In general, it appears that developments in technology and changes in practice have led to an increase in more complex procedures being undertaken within endoscopy units.

> *'We seem to be doing a lot more ERCPs[13], the demand for ERCPs has increased. We're doing a lot more ESDs[14], EMRs[15], we're just taking on halo[16] lists as well, so it just seems that gradually the demand is increasing. We also do EUSs[17] within the department as well, …when it was originally introduced it was only going to be a certain amount and it's double or tripled since then.'* – Lead endoscopy nurse

> *'Some of our consultants now are doing a lot more therapeutic work. These are patients that would normally have gone through major bowel surgery…and they're now having significant removal of the polyps, … within the endoscopy department … But what happens … is (we)go from the 13 point list where we might have on*

[13] Endoscopic Retrograde Cholangiopancreatography
[14] Endoscopic submucosal dissection
[15] Endoscopic mucosal dissection
[16] The endoscopic ablation of Barretts oesophagus using radiofrequency ablation (RFA) (HALO®system)
[17] Endoscopic ultrasound

> *average about eight patients on it, to … one patient. So it's a significant demand on the service.'* – Service line manager

This is affecting not just GI endoscopy activity but also the other procedures that units might be undertaking and which ultimately have an impact on their capacity.

> *'When Bronchoscopy was being used inefficiently we reduced one of the Bronchoscopy lists but their demand has increased again recently and they're doing EBUS as well and want some more capacity.'* – National interviewee

The Independent Sector

It appears from this study that the NHS is using the Independent Sector in a relatively ad hoc way, drawing on its capacity when necessary, rather than working in a more systematic and planned way. For example, independent units report 'mopping up' activity from the NHS, such as non-urgent referrals when their local NHS unit is under pressure. There are some examples of CCGs systematically commissioning services such as non-urgent referrals from alternative providers but this is not necessarily a widespread practice across the country.

> *'We'd have splurges of putting everything out to the private sector because we were at risk of breaching then there would be this big panic … then things would settle down again and we'd be fine for another year … why not smooth those peaks and troughs by having some sort of arrangement with your private provider where you can just filter stuff through on a fairly regular basis?'* - National interviewee

Where non-NHS providers are delivering services, or where NHS community providers are involved, robust mechanisms for routing people into the relevant MDT[18] must be established. A number of examples where this was happening effectively were described to the study team but there are still concerns among NHS acute providers regarding the quality of independent and community providers and their ability to manage patients appropriately and work within integrated pathways with other providers.

> *'There are times when you have to use private providers. There are several caveats though. First of all, they have to meet the same quality assurance standards as the NHS services. So they would have to have JAG accreditation. Secondly, they have to be appropriately linked up…there has to be a very effective and just as prompt feedback to the GP and the patient as there is in the NHS.'* – National interviewee

The issue of NHS endoscopists undertaking private practice was raised a number of times by interviewees. Concerns were raised about medical endoscopists being lukewarm towards non-medical endoscopists out of a desire to 'protect' their private practice, and about the lack of incentives for medical endoscopists to perform efficiently in the NHS.

> *'…one has to recognise that there are perverse incentives in terms of Consultant Endoscopists. The Consultant who perhaps isn't terribly efficient at running his list in the NHS may well be the same Consultant who is doing the same cases down the road in the private sector and private endoscopy is extremely well paid.'* – National interviewee

[18] Multi-disciplinary team meeting to discuss diagnosis and treatment of cancer patients

> *'… they would be putting on lists at the weekend and paying endoscopists huge amounts of money and the nurse huge amounts of money to do a waiting list initiative when in actual fact their lists in the week weren't even properly filled or utilised …'* – National interviewee

These are the perceptions of interviewees and it was not within the scope of this piece of work to determine whether there is any correlation between private practice or waiting list initiative activity and performance against standard NHS lists.

It is also worth emphasising that the systematic use of other facilities, whether independent or not, for non-urgent diagnostic work removes the simple, fast, and 'cheap' procedures from the main facility. Resource use per procedure in the latter would consequently rise and therefore across the system as a whole, significant savings are unlikely to be realised, though patient experience may be enhanced by shorter waiting times and a more patient-friendly environment.

Community provision and centralisation

The current strategy document for the NHS – the *Five Year Forward View*[iii] sets out a number of potential new models of care, one of which is the Multi-speciality Community Provider which would see groups of GPs coming together to create much larger practices providing an enhanced range of services such as diagnostic tests and procedures. It is suggested that these kinds of providers could shift the majority of outpatient-type activity out of hospital settings. Certainly, the consensus of opinion from those interviewed suggests that routine diagnostic work could be done safely within the community.

> *'…in terms of productivity there is something about moving it out of the hands of Consultants as far as the basic diagnostic tests are concerned and moving it into the hands of technicians. … the majority of diagnostic endoscopy, not therapeutic, but diagnostic, should take place in community based centres …an industrial approach.'* – National interviewee

However, this transfer of activity would require a careful consideration of the risks involved and significant investment in infrastructure and staff – the decontamination equipment alone is seen as being prohibitively expensive and staff shortages would be no less of an issue in the community than they are in the acute sector, so this may not be a cost-effective approach.

> *'If you were just doing a diagnostic colonoscopy in a fit patient I have no problem with that happening in the community. If you were doing a therapeutic endoscopy where you're removing a big polyp, there's small risk of perforating the bowel, it's a very high risk patient. It's going to need to be in the hospital setting.'* – National interviewee

> *'We run our facility with our four rooms running where we continuously clean and decontaminate the scopes through our decontamination area. So we haven't got enough endoscopy scopes to be able to run every list without reprocessing the scopes and cleaning them…if we needed to have an offsite facility …we would have to purchase around an extra 30 or 40 scopes, because we wouldn't provide a decontamination area offsite which has significant costs associated with it …you would be very limited what type of procedures you could move offsite because of the risk factor. So obviously no patients for sedation, no patients with high mortality… And you would need to employ more staff.'* – Service line manager

It was suggested that though the reconfiguration of services would be a matter for local health economies to determine, national leadership could help with planning by setting out criteria for what could safely, effectively and cost-effectively be delivered in the community.

> *'We could do a lot more in the community and take it closer to patients… we could stratify out better our two week wait urgent things from our non-urgent, less likely to need a biopsy work, and I do think we could deliver things in a community setting much more effectively … you need national leadership and strategy and direction and then you need the systems and leaders in place to enable that to be delivered at a local level.'* – National interviewee

Again, the removal of high volume low-cost procedures from acute units may not allow any resource saving across the system as a whole, as it would consequently raise the cost of the remaining procedures in the acute sector. Increasing community provision remains an option however if physical space within the acute sector is the underlying problem.

The view was also expressed that it might be desirable to consider centralising some procedures like ERCP in 'expert' units, so that resources are rationalised and clinical competence and quality are more easily maintained. Any wholesale reconfiguration of endoscopy services should be down to local health economies to determine and it is possible there is little appetite for this given the range of other priorities they need to address. Clinical Networks could take a role in these discussions but there was little evidence from the study that they were doing so.

Summary

In summary, services are clearly feeling the pressure of rising demand and will require considerable support to cope with it in the years to come.

3.2 Workforce

Recommendations

- Strategic planning around workforce should happen at the national level as recommended in *Achieving World-Class Cancer Outcomes*. We are aware that Health Education England is working with NHS England to deliver a training and development programme for Nurse Endoscopists, but this work should also include a robust assessment to determine the required number of trainees based on rising demand. Similar steps should be taken to ascertain the required level of new Consultant Gastroenterologists, Consultant GI Surgeons, other non-medical endoscopists, and Senior Endoscopy Nurses.
- Commissioners should work with local services to ensure the protection of training lists so that staff are adequately trained.
- Leadership teams should ensure the unwarranted variation between units in Nurse Endoscopists' pay is eliminated.
- NHS England and the Department of Health should work to ensure all staff involved in the delivery of endoscopy services are prepared for the transition to 7-day working. This should involve the management of expectations from the recruitment stage, and the provision of appropriate compensation. In addition, local services should ensure job plans are appropriately balanced to encourage retention and avoid burn out.

Background

When asked to comment on the biggest barriers for units in managing demand, the most common response among survey respondents was staffing issues, with space and infrastructure issues as the second biggest barrier. Physical capacity has increased considerably in recent years (according to the responding acute trusts[19] from the JAG data set there are currently 658 rooms within the acute sector) and though there are some issues mentioned in specific areas about a lack of physical space, increasing physical capacity would need to be matched by increasing the workforce.[20]

Findings

Recruitment

There has been a great deal of recruitment activity happening within endoscopy services over the last 12 months in order to increase capacity but in spite of this, staffing issues appear to be a limiting factor for many units, according to our survey respondents and interviewees. These relate to the recruitment of Consultant Gastroenterologists[21], non-medical endoscopists and

[19] 203 from a possible 221 which suggests an average total of 716 rooms

[20] HEE was contacted to contribute to this report, but it was not possible to secure an interview, which means a key perspective on workforce issues is missing.

[21] According to the BSG Workforce Report (2015), there were 1,370 substantive Consultant Gastroenterologists in the UK on 1st June 2015. The report notes a third of advertised consultant posts are not filled, though there are 110 UK CCT holders without a substantive consultant post. In 2011 the RCP calculated that the actual number of consultants required to serve the population of England and Wales was 1516 (1584 when part-time consultants are taken into account). However, the 2011 figures do not take into account major service changes such as the introduction of bowel scope and 7 day working, so a further expansion in posts is required.

senior endoscopy nurses, and the retention of Nurse Endoscopists specifically. A number of units mentioned that they had re-advertised posts for consultant gastroenterologists, Nurse Endoscopists and endoscopy nurses several times over before they could fill them and in some cases, posts remained unfilled.

> *'We went out to advert for qualified Nurse Endoscopists and it took three attempts before I was able to get anybody who'd had any previous experience.'* – Service line manager

> *'It's proving to be very difficult to recruit to the Nurse Endoscopist role… xxxx in particular have had adverts in circulation for a long time, and they haven't been able to secure anybody either in a training post or as a qualified Nurse Endoscopist. Despite offering attractive grades, there is just nobody being recruited to the post.'* – Lead specialist screening practitioner

It appears from the survey respondents that Band 5 nurses are particularly difficult to recruit. One unit reported that it had gone out to advert seven times for Band 5 nurses while another reported that it had taken 12 months to recruit two Band 5 nurses. Recruiting nurses with endoscopy experience is difficult though there appears to be interest from nurses without endoscopy experience. This means that units are required to undertake in-house training of these new recruits which will inevitably have an impact on their ability to work to optimum capacity.

Some units have gone overseas to recruit nurses while others have set up open days in the unit to boost interest and have had student nurse placements to encourage an interest in the service. According to the responses to the JAG survey conducted for this study, the vacancy rate is running at an average of close to 10% for qualified nursing staff.

The role of the Nurse Endoscopist

The in-house training of nurses already working in endoscopy settings as Nurse Endoscopists has been seen in the past as a pragmatic solution to resourcing issues but there are a number of factors that suggest Nurse Endoscopists are by no means a panacea for the staffing problem. A recent review[liii] points to a range of studies which demonstrate Nurse Endoscopists are as effective as medical endoscopists, including undertaking newer techniques such as capsule endoscopy. The cost effectiveness of nurse versus medical endoscopists is less clear. Studies assessing cost per test suggest Nurse Endoscopists can be more cost effective. However, a study[liv], using QALY as a measure of cost effectiveness, suggests medical endoscopists offer additional value through reduced follow up or attendance in primary care, possibly due to their ability to offer advice and guidance to patients during the endoscopy.

Patient satisfaction is often reported to be higher for Nurse Endoscopists, possibly due to the time spent with patients or their role as patient advocates[lv]. Findings in Scotland[lvi] have demonstrated the 'added value' non-medical endoscopists bring to the service in enhancing the patient care experience. However, variations in the job activities of non-medical endoscopists highlight the tension between the technical and caring aspects of the role, with participants expressing concern around the potential to limit the practice of these experienced nurses to a technical function.

A study also found that nurses required assistance in around a quarter of the procedures performed, in the form of advice, assistance with the introduction of the endoscope or with polypectomy[lvii]. A further study[lviii] from the Netherlands reports comparable findings. The

authors compared Nurse Endoscopists to physician trainees finding that while the quality and safety was comparable to medical endoscopists, it was acknowledged that there were differences in requirements for maintaining skills across the different professions. The study authors therefore recommended guidelines for Nurse Endoscopist training to establish criteria to maintain competence after initial training.

A study[lix] exploring the experience of endoscopy nurses participating in the nurse-led Flexible Sigmoidoscopy Screening Pilot, found that nurses were positive about the skills development from their participation. They noted some stress points which included decision making under pressure and coping with high throughput of patients, suggesting a potential risk that quality could be compromised during peaks of high demand and high complexity to ensure clinics run on time. Nurse Endoscopists also expressed concern at the risk of monotony, suggesting that a mix of activity (e.g. screening and diagnostic) would be important to relieve boredom. This was reflected in our research.

> *'Bowel cancer lists for the FOBT programme are very challenging examinations. They are finding lots of pathology … these are very interesting lists to work on. That can't be the same for the bowel scope lists. …From a physical examination point of view they can be very boring and laborious I can imagine for the endoscopists because sometimes they're churning through a list of ten patients and they're finding absolutely nothing. … So it's a hard grind for them.'* – Lead specialist screening practitioner

However, the same study does suggest that including an element of screening in work schedules may increase job satisfaction as dealing with symptomatic patients is seen as more stressful as patients themselves tend to be more stressed.

According to interviewees, the in-house substitution of a senior member of the nursing staff to become a Nurse Endoscopist creates a different, and often no less problematic gap to fill.

> *'There are several really significant issues for nurse endoscopy. One is that you take the most senior nurse out of the department and you make them into endoscopists and you then lose your most senior nurse and that's a significant issue for many institutions.'* – National interviewee

One unit had experimented with employing a number of newly qualified nurses to fill nursing vacancies on the unit but had seen them transfer out of the department in preference for ward-based posts. This had led the unit to realise they were probably too specialised an area for newly qualified nurses.

Training and grading

While experienced endoscopy nurses may be interested in the role of an endoscopist, the technical nature of the job requires candidates with the right skills and attitudes, and not all endoscopy nurses would make suitable Nurse Endoscopists. The training to achieve independent practitioner status takes approximately two years and though training to this level could be achieved more quickly in theory, this acceleration would inevitably result in an associated trade off in capacity which is problematic, in the current conditions of increasing demand. In fact, as reported by a number of interviewees, existing training lists are already being compromised.

> *'We're also meant to be training up the other Nurse Endoscopists to do Flexi-sig* [bowel scope]*, and at the moment with the way the lists and everything are because*

> *of capacity we haven't been able to do the training… But if we've got a full list which we're now having to because of capacity … it causes more problems with the assessment process for them and their training'.* – Nurse Endoscopist

> *'If you have one or at the most two nurses trying to do endoscopy in a unit alongside the doctors they'll be competing in some circumstances for lists with trainees who are trying to get their numbers up…there will be competition between some of the doctors and some of the nurses on those grounds.'* – National interviewee

This qualitative data is reinforced by the 2014 British Society of Gastroenterology[lx] medical trainee survey which reports that 39% of trainees in a training post had less than 1 dedicated training list per week on average, and that poor quality training lists are seen as a main barrier to endoscopy training. This is disappointing given that training in endoscopy was perceived to have improved following the introduction of JAG accreditation and the bowel cancer screening programme[lxi]. For example, a 2007 audit of training in London showed significant improvement compared to an audit in the same patch five years earlier[lxii]. Effective training underpins good quality patient care and its importance is referenced repeatedly in the literature.

Work is underway through Health Education England (HEE) to increase the number of training providers of non-medical endoscopist training modules, in order to increase the external capacity required for training. Work is also ongoing to develop a nationally agreed competency framework for these staff.

There are also only a handful of providers of the academic content of training for non-medical endoscopists, and this has an impact on the number of practitioners that can enrol at any one time.

Once training is underway, retention of Nurse Endoscopists can be challenging for a number of reasons. There is some degree of variation between units as to the band at which Nurse Endoscopists are paid. Some of this variation can be justified – for example units might start a nurse at a Band 6 when training and recognise the completion of training with a re-grade to a Band 7. Other units have Band 8 Nurse Endoscopists, which may reflect additional clinical duties such as the delivery of nurse-led services and clinics. It does appear however, that some of the Nurse Endoscopists interviewed for the study were dissatisfied with the band at which their job was graded.

> *"The bands for Nurse Endoscopists range from band six, which is a Sister's grade then onto mine, which is a senior Sister's grade and then others which are paid at like a Matron grade. I think a lot of the hospitals whereby they're asking for or giving out a higher grade do the same sort of job is where they're having difficulty recruiting, so it's almost like an incentive…"* – Nurse Endoscopist

The quality of clinical support provided to all non-medical endoscopists is seen as critical in ensuring quality standards are maintained and to promote job satisfaction but as units become busier and busier, such support can be stretched thin.

One other area that might be worth attention is the training of GPs as endoscopists. It was suggested that in previous years, it was more commonplace for GPs to learn to do endoscopic procedures and that this is no longer the case. It is feasible that pressure on training lists for gastroenterologists, surgeons and Nurse Endoscopists means that interested GPs are simply not able to find the means by which to develop these skills.

Stress and well-being among the workforce

The physical nature of scoping can also create difficulties with some interviewees noting the incidence of RSI (repetitive strain injury) among colleagues who scope and the incidence of stress and 'burn out' in staff more generally.

> *'…when a nurse is trained and becomes very competent, she gets overworked and burns out. … endoscopy is not something you can do 9 till 5, five days a week. And they do get used as the workhorses, and then they collapse after a while.'* – National interviewee

> *'And I sent it out saying 'please tell me how many scopes; how many sessions do you do;' …and the average came back that they did about four, but there were so many comments from those who'd been doing it ages saying 'we used to do more but we ended up with RSI' so it's a really big problem.*' – Nurse Endoscopist

Units were not asked specifically about their sickness absence rates for this study, but according to figures recently released by the Health and Social Care Information Centre, sickness absence for nursing staff is holding steady at just under 5% on average for 2014.

However, it is reported that absences as a result of stress, anxiety and depression among the NHS workforce as a whole appear to be rising[lxiii]. According to these figures, staff absences for mental health problems in hospital trusts in England have doubled in the past four years. Data acquired via a freedom of information request showed that 41,112 NHS staff took sick leave for anxiety, stress and depression in 2014, a rise from 20,207 in 2010. One unit noted that from a nursing staff group of 50, sickness and maternity leave had taken out a fifth of these posts, leaving the unit struggling to cover the gaps. It may therefore be helpful to plot sickness within endoscopy units systematically to ascertain whether the trend is of increasing rates of sickness in those units that are under greater pressure to manage their demand.

Maintaining clinical competence

There is a large body of scientific evidence to show that fatigue affects human performance but little research has been undertaken to assess fatigue in the performance of endoscopy procedures. However practitioner fatigue is a plausible reason for colonoscopy completion rates reducing during successive procedures[lxiv]. Job plans for all endoscopists should therefore be balanced and should not lead to a list commitment which is overly physically demanding. In general, interviewees and expert opinion suggest that five to six lists per week should be seen as the maximum for individual practitioners.

> *'All the pressures that you have as a Nurse Endoscopist are hard because if you're doing back to back lists, especially colonoscopy, it's really tiring mentally and physically, and then you're in again the next day doing it again. ..doing one session a day would be ideal.'* – Nurse Endoscopist

> *'You'd be far better off employing two or three nurses to do two or three lists a week and bolting on other roles to their job than just one to do six/seven lists a week, which isn't safe really.'* – National interviewee

The need to limit lists to avoid fatigue needs to be matched by the need to ensure that all endoscopists perform enough procedures to maintain clinical competence. There are quality measures for performing endoscopic tests which provide a minimum number of procedures

per annum that each practitioner should achieve. For the Bowel Cancer Screening Programme, this is more than 150 colonoscopies a year – or one list per week[lxv].

Evening and weekend lists

A service that routinely provides weekend and evening lists is considered to be a good quality service as determined by the British Society of Gastroenterology's guidance to commissioners[lxvi]. This is set against the context of a concerted policy drive for seven day a week services[lxviilxviii]. The need for system change to address the issue of seven day services has led to the development of a set of clinical standards to be implemented across England by the end of 2016/17. These standards are focused in ten areas including diagnostics[22]. The principle of seven day working is supported by a range of professional bodies, including the Academy of Medical Royal Colleges[lxix] and the Royal College of Physicians[lxx].

However, it was reported through interviews that some units had lost nursing staff (both endoscopists and non-endoscopists) because of the increasing demands placed on them to work 'unsocial hours'. It was suggested that this might in part be due to family commitments, given that the historic pattern of working in units may have initially attracted people to work in endoscopy for these very reasons.

> *'Their assumption of what endoscopy is, is a little bit different, so they come in and they realise that actually although it's a day unit, it's not an easy day unit, it's very hard work and you're on your feet all day and it's a long shift. And we've had three of them that have had to turn round and go back to the wards because of childcare issues and things.'* – Lead Endoscopy Nurse

A reluctance to work 'unsocial hours' is not limited to nursing staff, as medical staff were also reported as being less than enthusiastic at times to cover weekend shifts.

> *'I mean our hours have already changed from good old 8.00 to 5.00 but it's getting the endoscopist to cover the session because…why should it just be us doing the evenings and the Saturdays, that's not fair… But because of our staffing issues at the moment we haven't actually got the staff to cover the twilights or the Saturdays at the moment.'* – Nurse Endoscopist

> *'I'm staffed for 43 sessions per week, and that's Monday at six days a week, because we work a Saturday as well, and in the future we are looking at our workforce planning in relation to seven day working. And really the only reason we haven't moved to seven day working is because we haven't got the medical staff to support that.'* – Service line manager

It is important to recognise that in order to provide cover across seven days, more staff are required across all professional groups – it is certainly not desirable from a quality and safety

[22] The standard for diagnostics states: "Hospital in-patients must have scheduled seven-day access to diagnostic services such as x-ray, ultrasound, computerised tomography (CT), magnetic resonance imaging (MRI), echocardiography, endoscopy, bronchoscopy and pathology. Consultant-directed diagnostic tests and their reporting will be available seven days a week: within 1 hour for critical patients; within 12 hours for urgent patients; and within 24 hours for non-urgent patients."

perspective not to have consultant cover during unsocial hours in case complications arise that non-medical endoscopists cannot manage independently.

> *'The perception of extended working is always we're going to be worked harder, rather than explaining that actually no it's the same amount of work but over a different working pattern…'* – National interviewee

> *'Whilst it's all very well to say 'yes sweat the assets we can work 24/7' I do think it's unrealistic and it's all very well saying 'oh well the Nurse Endoscopists can do the weekends and the evenings' but we would still need to have a consultant available in case there was any complications ….'* – Nurse Endoscopist and endoscopy manager

NHS Improving Quality (NHSIQ) was delivering a programme to support 7 day working; there were 13 early adopter health economies[lxxi]. NHS IQ also developed a toolkit to help organisations implementing 7-day working[lxxii] which provides a baseline assessment and highlights where work is needed. Their 'Productive Endoscopy Unit' toolkit also aims to support endoscopy services to progress towards seven day working.

The role of medical staff in endoscopy

Specific challenges arise in relation to the medical staff working within an endoscopy unit. According to the Royal College of Physicians, approximately 60% of Consultant Gastroenterologists take part in their organisation's unselected medical take[lxxiii]. This combined with other commitments such as the GI bleed rota means that there are regular sessions when they are unavailable for scoping. One Consultant Endoscopist interviewed for the study described the effect of this as the unit losing at least two lists a week when he spent his turn of the rota on the wards. As the number of medical admissions continues to rise across the NHS[lxxiv] this inevitably puts pressure on non-endoscopic activities such as ward rounds. This has a knock on effect of endoscopy PAs (programmed activities).

> *'One of the difficulties of leaving it in the hands of largely Consultant Physicians is that they have many other calls on their time. Many of them do maybe two lists a week or even only one list a week …'* - National interviewee

> *'The average highly trained colonoscopist will be doing two sessions a week. …we've got these highly skilled people ready to diagnose bowel cancer and they're not actually doing very much of it. .. If all Consultant Gastroenterologists suddenly did one extra endoscopy list a week … you'd suddenly have 50% extra capacity but of course everybody has got a full job plan, we're pulled in lots of directions…. '* – National interviewee

Though most lists provided by medical endoscopists are performed by gastroenterologists, lower GI and upper GI surgeons will undertake a number of sessions on a weekly or fortnightly basis. It was noted that while endoscopy is high up the list of priorities for gastroenterologists, this is not necessarily the case for surgeons, as their theatre lists and other fixed commitments take precedence. This means that lists may either start late, and therefore may not be able to accommodate as many cases as they should or may need to be covered at short notice.

It would appear that, in the main, surgical endoscopists do not have the time to take a leading role in endoscopy – essentially they become part of the provider service and not part of the management service. It was felt by some surgical endoscopists that this could potentially lead to their contribution being devalued. Indeed, the view was expressed by some that surgeons

might not be necessary as providers of endoscopy procedures at all. This was countered by the surgical argument that without their contribution, there was a risk that continuity in the care of patients and their diseases might be compromised i.e. there would be one group of clinicians diagnosing a disease and another group of clinicians treating it; and that emergency care may also be compromised if surgeons do not retain their skills in endoscopic work.

> *'…surgeons doing Endoscopy get information about the tumours and the diseases that they're treating that can help them modify and improve the surgery they're delivering… is that advantage big enough to justify having part time Endoscopists? I think it is, but many people think it isn't.'* – National interviewee

> *'I think it would be a very negative impact on colorectal services in the UK if there was no endoscopy being done by colorectal surgeons….In the emergency setting, the requirement for decompressing a colon in a busy unit like ours is probably every day.'* – Colorectal surgeon

Future developments may also be at risk if surgeons do not play an active role in delivering endoscopic procedures.

> *'If we look at local resection of bowel cancers using Endoscopy combined with Laparoscopy where you have a surgeon and an Endoscopist working together, if those two practices aren't joined up then it's very difficult to engineer that particular development and it's actually quite difficult to envisage it or conceptualise it because there is nobody working in both areas…'* – National interviewee

In general, cross cover arrangements for units are often complex to manage and maintain as gastroenterologists, Nurse Endoscopists, and upper and lower GI surgeons, while all theoretically available to perform endoscopies, are unable in practice to provide like for like cover i.e. surgeons will perform upper or lower GI procedures only whereas gastroenterologists will do both. Nurse Endoscopists may also perform either upper or lower GI procedures only. This has an ongoing impact on covering routine, as well as emergency endoscopy lists, and is seen as being particularly challenging for holiday cover arrangements. A number of units mentioned trialling 'buddying' arrangements for their consultants.

> *'Cross cover … could be a little bit of an elephant in the room to start with… some surgical team members would have set lists on set days and through no fault of their own would have other commitments they would have to cover… Some people have tackled that by saying to the surgical team you have four slots and you use them between you and you should always use them.'* – National interviewees

> *'… if one endoscopist was off, then this buddy would step in …especially for the colorectal team where there's difficulties if they've got on call commitments. … if they have to do a post-take ward round following being on call the previous evening, you can have delays in getting to the endoscopy department.'* – Endoscopy nurse lead

Other staff groups within the endoscopy team

The largest professional group among non-medical endoscopists is nursing but there are endoscopists who are radiographers, physiotherapists and Operating Department Assistants - a background in nursing is therefore not a pre-requisite to becoming a practitioner. It is feasible for example that the physicians' assistant type role could be developed in this way, as it is in the US. The view was expressed that it would be possible to train a new cohort of

practitioners that possessed technical expertise in a limited range of procedures such as endoscopic tests and that this might help to reduce the reliance on the nursing profession to expand capacity in endoscopy units. There was a note of caution though about the danger of taking staff from one under-resourced area of the workforce, to shore up another.

> *'The entry point could be radiographers for instance, or operating department practitioners … they are quite technically minded people and yet understand about patients as well….On the other hand they're not specialities that are overflowing with people either so we'll just be robbing Peter to pay Paul if we're not careful but it does provide quite a broad base.'* – National interviewee

Specialist Screening Practitioners work specifically for the Bowel Screening Programme. They do not perform procedures themselves but manage their own caseload of patients going through the screening process and beyond. It is a requirement of an SSP to be a registered nurse and to have undertaken a module at degree level on the role. Though dedicated to the Screening Programme, SSPs can be a source of useful support and advice for endoscopy nurses, particularly in areas such as advanced communication skills. However, it was reported that some units may be considering using an administrative role at a lower pay band to undertake the data collection element of the role in order to keep costs down.

> *'We acknowledge that we are running quite an expensive model given that we're using two specialist screening practitioners on each bowel scope screening list. Other centres are exploring the use of Band 5 nurses and other grades of staff to support the lists in terms of data collection, so perhaps a Band 4 or a Band 5.'* – Lead specialist screening practitioner

Interviewees noted that unqualified staff or Health Care Assistants (HCAs) also play a vital role in many endoscopy units, though their skill mix and duties can vary quite considerably between units. This appears to be a relatively flexible workforce, with the ability to adapt to suit local circumstances and needs. A number of interviewees talked about upskilling their HCAs to undertake additional activities in the face of recruitment difficulties for qualified staff. However, vacancy rates for this staff group are also reported in the JAG return as being close to the 10% figure.

> *'The Band 3s are exceptionally good. Our Band 3s we've got are absolutely first class. …you could have one/two Band 3s – we're also looking at Band 4s as well – that will be trained up to a competency level to be able to deal with everything else that needs doing, all the technical stuff that needs to be done in the suite.'* – Endoscopy nurse

Administrative staff play a key role in the smooth running of a unit too. A number of interviewees commented on the investment they had made in senior unit managers or administrators and the payback this had generated as the more administrative staff understand the procedures the unit undertakes, the more efficiently they can manage the lists and rotas. In addition, a knowledgeable administrative function can provide additional support to clinical staff and patients alike by providing pathway enhancements such as clerical triage and reminder calls.

> *'… I think the thing which has made the biggest impact is persuading the trust to invest in a dedicated endoscopy manager … Because it takes a huge amount of time and they need the autonomy, support and equality to be able to make changes..'* – Gastroenterologist

> *'I think we're seeing a lot more efficient booking of patients. An example would be there would be a patient who needs some therapeutic technique done, and they've been booked onto the wrong list…who it's booked into, they couldn't do the techniques; that's a wasted slot…But now the admin staff have an understanding who can do what and what the most appropriate list is.'* –Clinical lead

There seems to be a limited literature base on other staff groups within the workforce, such as sterile service staff. One study[lxxv] explored job satisfaction and education opportunities, based on a survey of members of the Institute of Decontamination Science. The study concludes that job satisfaction could be increased through greater educational opportunities, options for career progression, increased profile of the profession and an increase in pay bands.

Our literature search found little in the way of evidence relating to job satisfaction as a whole. A qualitative analysis[lxxvi], involving four focus groups of medical, surgical and nursing specialists in England and Wales, captured some disillusionment amongst endoscopy units, in their ability to affect change and improvement. Barriers to service improvement included: understaffing, volume of administrative work, lack of long term planning, poor referral information, and the perceived place and visibility of the endoscopy unit within the larger organisation. Facilitators included: more Nurse Endoscopists, new guidelines for referral and management, the use of "prep" nurses and more specialist staff.

The Independent Sector

While there may be some spare physical capacity within the independent sector, this is not necessarily matched by a cohort of readily available trained staff. Though independent organisations do employ their own medical staff, most doctors providing services in the independent sector are NHS employees with existing commitments and their ability to do more in the independent sector is therefore limited. Nurse recruitment and retention is also an issue for the independent sector. Some independent providers are prepared to pay salaries in excess of NHS salaries to attract Nurse Endoscopists but this strategy is not guaranteed to resolve recruitment challenges.

> *'I think the private sector has no spare capacity, because the people doing it are the same people who deliver the NHS work. So the only additional capacity they can offer is rooms and infrastructure that's under-used.'* – National interviewee

> *'You know, utilisation of units is a main issue …even our units, they're lovely units; … but we can't use them as much as we would like to. I mean we could have evening lists; we could have weekend lists but unfortunately we haven't got enough staff to cover those lists…*'– Clinical lead for endoscopy, independent provider

The independent sector is not generally set up to train junior medical staff and this is the case for endoscopy service providers. This means that training non-medical endoscopists can be problematic though there were examples of this happening in some parts of the country.

> *'One of the positives of the independent sector is you're not slowed down because you're not training junior doctors or registrars and it's all consultant-led, but the downside is you haven't really got that capacity or ability to maybe train your own Nurse Endoscopists.'* – Clinical lead for endoscopy, independent provider

Summary

In summary, workforce was clearly the main issue of concern for services struggling to keep pace with rising demand. It is clearly a complex issue, with no 'quick fixes'. It would therefore be beneficial for stakeholders from across the health service to work together to implement solutions in a strategic way.

3.3 Service development and improvement

Recommendations

- NHS England should support services to achieve and maintain JAG accreditation. Services should also be encouraged and enabled through the commissioning process to make use of appropriate productivity tools.
- Commissioners should consider innovative ways to meet rising demand, including alternative pathways and processes, such as supporting Straight to Test access to endoscopy through telephone triage/pre-assessment which would help to speed up diagnosis. In addition, increased collaboration between endoscopy units and strengthening links at the interface between primary and secondary care could help to improve the quality and appropriateness of referrals.

Background

With the introduction of JAG and GRS, quality in endoscopy services has been put in the spotlight. The work of the JAG and its accreditation process is universally recognised by those we spoke to and survey respondents as improving quality and productivity and it was noted that other countries look to these models to improve their own services.

> *'… there's been a transformational change in Endoscopy over the last 10 – 15 years…not just in how we perform but our whole attitude to it. … although… there are on-going challenges to improve standards, efficiency and deal with ever rising demands, there is … a definite change of mind set within the profession which allows us to sort of tackle this.'* – National interviewee

Findings

There are tools available to endoscopy units to support quality and service improvement, notably the PPAT tool[lxxvii]. Developed by the JAG, this toolkit aims to assist endoscopy services in assessing demand and capacity; waiting list management; booking and choice; performance and productivity; and workforce. Evaluation has found that units completing the tool since June 2012 were more likely to achieve waiting times targets for symptomatic and surveillance waits[lxxviii].

Following the introduction of the bowel cancer screening programme, there was a recognition of the impact on demand and capacity, which led to a number of other national initiatives focused on service improvement and productivity to create efficiencies[lxxix]. A key review was undertaken in 2012 by NHS Improvement[lxxx], working with 14 NHS endoscopy services in England. A rapid review was undertaken at each of the 14 services, looking at clinical and administrative processes, and highlighting six areas in relation to service improvement and productivity as follows:

1. Operational management: The placing of the endoscopy service within its parent organisation and visible ownership of the service can influence performance, through competition for resources; collaboration between teams; and unclear governance and decision making. Administrative staff often reported scheduling conflicts where decisions are made at the last minute and may impact other teams; in one case, 25% of an administrator's time was spent reworking schedules.
2. Data collection and planning: Information is critical to support planning, facilitating a greater understanding of patient movements, room turnover and waiting times.

3. Demand: The review highlights variations in how patients on different pathways are managed suggesting that some patients may be experiencing more delays as a result of how pathways are prioritised. A nurse-led pre-assessment is part of the bowel screening programme pathway and some units are now adopting this for elective patients as it has been shown to reduce non-attendance and same day cancellations (the site visits reported significant variation in did not attend (DNA) rates, ranging from 3 – 20%).
4. Capacity: This includes exploring issues which impact on daily schedules, such as late starts, portering delays and the time taken to prepare patients exceeding expectations. This involves workforce planning, room scheduling and preparation, availability of equipment and resources to support patient preparation. The NHS IMAS Intensive Support Team has developed a tool to support units to manage capacity.
5. Variation: Understanding variation between teams, individuals and rooms can help to identify opportunities for improvement. Not all variation will be unjustified but there may be opportunities to learn from good practice.
6. Patient experience: This includes providing good quality information, increased choice for patients and integrating patient feedback into service management. Examples of good practice include the use of a DVD at University Hospitals Birmingham NHS Foundation Trust to inform patients of different procedures; and a hand held device to collect patient feedback at Gateshead Heath NHS Foundation Trust, used to evaluate service changes.

The Productive Endoscopy Unit Toolkit

The recent NHS IQ service improvement initiatives resulted in the publication of The Productive Endoscopy Unit Toolkit[lxxxi] which is now readily available to units. The toolkit helps units to explore team working, scheduling, referral management, pre-assessment and patient preparation, session start up and patient change-over, consumables and equipment, handover, recovery and discharge. It also contains many helpful practical examples of the actions taken by a wide range of units to improve their efficiency and productivity. One unit we spoke to had undertaken a considerable amount of work looking at streamlining their pathways and patient flows. It was noted that this kind of work takes time, energy and commitment and strong leadership is required to guide teams through and keep motivation and momentum going.

> *'I think any unit could make gains of about twenty percent in terms of activity if they really embrace the whole sort of productivity toolkit… The problem is it's difficult for people to stop and think when you're in a busy clinical job; they just don't feel like they have the time to dedicate to these things.'* – National interviewee

In other examples of lean thinking from the literature, the pathway for un-sedated patients receiving upper GI endoscopy has been reviewed[lxxxii]. The process was reduced from 19 to 11 steps as a result, and the maximum lead time was reduced from 375 to 80 minutes. Changes included the removal of the recovery unit for un-sedated patients and a review of the physical layout of unit and patients' journeys through the unit. The process has been piloted and tested in another Trust for applicability. In another organisation[lxxxiii], which has the shortest average pre-procedure time, front desk staff communicate with endoscopy personnel using walkie talkies to ensure patients are sent when the room is ready; an assigned "traffic director" is responsible for ensuring patient flow is as smooth as possible.

Other examples of seemingly modest changes making big differences from examples shared with us by interviewees and survey respondents include the introduction of short daily 'huddles' or meetings to discuss activity for the day ahead and to enhance communication

more generally within the unit, and daily vetting of two-week wait referrals. One unit we spoke to had introduced a 'Manager of the day' system, whereby the nurse manager in charge that day deals with all day-to-day issues and escalates problems as necessary. This arrangement made communication more efficient and developed a more distributed style of leadership within the department which was seen as valuable in gaining buy-in to service improvement activity.
A survey respondent meanwhile highlighted their unit's introduction of an in-house 'stock shop' which enabled them to extract more value for money from their procurement of consumables and to stock their rooms more efficiently, ensuring that lists were not delayed because items of equipment or other supplies were not readily available.

> *We've almost got like a shop within the department – so the stock is theirs. …they come once a week and scan it and replace anything we've used. …So we've never run out of products. We've never been overstocked by products, and we don't have things going out of date sitting on the shelves. But equally I think in the first six months we probably saved about £8,000.* – Lead endoscopy nurse

Potential for further efficiencies
Many units responding to the qualitative survey report that they believe they can still extract efficiencies out of the system by better list management, cross-cover arrangements, improving cancellations and Did Not Attend (DNA) rates etc. with 16% assessing themselves as being below a mid-way point for operating at maximum efficiency. However, many of the interviewees we spoke to also felt that much of the 'low hanging fruit' had already been addressed in their own units and that any other actions they could reasonably take would be either very time consuming or would require additional investment in financially constrained times. It does appear from our study that many Trusts have invested quite considerably in endoscopy services over the last few years, whether by creating new rooms, new decontamination kit or employing more staff. However, survey respondents and interviewees alike mentioned developments they would like to see happen but which were unlikely in the current financial climate.

One such example was given from a site that had already had approval of its business case to reconfigure its endoscopy rooms to make the service more efficient. However, funding for the capital work had been delayed in the last financial year and it was looking unlikely it would be approved in this financial year due to other Trust priorities. There is also the issue that the more activity is undertaken by units, the quicker the turnover of equipment. However, a number of survey respondents commented that their Trusts were delaying replacing older kit because of financial constraints. As equipment becomes older, it inevitably raises concerns about reliability.

> *'…some of the equipment…was variable, but certainly you would have questions where certain pieces of kit were having to be turned around quite quickly and then if one of the decontamination washers went down, it all stacked up and led to delays.'* – National interviewee

In addition, any new technological developments which could increase efficiencies may not be fully taken advantage of if the capital investment is not forthcoming.

There is some competition for capacity in units with other services and tests taking up lists. Developments in these services can also be impacting negatively on demand. For example, EBUS is a more sophisticated bronchoscope with an ultrasound probe - it requires two operators to perform and it takes longer than an ordinary bronchoscopy (instead of between

six to eight minutes, or 20 minutes if complicated, an EBUS takes between 20 minutes and three quarters of an hour). Before EBUS was introduced, a surgical procedure was required for a lung biopsy on a lymph node, so the activity has now moved from surgery to the endoscopy unit if this is where EBUS is usually performed.

If the work was re-provided elsewhere, providing of course, that more general space constraints in an acute hospital don't preclude this from happening, this would free up additional capacity for endoscopy work. A number of units responding to the survey and a number of interviewees noted that their units were either in the process of negotiating the re-provision of other activity elsewhere, or had recently done so. There are cost implications here though as the infrastructure available within the endoscopy unit has to be replicated elsewhere. In one unit, it was reported that the imminent re-provision of cystoscopy out of the endoscopy unit would free up six lists. However this re-provision meant an investment of £350k in replacement equipment and nursing staff. On this occasion this investment has been supported by the Trust's commissioners in order to reduce waiting times.

Leadership and direction

A number of interviewees talked about the importance of strong leadership within the endoscopy service and the ability of the triumvirate of lead nurse, manager and clinician to build a good working relationship together to sustain and develop service improvement. The importance of establishing a good relationship with the Trust and its overall management more generally was also stressed in order to ensure that endoscopy has a strong profile within the organisation and is able to be more autonomous, or more 'in charge of its own destiny' within the management structure.

> *'This is where clinical leadership is so important, somebody just to stand back and say well this is completely unacceptable… I always say the holy trinity of an endoscopy department is the lead consultant, lead nurse and the service manager. And if you can get those three people working together then you're unstoppable.'* – National interviewee

Referral management

Other areas for units to address to improve productivity and reduce inefficiencies include referral management and consistency of surveillance practice. A Cochrane review[lxxxiv] investigating interventions to improve outpatient referrals from primary care to secondary care, classified interventions into three categories: educating healthcare professionals, organisational changes (systems of referral) or financial interventions. Educational interventions were the most promising and those involving secondary care specialists and structured referrals sheets when distributing guidelines for referral were shown to impact referral rates. Interventions that included passive dissemination of guidelines with feedback about how they are referring were shown to be ineffective in quality improvement. There was limited evidence on organisational interventions although the authors concluded that providing a second opinion before referring may reduce unnecessary referrals. The authors found that there was not enough evidence to establish the use of financial incentives in quality improvement of primary care referrals.

The quality of GP referrals as reported by interviewees and survey respondents is seen as variable and could be improved. Some units are managing this proactively by working with local GPs to develop their knowledge and skills.

> *'Well we've written some referral guidelines which are obviously modelled on the General National Guidelines for referrals for routine procedures, and made them*

> *really user friendly, … in all units we have GP liaison people and they've gone to all the surgeries to distribute this. … We're involved in GP training sessions… we do regular referral appropriateness, audits, and obviously pickup if there's a surgery that maybe we feel doesn't refer particularly appropriately, we go in and try to educate.'* - Clinical lead for endoscopy, independent provider

The view was also expressed however that 'managing' the quality of GP referrals should be undertaken within general practice as this may be more palatable than intervention by the acute sector. The point was made that action is taken when it appears GPs are referring too much but those who are not referring enough are not as visible, and yet, this is as much, if not more of a quality concern.

> *'So it's all about getting the GPs to refer early; lower their threshold, but that will mean that they'll be a large amount of benign things discovered.'* – National interviewee

Lowering the referral threshold under the revised NICE guidance published in June 2015 is not seen as likely by interviewees to improve GP referrals and may mean people on a non-urgent pathway are more disadvantaged. It may also mean that patients who were previously on a non-urgent pathway will now be on an urgent pathway. However, it has also been suggested that GPs are largely unaware of the new guidance and may not change their practice without some further means of facilitating its implementation. A recommendation concerning the dissemination of the new referral guidelines was made in *Achieving World-Class Cancer Outcomes*. Furthermore, the new cancer strategy also suggests a streamlining of urgent and non-urgent pathways, which would mean all patients should receive test results within 4 weeks of referral.

The literature suggests that improving compliance with guidance may help to address the issue of appropriateness and that the best approach is via active educational interventions rather than passive dissemination of guidance. Recommendations include the use of clinical audits by endoscopy units and GP practices to understand the local context; and development of education programmes to improve the quality of referrals (including evaluation of the impact by measuring referrals before and after). It has also been suggested that robust referral guidelines with clear guidance on the pathways for high risk patients is critical for direct access endoscopy[lxxxv].

The ability of GPs to consider the most appropriate pathway for patients who might be too frail to subsequently undergo procedures was also raised in our research.

> *'…where there is capacity to actually potentially reduce demand is to have a more thorough assessment of the patient's total health condition before automatically sending them for a colonoscopy. We would be sent some patients by GPs who are following the letter of the law and sending us an urgent referral …it would have been better for them to have just a straight CT scan and a conversation because we were never going to get into a position to be able to operate on them and in fact even doing the colonoscopy is quite risky for some of those patients.'* – National interviewee

While there is some attention being paid to GP referrals, managing consultant to consultant referrals for endoscopic tests is not without challenge. These can account for the largest proportion of endoscopic activity in a unit and more could be done to improve the pathways internally to ensure that patients are not referred for endoscopic tests without other

appropriate diagnostics having been undertaken such as blood tests to measure antibodies for coeliac disease.

Direct access

Direct access for upper GI endoscopy is recommended by NICE guidance and according to the literature direct access arrangements have been widely implemented to facilitate timely referrals. A survey by the BSG[lxxxvi] found 74.8% of its members offered direct access endoscopy – however, only 10% were found to offer "true" direct access, i.e. direct referral to endoscopy carried out without selection by a hospital consultant. The audit of 4262 patients (covering the period 2004-2011) assessed the appropriateness of direct access referrals for upper GI endoscopy, assessing the diagnostic yield of such referrals and the cost of the direct access service. The findings showed 92.2% of upper GI endoscopies in patients aged less than 40 were normal and an additional 5.8% could have avoided endoscopy and been offered alternative treatment with proton pump inhibitor or H2 antagonist. Overall, 87.6% of patients (3734) had a normal endoscopy, suggesting a significant rate of unnecessary procedures – in addition, 52% of respondents offering direct access had waiting lists of over six weeks, suggesting the unintended consequence of impacting capacity for other cases.

Achieving World-Class Cancer Outcomes recommends that NHS England should mandate that GPs have direct access to key investigative tests, including endoscopy, as it is felt that this could save time and outpatient appointments when a GP knows which test to order.

The Productive Endoscopy Toolkit recommends introducing telephone triage/pre-assessment on a 'Straight to Test' pathway. Pre-assessment or triage is usually undertaken by a member of the unit's nursing team who, while providing information to the patient, can also gather information about the patient's social circumstances which might have a direct impact on their suitability to undergo the procedure.

> *'...pre assessment was about preparing people medically but also preparing them emotionally for the procedure that they were going to come in for and attendance tends to be improved if you've got pre assessment.'* – National interviewee

In order for the process to work efficiently, information provided to the unit by the referring GP should be comprehensive and standardised.

Direct access removes the need for an out-patient review before a test which can potentially speed up diagnosis and free up clinical time to undertake scoping activities, providing the physical space is also available.

> *'We thought that the clinic assessment added very little to the patient's journey and why not just scrap that, triage the patient over the phone by a nurse with a set of fairly standard questions just to make sure that doing a colonoscopy was safe and a good idea and then the patient could go straight to their colonoscopy or flexi-sig. ...the doctors who are in clinic could do something else and the commissioners pay less money cos they're not paying for the clinic so everyone benefits.... the benefits in terms of the patient pathway and saving money on RTT fines was thought to outweigh the financial disincentive of losing clinic activity.'* – National interviewee

However, it was suggested by interviewees that in the case of a negative test the need for a follow-up appointment in a clinic remains as these patients are experiencing troublesome symptoms which require further investigation. Therefore, the need for many patients to be seen in an outpatient clinic, is delayed, rather than removed.

The introduction of a direct access[23] pathway in Leicester, where high risk patients were sent straight to test without outpatient assessment, resulted in speeding up the diagnosis of colorectal cancer by 15 days[lxxxvii]. A small audit[lxxxviii] of 2-week straight to test referrals to Mayday Hospital (now Croydon Health Services NHS Trust) over the period of one year found straight-to-colonoscopy for urgent suspected cancer referrals to be a safe, feasible and cost-effective method for delivery of the 62-day target with no impact on endoscopy waiting list. Another audit of referrals[lxxxix] via the 2-week cancer pathway at Eastbourne District General Hospital aimed to compare the information in GP referral letters for straight to test cases with the information in surgical assessment letters for cases referred for outpatient assessment. The results suggest that GP assessments were less comprehensive, due to the accuracy of rectal examination and surgeons' use of rigid sigmoidoscopy; the conclusions suggest that routine use of rigid sigmoidoscopy in general practice could improve straight-to-test referrals.

It should be noted that although published recently, the audits referred to above were based on data which is now ten years old and therefore won't reflect recent service changes. The ACE programme (Accelerate, Coordinate and Evaluate), led by NHS England and supported by Cancer Research UK and Macmillan Cancer Support, will hopefully produce a robust body of up-to-date evidence. The Programme is exploring best practice and innovations in a number of sites aimed at enabling earlier diagnosis of cancer, including GP direct access and self-referral. It is expected that the first outputs in the form of 'How to' guides will be available during autumn 2015, with a full evaluation to be concluded sometime after September 2016.

> *'That's what we would hope to see in evaluation, a) clinically is the straight to test pathway better but also economically, you know, what are the implications, does it mean you have to increase your capacity for example. And that's particularly relevant in a direct access where there are a lot of people concerned that should you give GPs direct access to both flexi-sig and colonoscopy that that would lead to a huge increase in the number of patients referred for those tests.'* – National interviewee

Pre-op assessment and reminder calls

Effective pre-op assessment and telephone reminder calls can help to reduce the number of late cancellations or DNAs[xc]. This is also the experience of those units we spoke to and respondents to the qualitative survey.

> *'We pre assess every colonoscopy patient so actual DNAs for colonoscopies is minute, if they're going to DNA they DNA from their pre assessment so it doesn't reach the capacity for the suites. The 2 week DNA rates... I think it's around about 2% ...a nurse rings them and talks to them and agrees the appointment with them when they can.'* – Lead endoscopy nurse

This is reflected in a position statement from Bowel Cancer UK[xci] which suggests that units consider introducing direct booking and pre-assessments to minimise non-attendance. A study[xcii] comparing face-to-face and telephone pre-assessments for screening colonoscopies randomised 6,600 patients to receive either a face to face or telephone assessment. Those who responded to an invitation for a phone consultation were less likely

[23] The standard referral route of GP to outpatient clinic was replaced by a protocol driven sequence based on the patient's declared symptoms, with the initial consultation being replaced by the first test taking place within 31 days.

to go on to attend colonoscopy than those attending face to face appointments, suggesting that phone assessment may not be a viable approach to increase uptake.

Reminder texts are quite common practice in hospital outpatient settings and the IT systems are set up to work directly from the PAS (Patient Administration System). However, more than one interviewee noted that as their endoscopy activity was coded as inpatient activity on their PAS, the automated text messaging does not work and reminder texts have to be made manually. There is therefore a trade-off between the time taken and resource used to carry this out and the benefit to be gained from reducing DNAs and cancellations.

There is some difference in opinion as to the most appropriate time to make reminder calls – too far in advance and the reminder effect is diluted, too close to the day of the procedure and a resultant cancellation by the patient means it is unlikely their slot can be reallocated. Three days before the procedure was considered by a number of units we spoke to, to be the optimum length of time to make the call.

Patient choice

On a related note, there is interest in offering more patient choice with regards to appointment scheduling but our search suggests a lack of literature reporting innovations in this area. We found reference to a hospital service in Norway which has experimented with drop-in access for gastroscopy. The evaluation[xciii] compared the patient and staff experience of drop-in versus appointment-based access. The mean time from initial GP consultation to gastroscopy was 3.6 weeks for the drop in group and 14 weeks in the appointment group. The service experienced a 47% increase in the number of procedures performed and the proportion of examinations with pathological findings increased from 42% to 58%. The GPs and patients reported higher satisfaction with drop-in access; hospital staff also reported general satisfaction but found their working days were more unpredictable.

Surveillance protocols

Surveillance protocols for patients will vary between units but a closer focus on whether these patients require further investigations and if so, the most appropriate timing of these, can reap rewards. The literature reports on one unit that managed to remove 37% of patients from its list without them undergoing a colonoscopy and reduced DNA rates from 7.6% to less than 1% by introducing a nurse-led surveillance management programme[xciv].

Our research suggests that a number of units are undertaking a more systematic approach to scrutinising their surveillance lists, in order to manage their demand.

> *'… we're really re-evaluating and revalidating all these surveillance patients going through – putting the Nurse Endoscopist to one side an afternoon a week, so taking them out of endoscopy, giving them an additional role … validating all these referrals. We do take some off the list…'* – Endoscopy clinical lead

Opportunity costs are at play here however as it takes time to revalidate surveillance patients, and this is time that cannot therefore be used for scoping. Units are juggling between setting aside time for surveillance revalidation to reduce demand and using that time to scope to provide capacity.

> *'We try and get one admin session a week to do our admin, and then a validation session as well. But the trouble is when you're short-staffed you end up then having*

> *to help out, or a doctor's off sick so you end up scoping, you know.'* – Nurse Endoscopist

Research in endoscopy services

There is a suggestion in one study[xcv] that involvement in research may have a positive benefit on the quality of endoscopy services. The Northern Region Endoscopy Group (NREG) was founded in 2007, encompasses 17 endoscopy units and has become a respected and successful collaborative research network. The network contributes to trials, holding grants worth over £1.5 million. The collaborative model is thought to be a critical factor in advancing improvement and innovation. Though no questions were asked specifically about the ability of endoscopy units to be involved in research activities, a number of interviewees commented on this aspect of the service, suggesting that service pressures were restricting their ability to be as involved in research as they would like. This echoes the findings of an earlier study by Cancer Research UK[xcvi] on the ability of the NHS to maintain research capacity and competency in the face of rising service pressures

One unit also indicated that their energies were focused on audit activity in order in part to satisfy JAG requirements, rather than on other types of research.

Summary

In summary, a huge programme of improvement work has been undertaken in endoscopy since JAG was set up in 1994, and it is widely agreed that this has resulted in an internationally renowned high-quality service. However, as demand rises, services will need support to maintain these gains and continue to make improvements.

3.4 Data Quality and Access

Recommendations

- The Health and Social Care Information Centre (HSCIC) should work with endoscopy providers to ensure that Hospital Episode Statistics (HES) contains a complete and accurate record of all NHS commissioned endoscopies, making changes to data specifications to identify whether a procedure is for surveillance, screening or symptomatic purposes
- Data on the activity and outcomes of the Bowel Cancer Screening Programme should be routinely published in a format consistent with the breast and cervical screening programmes. Public Health England should also work to ensure there is timely access for researchers to appropriate data about the Bowel Cancer Screening Programme

Background

Good quality data is vital if we are to understand current and future levels of endoscopy, and the reason for the endoscopy taking place. It also helps services to understand how they are performing in relation to one another, and internationally, and enables improvements to be implemented and measured. Improving data quality and access will therefore help to support efforts to cope with rising demand and evaluate these.

Findings

Measuring Outcomes

The challenge ahead is to measure the true outcomes of endoscopy services, for example, reduced mortality from colorectal cancer. Bowel Cancer UK suggests that completion rates should be a key indicator of quality[xcvii]; incomplete tests can lead to repeat procedures which can be distressing for patients and are also more costly for the service, contributing to further demand. It also suggest rates of post-colonoscopy colorectal cancer should be monitored, to track miss rates and to learn why polyps have been missed or not fully removed, to improve diagnosis and survival rates. This kind of measurement is already being captured in some areas and shows significant variation between hospitals and individual endoscopists in the proportion of people they have scoped in the previous five years who subsequently develop cancer of the bowel.

> *'One of the things that we've done in our colorectal sites group is look at the proportion of people with cancer of the bowel who've had a colonoscopy the previous five years and you will find that that varies enormously by both hospital and individual endoscopist.'- National interviewee*

It would be possible to introduce endsocopist-level outcomes in the same way that surgeon-level outcomes are now routinely published and there was some interest for this.

> *'When you have a list of, you know, eight endoscopists, A to G and you know that you're A, and your completion rate is down at 70% and somebody else's is 95% it does focus the mind.'* – National interviewee

However, the methodological issues would be the same for surgical procedures i.e. is each endoscopist performing enough procedures for their outcomes to be considered statistically significant? Unit-level outcomes may therefore be preferable.

> *'If we look at complications from say colonoscopy or missed cancer, then that I think has to be reported at a sufficient sample size and I think the sample size would be at a trust level.'* – National interviewee

The quality and consistency of data produced on endoscopy services more generally was raised as a concern by a number of interviewees with disparities noted between the HES and DD01 datasets, with HES in particular not containing some important aspects of information such as the reason for the diagnostic procedure and the referral route of the patient.

> *'If you want to get the number of endoscopies, it's very difficult data to get hold of, you have it recorded inconsistently … you don't get …how many endoscopies were screening, how many were GP referral, how many are routine surveillance … and you need that, because each of those are going to grow at different rates … So that data, as far as I'm aware, isn't really coming out of anywhere centrally in a consistent manner at the moment.'* – National interviewee

Bowel Cancer Screening Programme Data

The data published on the activity and outcomes of the National Bowel Cancer Screening Programme is not as comprehensive as the data routinely published for other Cancer Screening Programmes (i.e. Breast and Cervical)[24]. Furthermore, the research team was unable to access data relating to the Bowel Cancer Screening Programme from Public Health England in time to include it in the modelling work for the initial deadline of this project. It is felt that the process of assessing and processing information requests for researchers which would not disclose patient identifiable information could be streamlined.

The IT infrastructure required for effective data management, and the resources and skills in data analysis and modelling were also considered to be in short supply. There is also no nationally agreed dataset for endoscopy procedures - it is understood that the BSG developed a dataset but that this has not been adopted by the NHS or NCIN. Data on endoscopic procedures carried out in primary care is also particularly difficult to obtain.

> *'… there's not a nationally agreed dataset for endoscopy procedures. …you've got to devise a dataset which is completely aligned to the NHS data dictionary, it uses the proper codes and that the burden of collecting the data for the NHS is not overwhelming. So it's got to be a really carefully thought through dataset.'* – National interviewee

This lack of consistency and limited resource might potentially hamper a more strategic approach to service development and configuration of services.

Summary

In summary, there are a number of improvements that can be made to ensure the data that is collected is fit for purpose, routinely published and available to researchers in a timely manner where appropriate. This will help us to measure the performance of endoscopy services, and evaluate efforts to improve the service.

[24] The research team are aware that the BCSP are working on publishing KC73 returns by December 2015 and KC72 returns by 2016 and are working towards a final version of these for 2020.

3.5 New Technologies

Recommendation

- Public Health England (PHE), NHS England and the National Screening Committee (NSC) should undertake a strategic planning process to ascertain how best to manage the pressures which will inevitably be created in endoscopy services by the recommended introduction of FIT into the Bowel Cancer Screening Programme. Similarly, the ongoing rollout of Bowel Scope into the Screening Programme should take into account the pressures services are currently facing. Services should be supported to roll out these tests as swiftly as possible.

Background

As with any other area of medicine, endoscopy services must continually adapt to new technologies and innovations, whether in the development of more sophisticated scoping tools, or imaging kit, or new diagnostic tests. Services are currently working to roll out the Bowel Scope test into the Bowel Cancer Screening Programme, and the National Screening Committee has made the interim recommendation that the Faecal Immunochemical Test (FIT) replaces the Faecal Occult Blood Test (FOBT) as the primary test of the Screening Programme. Both tests have significant potential to drive demand for endoscopy over the coming years.

Findings

> *'Endoscopy is technology driven and we're currently using a very antiquated tool which was developed in the 70s … it is inconceivable that in five years' time we'll be using the same equipment … Endoscopy is going to change radically over the next decade.'* – National interviewee

> *'The biggest change that I see coming…is moving more and more towards optical diagnosis rather than relying on taking samples. …we have HD monitors; we have all this sort of devices that allow us to really see so clearly. For example, if we find a polyp, you know what sort of polyp it is, …and that may save all of us a lot of money … in the main teaching hospitals they've started not actually taking polyps out if they're sure that they are totally benign …we can see so much better now.'*- Clinical lead for endoscopy, independent provider

Changes in the equipment being used was seen as likely to happen in the medium term, while other potentially more game changing diagnostic tests, would be rather longer in their development.

> *'I think in the longer term, there will be other techniques … genomics, the impact of DNA testing of stool, competing technologies such as radiology – but certainly in the next five to ten years, I don't see endoscopy going anywhere quick.'* – National interviewee

Diagnostic tests

More recent developments include the introduction of faecal calprotectin tests to help distinguish between inflammatory bowel diseases, such as Crohn's disease and non-inflammatory diseases, such as irritable bowel syndrome. The use of faecal calprotectin should prevent people having to undergo invasive investigations such as endoscopies to

diagnose their condition. The test is recommended by NICE with guidance issued in October 2013[xcviii].
The FIT[25] test will also be a potentially significant development, as it is considered a more sensitive test and therefore a more effective test than the current FOBT[xcix c]. It is also easier to use and requires only one sample of faeces, as opposed to the six required for the existing FOBT programme. It is therefore hoped it will increase uptake. Introduction of FIT has been recommended by the National Screening Committee and is currently subject to consultation. Scotland has already announced it will be introduced, and this is likely to be phased in over the next two years.

The introduction of breath and blood tests as new methods of screening could ultimately see the demand for endoscopic tests reduce over time[ci]. However, these tests are still in development and their introduction into screening programmes in the NHS is likely to take many years. Further studies will be required to confirm test reliability and to ascertain what additional benefits may be gained over standard methods and the evidence on any new screening test will be reviewed by the National Screening Committee before it can be adopted. Interviewees were aware of new developments and were cautiously optimistic about their potential. However, some interviewees noted that only an endoscopy gives direct visualisation of the patient's insides and this can exclude a large number of diagnoses that a breath or blood test can't do.

> *'If a patient comes in and says 'have I got cancer?' then one would imagine we could design a non-invasive biomarker to help risk stratify that population…But the reality is patients don't come in with that. Patients come in and go 'I don't feel well'. So you have to answer a different question. Endoscopy gives you direct visualisation and allows you to exclude a large number of diagnoses that a breath test or a blood test (won't) …that will be a slow train coming, that's not around the corner.'* – National interviewee

CT colonography
Interviewees and survey respondents alike referred to the benefits of introducing CT colonography, (or virtual colonoscopy) which involves using a CT scanner to produce images of the colon which are then manipulated and interpreted by a radiologist. This is a less invasive procedure than a conventional colonoscopy and sedation is not usually required – the procedure is therefore used for people who are too frail to have a colonoscopy, or if there are other reasons why a colonoscopy would not be suitable. It is more effective than a barium enema test[cii] and there is continued pressure nationally to phase the latter out. The procedure can be performed on standard CT scanners, but units introducing the procedure need the right software and radiologists require training to be able to interpret the results.

There were some differences of opinion expressed about comparisons between CT colonography and colonosopy though the two tests have similar sensitivity for detecting bowel cancer[ciii]. Unlike colonoscopy, tissue samples cannot be taken at CTC and patients may therefore require a follow-up test to confirm a suspected cancer. One interviewee commented that the technique 'will never be as good at seeing the bowel as endoscopy', while another suggested the technology would help to detect other cancers.

[25] FIT (also known as immunochemical faecal occult blood test, iFOBT, as opposed to the guaiac faecal occult blood test.) These tests were introduced in 2001 and detect the globin in faeces rather than the haem.

> *'That's the advantage of CTC you can get a more definitive diagnosis when it's not just rectal bleeding or change in bowel habit, because you'll pick up the non-bowel cancers.'* – National interviewee

The ability of CT colonographies to detect findings of varying significance can result in patients being referred for unnecessary follow-up tests also. According to one study[civ], 30% of patients who had a CTC had a follow-up test compared with only eight per cent who had colonoscopy - almost a third of follow-up tests for the CTC patients were to investigate small polyps that could have been left alone because they were unlikely to develop into cancers.

Other developments

A systematic review[cv] of the effectiveness of water infused colonoscopy (as opposed to air or CO2) was published in 2013. This may become a popular technique in the UK as it is reported patient discomfort is less without operation time and intubation rates being adversely affected. There will also undoubtedly be significant changes in the sophistication of the endoscopy instruments used over the course of the next few years and interviewees felt this was likely to see a growth in therapeutic endoscopy and hybrid endoscopic/ laparoscopic procedures.

For example, Natural Orifice Translumenal Endoscopic Surgery® (NOTES®)[26] is a new type of hybrid endoscopic/surgical procedure currently being studied. This approach involves intentional perforation of the gastrointestinal tract, allowing access to the peritoneal cavity. As an example, the gallbladder might be removed through the mouth, after a small incision is made in the stomach wall via the oesophagus to gain access to the abdominal peritoneal cavity. It is suggested that the NOTES® technique reduces post-operative pain, shortens recovery times, and improves cosmesis (lack of surgical incision scars). The first multicentre human clinical trial is currently underway in the US[27].

Summary

In summary, it is clear that the service needs to be ready to introduce evidence-based new tests as and when they come along. This often requires finding the right balance of encouraging, supporting and adequately funding services to adopt new technologies, and swiftly taking action to rectify the situation if they are not adhering to best practice.

[26] The NOTES® initiative is a joint effort of the American Society for Gastrointestinal Endoscopy (ASGE) and the Society for American Gastrointestinal and Endoscopic Surgeons (SAGES). Together, these societies have formed the Natural Orifice Surgery Consortium for Assessment and Research® (NOSCAR®), a group that provides guidance and oversight and evaluation NOTES® of techniques and the related research required.

[27] www.noscar.org

4. Appreciative Inquiry Case study - 'stepping stones to change'

Background

An Appreciative Inquiry event seeks to support and enhance good practice, while drawing out transferable lessons about what works and how. It also provides a positive framework to think forward towards further improving an organisation or project[cvi] [cvii]. The method involves asking a series of positively framed questions to encourage the teams involved to put energy into finding out what went well, and why, rather than spending too much time focusing on (and therefore reinforcing) problems or failures.

Royal Liverpool University Hospital – Endoscopy Unit

The endoscopy unit at Royal Liverpool University Hospital has made substantial progress over the last five years in the way that it works and now operates in a way that engages and values all parts of the team. In terms of activity, they are the second largest unit in the country to operate from one site and have managed to keep pace with increases in activity by thinking about and improving every aspect of the delivery of their service.

People

In 2009, the unit faced a watershed moment when its JAG accreditation was delayed due to a requirement for substantial improvements in its workforce domain, particularly nurse management. Though a challenging time, the endoscopy lead and consultant endoscopist, and the directorate manager (both appointed earlier in 2009) began to change the whole nursing management structure; the previous unit manager, nurse trainer and two junior sisters and an admin manager retired and were replaced with a higher banded unit manager, a deputy manager /nurse trainer and four junior sisters and a new admin manager. Over a three year period the unit has therefore managed to develop a new cadre of nurse leaders and a well-trained and committed administrative team.

A key feature of the leadership team's approach has been consistent and meaningful engagement with all front line staff – whether nursing, healthcare assistants, administrative or decontamination staff and this has been recognised internally with a Trust award for staff engagement. This approach has resulted in incremental rather than revolutionary change – as the unit manager explained, there have been many "stepping stones" to get where they are now.

Initially, the leadership team worked to develop a better understanding among staff of how their role contributed to the whole patient pathway - individual members of staff were given responsibility for managing specific projects addressing particular elements of the pathway. The unit manager used her newness to the service area to her advantage by questioning and challenging staff to explore their roles and relationships with each other and to dispel some 'myths and assumptions' that had built up about what could and couldn't be done.

The close, respectful working relationship between nursing, medical, administrative and management staff is continually nurtured through both formal and informal communication processes. For instance, staff have a weekly 'activity meeting' where all staff can discuss their progress and concerns, and plan ahead. They decide jointly on a unit 'rating' (green, amber and red) and whether they need to escalate any specific concerns, or requests such as resources for overtime payments to the directorate manager. It was through this open communication that administrative staff were able to express their concerns that as the first point of contact for patients, they were often asked clinical questions they felt they couldn't

answer. In response, the team developed clearer guidance to ensure clinical questions were passed onto the relevant person.

Supplementing formal meetings, the clinical, managerial and administrative lead speak "almost hourly" to ensure that they are up to date with what is happening in the unit. The team also has a five minute briefing every morning which everyone attends and where information on who is doing what and key messages for the day is exchanged. There is also a nurse manager of the day arrangement whereby a dedicated person deals with all the day-to-day issues, liaises between people and escalates problems as necessary. In addition, staff now regularly attend social events together. This balance of formal and informal allows for a flexible approach to managing the unit built around trusting relationships between team members.

Outside of the Trust, the senior team has built strong relationships with other providers and primary care. The unit has adopted a multi-Trust delivery model for its Bowel Screening Programme which was felt to be the most resilient option but which has required a high level of trust and transparency to be developed. The relationship with primary care has strengthened since the introduction of Clinical Commissioning Groups and GPs are reported to be well engaged with the screening programme.

Place

The Endoscopy Unit and the Bowel Screening Centre are located very close to one another on the ground floor of the hospital and both are run by the same clinical lead and directorate manager which has led to an integrated approach with increased understanding, flexibility and co-operation between the two services. One of the biggest challenges for the unit has been the small footprint they have had to work with. Very little has changed in terms of physical space since the 1990s, though an additional room (which has led to the displacement of the staff room off the unit) has just become operational. It is a temporary solution until the new hospital, on an adjacent site, is ready in approximately 18 months' time. This will provide the team with a much larger footprint to work within.

While the lack of space has clearly sometimes been challenging, the team has fought hard to make it workable. The Productive Endoscopy project enabled them to work through some of the capacity constraints and led them to clearing up and redistributing some of the consumables and equipment to create a better patient flow. These are now stored as close as possible to the rooms in which they are needed. This has had the effect of improving staff relationships on the unit, as people are not fighting for space and the environment is said to feel 'lighter' and calmer.

The staff are aware that the current space constraints may affect the patient journey and their experience. The waiting room can be busy which can potentially affect privacy at the reception desk. In addition, the interview rooms and preparation room (for enemas) are just off the hallway from the waiting room. Consequently substantial physical changes to the unit (e.g. creating separate male and female recovery areas, more separating doors, and new reception glass frontage), and changes in patient flows have been introduced. Staff awareness also enables privacy and dignity to be maintained within these constraints, as far as possible.

One advantage of the close working conditions however has been the opportunities for informal communication and the endoscopy lead noted that the team will have to work hard not to lose that sense of close working relationships at the new site.

Patients

The staff are cognisant of the fact that "every patient that comes through the door thinks that they might have cancer". The need to be supportive and to try to "make the pathway as pleasant as possible" was noted. Consideration for patients is evident in the waiting room where there are signs up to ask those waiting to be mindful of people who are fasting by not eating or drinking in the unit.

One difficulty the team encounter is that relatives and friends are not allowed in the unit itself – this is a JAG requirement in order to maintain privacy and dignity but it is also a practical consideration of space. Some nurses acknowledged that they struggle with this because they feel that patients sometimes need that kind of support and that the wider Trust is very supportive of including relatives and carers in all aspects of the care of patients.
Regular and sensitive communication with patients underpins the team's approach to working .This is evident from the first contact, with the admin team taking their role as providing reassurance seriously, through to sending reminder texts for appointments; always informing patients if there will be a delay; through to collecting feedback from patients after discharge and displaying 'You said, We did' posters to let people know how their feedback has made a difference.

The team are proud of the excellent patient feedback they receive and their low numbers of complaints despite the challenges of the physical environment and undertaking around 17,500 procedures a year.

There is less opportunity for long-term patient involvement in the running of the unit, because most patients come just once, rather than returning regularly over time. However, where possible the team engages patients in designing the service. One example of this is the identification of people with autism and learning disabilities in advance and arranging for them to have pre-visits to meet the staff and to go into the room where their procedure will be undertaken. During feedback and consultation, it was identified that feeling prepared could really help to alleviate their anxiety about the procedure for this group of people.

The Future

The unit has a growing profile within the Trust, because of its development as a strong, cohesive team and its income generating ability. This has meant that the Trust has been prepared to invest in the service. The team are continuing to look for ways to increase productivity and working differently to improve quality and promote efficiency - for instance, introducing a managed service contract for all its kit and consumables which it thinks will be able to save potentially 14% of its budget.

A key strength of the unit's strategy is to plan well in advance for staffing needs - it managed to get eight endoscopists accredited in April 2014 in order to meet the demands of the roll out of the Bowel Scope Screening Programme which started in March 2015. However, recruitment remains a challenge across the region and country. The changing working hours – currently to an 8am-8pm working day but eventually to 7 day working - requires the recruitment of more admin and nursing staff to work flexible shifts. The unit is also developing a more robust plan for holiday cover and is looking for a way to buddy up consultants to provide cross-cover.

The team is striving to improve the quality of everything it does – this is demonstrated by the training programme for nursing staff which is delivered by the nurse managers in house. This programme will ensure every nurse is brought up to the same level of knowledge and skills.

Other developments planned for the next 12 months include developing a nasal-endoscopy service, piloting a new electronic consent process using handheld PDAs, and developing the organisation's website to include video resources for patients.

5. Discussion and Conclusions

Endoscopy teams that we talked to, and met, and that responded to our survey, demonstrate an enormous amount of enthusiasm and passion to improve their service and strive for excellence in the service they provide patients. However, the over-riding impression from this research project is that units are operating on the margins of optimum capacity in terms of staffing. While they appear on the whole to have been making improvements in efficiency and managing their waiting times, this has been at some cost, not just in financial terms through the running of waiting list initiatives, but in terms of staff goodwill, as staff are asked to provide additional lists over and above their normal working hours.

This 'just about coping' situation means there is little give in the system to accommodate increased demand and little resilience to respond in the event of any adverse event that might affect the availability of key staff. It also leads to vicious circles developing such as the delay in training in order to accommodate full lists to manage demand, which inevitably means those staff who are fully trained and competent continue to bear the burden of scoping - this is a particularly insidious situation, as the more pressure endoscopists are placed under to provide more scoping lists, the more likely it is that they will become less productive and effective, suffer from stress or physical problems, or choose to leave.

Our modelling work shows that demand will increase significantly over the course of the next five years. Working with Trust chief executives, Local Education and Training Boards (LETBs) and HEE, Units must start immediately to plan for the increase in their workforce that this will inevitably require. It is a complicated jigsaw and whatever actions are taken to staff endoscopy units appropriately are likely to have consequences on other areas of service delivery. For example, a renegotiation of medical rotas to free up the time of Consultant Gastroenterologists will mean that another cohort of medics would be required to pick up these duties. Broadening the base for recruitment of non-medical endoscopists is sensible but should not place other service areas at risk of having their own staff that might be in short supply 'poached' by endoscopy services. There is a time lag of approximately two years before non-medical endoscopists are fully trained and competent and this means that existing trained staff will have to continue to be the backbone of the service.

Unless staffing issues are tackled head on, waiting lists will lengthen and all the sterling work undertaken in the last 20 years or so to develop endoscopy services in order to improve quality, productivity and patient experience might be jeopardised. There is a very real danger that all the progress made thus far in diagnosing and treating all patients, but most specifically cancer patients, will be in danger of stagnating at best, or sliding backwards in a worst case scenario.

Though the largest proportion of expected increases in activity will come from the bowel cancer screening programme, which is funded through Public Health England, there is still a chunk of additional activity not related to screening that Clinical Commissioning Groups will be obliged to pay for. Though it is assumed that much of this activity could prevent higher costs of treatment later on if cancers and other conditions are caught soon enough, it is not possible to demonstrate a clear return on investment in the normal short-term budgeting cycles of commissioners, which is problematic in terms of engaging commissioners.

A national response is required to address some of the concerns here such as a strategic planning exercise for workforce requirements across the broad range of potential non-medical endoscopists and appropriate training plans and programmes are developed. The

development of a national data set for endoscopy services is also a priority. The introduction of new screening initiatives, or enhancements to existing programmes should be considered carefully in light of these findings to ensure the right balance of ensuring patients who need an endoscopic procedure receive one in a timely way, without overloading the service.

At the local level, commissioners must be made more aware of the pressure facing endoscopy services and the implications increased activity will have on their budgets. Commissioners can do much to support units by providing leadership and guidance on best practice in referral arrangements and by supporting developments to improve and streamline pathways. Any opportunities to configure services in a more effective way should be explored, as should the full potential of local independent providers to deliver a planned, complementary service to NHS provision, which does not destabilise the NHS provision by cherry picking.

NHS endoscopy services are seen as world-leading with respect to quality and efficiency and staff should feel justly proud of their achievements thus far, delivering ever-increasing activity with higher levels of clinical quality and patient satisfaction. The service is at a crossroads however, and the decisions made in the next few months will set the course for the service for many years to come. It seems sensible that these decisions are overseen by a single co-ordinating body.

We strongly urge the Government and the NHS to work together to act on the recommendations in this report to ensure that cancer patients – and indeed all patients using endoscopy services – receive timely, high quality care.

Appendix 1. Research Aims and Methodology

Research Aims

The aim of this project was to ascertain the barriers to meeting rising demand for endoscopy services and how these can be overcome. The work took a mixed-methods approach, comprising five elements summarised below:

- A review of literature and evidence, the principal aim of which was to identify key themes and issues for further exploration

The literature base relating to demand and capacity within endoscopy services is significant and typically focused more on clinical aspects than on service management. Recognising the full range of activity in endoscopy units and broader influences on demand and capacity, our search included diagnostic tests other than endoscopies. For the sake of timeliness, the review has taken a pragmatic approach, and whilst we have taken a systematic approach to find literature, this is not a systematic review and is not based on an exhaustive search. As with any review, there are some limitations.

- Qualitative interviews with stakeholders to explore views and experiences at a local and national level

Between February and May 2015, 40 semi-structured interviews were carried out with a range of participants including gastroenterologists, surgeons, non-medical endoscopists, endoscopy nurses, senior managers and policymakers (see Appendix 2 for topic guide). These interviews were recorded and the tapes transcribed verbatim. In addition, an Appreciative Enquiry event was held with a site that was deemed to be a high performer in terms of managing its demand.

- An online survey with mainly free text responses to gather a broader range of qualitative responses on the challenges facing endoscopy units and examples of good practice

The survey was constructed using Bristol Online Surveys and was distributed to all UK NHS and independent sector units through the JAG, at the same time as the JAG April GRS census return was issued to sites. The number of responses (n=98) indicates a 21% response rate across all sectors.

- Additional questions embedded into the JAG April GRS Census return from endoscopy units to capture mainly quantitative data on activity and capacity, with some scope for providing additional free text comments

A total of 380 units across all sectors responded completely to the additional questions which equates to a 79% response rate. A total of 412 units provided at least a partial response to the additional questions. The number of returns received from NHS acute units only (n=207) indicates a 94% response rate for this sector, and it is these responses which are the focus of

the subsequent analysis. Elements of the analysis are drawn upon throughout the report but a full slide set of the results is available through the JAG website[28]

- An **activity and demand model**, with a five-year projection of demand

A model has been developed, which builds on baseline activity information to estimate future levels of demand for diagnostic endoscopies. The model provides activity estimates to 2019/20.

This report summarises the main themes and findings from the study, with a series of recommendations for endoscopy services based on examples of good practice where found.

Literature and evidence review

Database searches were undertaken by an Information Specialist at Health Centre Services Management Library, University of Birmingham, using the following databases:

- Medline
- Embase
- HMIC
- CINAHL
- Cochrane Library

Our search strategy was based on a combination of controlled vocabulary and free text terms, selected to retrieve a manageable number of references. A total of 1062 references were retrieved from the search.

A search of the "grey literature" was also conducted, via the web sites of the following organisations:

Table 4 – Web sites used for literature search

Type of organisation	Organisations/sources included in search
UK Royal Colleges and professional bodies	RCP London; RCS England; RCN; JAG; BSG
International bodies and groups	European Society of Gastrointestinal Endoscopy; American Society for Gastrointestinal Endoscopy; Society of American Gastrointestinal and Endoscopic Surgeons; European Society of Coloproctologists; World Gastroenterology Association; European Association of Gastroenterology and Endoscopy Nurses and Associates; Association of Coloproctology of GB and Ireland

[28] http://www.thejag.org.uk/downloads/National%20Policies%20and%20Reports/GRS%20census%20unit%20information%20summary_April%202015.pdf

Cancer charities	Cancer Research UK, Bowel Cancer UK
National NHS	NHS England, NICE, Health Education England; NHS Networks
Public Health England	National Cancer Screening Programmes; Atlas of Variation - Diagnostics
Improvement bodies	NHS Institute of Innovation and Improvement; NHS Improving Quality
Think tanks	Kings Fund; Nuffield Trust; Health Foundation; Centre for Workforce Intelligence
Trade press	HSJ

96 references from the database and grey literature searches were selected for the review, according to the inclusion and exclusion criteria:

Inclusion criteria

- Policy and service perspectives
- Good practice in terms of operating an endoscopy unit
- Adult services only

Exclusion criteria

- Technical/clinical material i.e. endoscopy techniques, clinical developments, effectiveness of diagnostic tests (sensitivity, specificity, positive predictive value) unless impacts on activity/demand/capacity

Qualitative interviews with stakeholders

The views and experiences of those delivering or commissioning endoscopy services were explored through interviews with experts at a national level and with clinicians and managers in endoscopy units. Interviewees at the national level were identified in conjunction with Cancer Research UK. It was originally intended that the selection of these sites would be determined by the extent to which they were involved in the Bowel Scope Screening Programme, so that there would be representation of a unit from the pilot phase, and first and second stage roll-out. Units would then be sampled from these stages based on maximum variation to take into account the following characteristics as far as possible:

- *Socio-economic characteristics*: e.g. areas with more and less affluent populations
- *Demographic characteristics*: e.g. inclusion of areas with more and less homogeneous and heterogeneous populations
- *Environmental characteristics*: e.g. areas with differing urban: rural population ratios
- *Geographical characteristics*: e.g. the sites combined would cover different areas of England

Regrettably, it was not possible to select a site from the first stage of the roll-out. A number of sites in this category were approached but declined to take part due to service pressures. Therefore two of the sites included are from the pilot phase of the bowel scope roll-out and one is from the second stage of the roll-out.

A total of 40 people took part in telephone interviews between February and May 2015 - 19 at a national level and 21 from endoscopy units. Interviewees from endoscopy units were selected according to their job role (purposively sampled) and include clinical, managerial and nurse leads for NHS and Independent endoscopy services, Nurse Endoscopists, endoscopy nurses, Consultant Gastroenterologists, Consultant Colorectal Surgeons, and Specialist Screening Practitioners. The original intention was to interview eight members of staff from each site. However, service pressures meant that some people we approached declined to be interviewed, or were subsequently unavailable. We therefore supplemented our interviews with a small number of staff from other sites, who had expressed an interest in being interviewed through the online survey. These interviewees were selected on the basis of maximum variation and filling 'shortfalls' in the job roles identified above from the original sites.

Interviews were semi-structured, based on a topic guide that combined core questions with more detailed probes to clarify responses and explore issues in greater depth. On average they lasted 45 minutes and – with participants' permission – were digitally recorded; they were then transcribed verbatim. Thematic analysis of the data was carried out, guided by the principles of Ritchie and Spencer's Framework Approach[cviii]. This involves the initial identification of analytical themes derived from the research questions and existing literature, to which additional themes are added as new insights emerge from the data. The value of this approach is that it is particularly well suited to the problem-oriented nature of applied and policy relevant research, whilst also allowing for an analytical process which remains grounded in and driven by participants' accounts.

Appreciative enquiry event

An Appreciative Inquiry (AI) study was carried out in one site, identified through the interviews as an example of good practice in managing its demand.

The approach was semi-structured, focusing on the three domains of culture people, patients and place[cix]. Problem areas are framed in a way that makes them more accessible to change and the facilitator explores with the teams creative ways in which improvements could be made.

The aim of our analysis was to add to our understanding of the factors that support embedding research (from previous methods) in order to generate a more nuanced and realistic account of how and why things have worked well in a particular service. This enabled the research team to add significant value to the overall findings, by drawing on the positive experiences of people working in services where research is highly embedded, while also exploring aspirational ideas about what would be opportunities for the future.

Online survey

An online survey with mainly free text responses, on the challenges facing endoscopy units, was designed in order to achieve a broader reach of participants than was possible through interviews. The survey was constructed using Bristol Online Surveys and was distributed to all UK NHS and independent sector units through the JAG, at the same time as the JAG April 2015 GRS census return was issued to sites. The number of responses (n=98) indicates a 21% response rate across all sectors.

JAG census return

A number of additional questions were embedded into the JAG April GRS census return from endoscopy units to capture mainly quantitative data on activity and capacity, with some scope for providing additional free text comments.

A total of 380 units responded across all sectors which equates to a 79% response rate. The number of returns received from NHS acute units only (n=207) indicates a 94% response rate for this sector, and it is these responses which are the focus of the subsequent analysis presented in this report. For a full set of findings, please visit the JAG website – http://www.thejag.org.uk/downloads/National%20Policies%20and%20Reports/GRS%20census%20unit%20information%20summary_April%202015.pdf

Activity and demand model - Modelling Potential Changes in Gastro-Intestinal Endoscopy Activity in England between 2013/14 and 2019/20

A model has been developed, which builds on baseline activity information to estimate future levels of demand for diagnostic endoscopies. The model provides activity estimates to 2019/20. The model applies a series of multipliers to specific subsets of activity in the baseline year where each multiplier represents the impact of a specific change factor. This method aims to maximise the independence of each of the change factors.

The model can be described as predominantly static (i.e. the state of the model is largely time independent), explicit (i.e. the input parameters are considered to be fully known), continuous (i.e. endoscopies are not regarded as discrete events) and deterministic (i.e. no randomness in the system producing demand for endoscopies is considered). These design decisions were taken in light of the time available to build the model, the large number of model factors and to ensure transparency and thereby allow the widest review.

The model uses the following datasets;

- Hospital Episode Statistics (source : HSCIC) – a detailed, pseudonymised, record-level dataset of all inpatient episodes, outpatient attendances and accident and emergency department visits commissioned by the NHS in England
- Diagnostic Imaging Dataset (source : HSCIC) – a pseudonymised record-level dataset of all diagnostic imaging activity commissioned by the NHS in England
- BCSP Bowel Cancer Screening Programme data (source : BCSP) –a bespoke summary data extract showing counts of screening invitations, participation, diagnostic tests and screening outcomes by CCG (Clinical Commissioning Group), broad age groups and gender
- Census of Endoscopy Units 2015 (source : JAG, Joint Accreditation Group) – all UK services are asked to complete the April GRS census, it is an on-line survey containing questions about organisation, staffing, infrastructure, activity and training within endoscopy units
- 2013 mid-year population estimates (source : ONS, Office of National Statistics) – estimates of the resident population of England by single year of age, gender and CCG (Clinical Commissioning Group)
- 2012-based subnational population projections (source: ONS, Office of National Statistics) – estimates of future resident population by single year of age, gender and CCG
- Monthly diagnostic waiting times and activity, DM01 (source : NHS England) – summary data showing the number of people waiting for a set of diagnostic tests by type of test, duration of wait to date, commissioner and provider and the number receiving tests by type, commissioner and provider.

- ONS Cancer Registrations, MB1 series (source: ONS, Office of National Statistics) – Publications presenting data for England on those patients who were diagnosed with cancer during each year from 1995 to 2012 and whose registrations were received at the Office for National Statistics (ONS).
- Two week waits referrals (source: National Cancer Intelligence Network) – summary data showing the number of 2-week-wait referrals by GP Practice.

In addition, the model uses information derived from

- Selected published studies and grey literature - individually referenced throughout this report
- Interviews conducted by the project team as part of the wider project
- Opinion of Expert Adviser, Dr Bob Walt, Gastroenterology - Consultant Physician, University Hospitals Birmingham NHS Foundation Trust
- An informal reference group established by CRUK for this project
- NHS England Endoscopy Stakeholder Meeting.

Establishing Activity in the Baseline Year (2013/14)

Three datasets were used to construct the baseline activity estimates; Hospital Episode Statistics, the Diagnostic Imaging Dataset and data supplied by the Bowel Cancer Screening Programme.

Hospital Episode Statistics includes records of all patient contacts with NHS hospitals and NHS commissioned activity in private hospitals. An extract of inpatient and outpatient hospital episode statistics was taken where the record included any relevant GI endoscopy procedure. Activity was grouped into categories; colonoscopy, flexible sigmoidoscopy, barium enema, upper GI endoscopy, upper GI endoscopic ultrasonography (EUS), endoscopic retrograde cholangiopancreatogram (ECRP) and hepato-pancreato-biliary endoscopic ultrasonography (HPB EUS). The OPCS 4.7 procedure codes used to define the forms are endoscopy are set out in the table 5 below.

Table 5 – Procedure codes used to define endoscopy procedures included within the model

Form of GI endoscopic procedure	OPCS 4 codes
Colonoscopy	H201, H202, H203, H204, H205, H206, H208, H209, H211, H212, H213, H214, H218, H219, H221, H228, H229, H681, H682, H683, H684, H688, H689
Flexible sigmoidoscopy	H231, H232, H233, H234, H235, H236, H238, H239, H241, H242, H243, H244, H248, H249, H251, H252, H258, H259, H691, H692, H693, H694, H698, H699
Barium enema	U174
Upper GI endoscopy	G141, G142, G143, G144, G145, G146, G147, G148, G149, G151, G152, G153, G154, G155, G156, G157, G158, G159, G161, G162, G163, G168, G169, G421, G422, G428, G429, G431, G432, G433, G434, G435, G436, G437, G438, G439, G441, G442, G443, G444, G445, G446, G447, G448, G449, G451, G453, G454, G458, G459, G461, G468, G469, G541, G542, G543, G548, G549, G551,

	G558, G559, G641, G642, G643, G648, G649, G651, G658, G659, G791, G792, G793, G798, G799, G801, G802, G803, G808, G809
Upper GI EUS	G452
Endoscopic retrograde cholangiopancreatography (ECRP)	J381, J382, J388, J389, J391, J398, J399, J401, J402, J403, J404, J405, J406, J407, J408, J409, J411, J412, J413, J414, J418, J419, J421, J422, J423, J424, J425, J428, J429, J431, J432, J433, J438, J439, J441, J448, J449, J451, J452, J453, J458, J459
Hepato-pancreato-biliary EUS	J531, J538, J539, J741, J748, J749

Although CT colonoscopy procedures are in some cases recorded in HES, the Diagnostic Imaging Dataset (DID) is thought to be a more complete dataset for imaging activity. DID includes all diagnostic imaging activity carried out in NHS hospitals and NHS commissioned activity carried out in private hospitals. CT colonoscopy activity was defined as the activity with either the SnomedCT code 418714002 or the National Interim Clinical Imaging Procedure (NICIP) code CVCOY.

Data extracts were supplied by Bowel Cancer Screening programme for the purposes of this project. These extracts include;

- The number of subjects invited, responding, receiving an endoscopic procedure and receiving a diagnosis through the bowel scope screening programme by CCG, gender and financial year
- The number of subjects invited, receiving and returning kits, positively screened, receiving endoscopic or imaging procedure and receiving a diagnosis though the faecal occult blood test (FOBT) programme by CCG, age group, gender and financial year.

CT colonoscopy activity records from DID were assigned to a single inpatient or outpatient record in HES using a probabilistic data linkage method. CT colonoscopy records from DID were linked on a patient basis to all inpatient and outpatient HES records for the same individual[29]. Each linked HES record was then ranked based on the correspondence of a range of fields in HES and DID including the procedure dates and the procedure setting. Each DID record was matched to the single HES record with the highest rank. These CT colonoscopy records were then appended to the HES records for other forms of endoscopy.

The model requires activity to be assigned to one of three cohorts; screening (FOBT / Bowel Scope), symptomatic (emergency / non-emergency) and surveillance (including follow up), since many of the change factors apply specifically to one or more of these activity subsets. Given that HES and DID activity is not explicitly defined in these terms, an algorithm was developed to assign activity to these three cohorts. The first steps in this algorithm are set out in the table below. These rules are applied in a specific order. Only activity not assigned to a cohort by an earlier rule is available to be assigned by a later rule.

Table 6 – Rules governing assignation to activity cohort

[29] The HES and DID were pseudonymised by the Health and Social Care Information Centre using the same algorithm and pseudonymisation key such that an individual within the two datasets could be uniquely identified without the need for personal identifiable data.

Rule order	Rule	Assigned Cohort
1	Elective inpatient or routine outpatient activity for patients with diagnosis in HES of GI cancer, inflammatory bowel disease or Barrett's oesophagus between 2004/5 and 2012/13	Surveillance
2	Elective inpatient or routine outpatient activity for patients with diagnosis in HES indicating endoscopy activity follow-up of treatment for GI cancer, inflammatory bowel disease or Barrett's oesophagus in 2013/14	Surveillance
3	Planned inpatient activity with earlier HES activity indicating a history of endoscopy for the relevant anatomical site between 2004/5 and 2012/13.	Surveillance
4	Emergency inpatient activity	Symptomatic
5	Colonoscopy and flexible sigmoidoscopy activity for patients aged 55 or 60 to 74	Screening or Symptomatic (see 4.7 below)
6	All other activity	Symptomatic

Activity assigned to the 'screening or symptomatic' cohort are apportioned to the screening or symptomatic cohorts by analysing activity rates in the ages eligible for the screening programmes[30] with the activity rates in the ages immediately above and below these eligible age groups[31]. Activity in the eligible age groups at the average rates in the age groups immediately above and below, were assigned to the symptomatic cohort. This analysis was conducted by CCG and gender. Residual activity was assigned to a potential screening cohort.

Given concerns about the completeness of recording of endoscopy activity carried out as part of the Bowel Cancer screening programme (BCSP) in HES[32], the activity assigned to the potential screening cohort in the augmented HES extract was adjusted to match the activity levels in the data obtained from BCSP. Adjustments were made by BCSP programme, endoscopy procedure, CCG, age, gender and outcome.[33] Over-estimates of screening activity in the potential screening cohort were re-designated back to symptomatic cohort – see Fig10 below.

[30] 60-74 years for FOBT and 55 years for Bowel Scope
[31] 57-59 & 75-77 years for FOBT and 52-54 & 56-58 years for Bowel Scope
[32] source: Letter from Prof. Erika Denton, National Clinical Director for Diagnostics and Dr Michael Glynn, National Clinical Director GI & Liver Disease, NHS England to NHS Trusts re : *Reporting BCSP endoscopy activity in HES*, 30th October 2014.
[33] Artificial records were created for CCGs that had no record of bowel scope activity in the baseline year to allow an assessment of the model change factors. These artificial records were subtracted at the end of the modelling process.

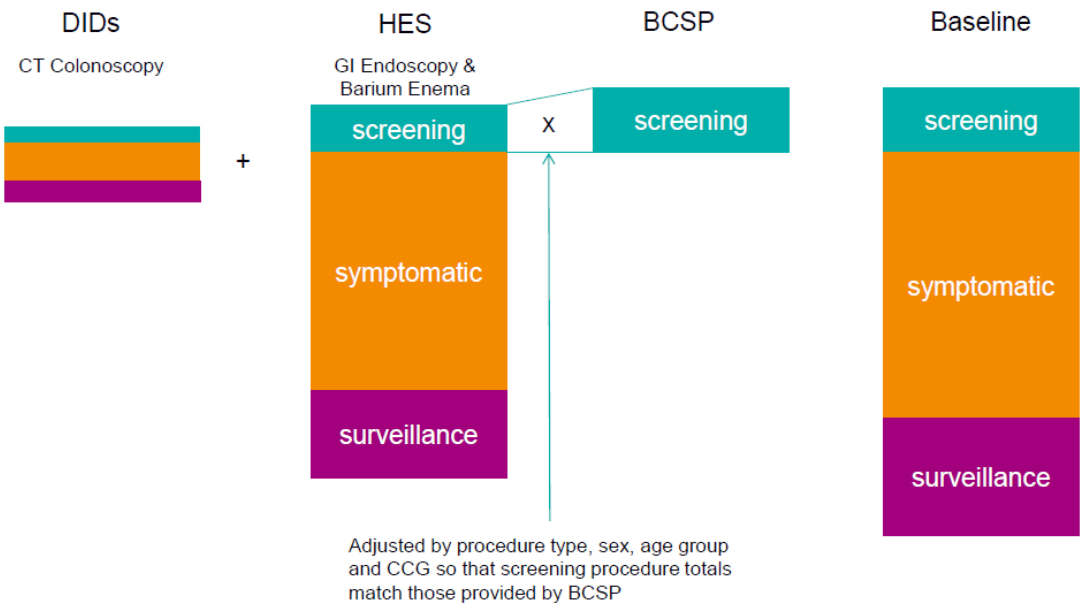

Figure 10: establishing activity in the baseline year

The final baseline dataset was then grouped and summarised by procedure type, cohort, condition/diagnosis, age, gender, CCG and relevant previous diagnoses.

Factors Expected to Influence Demand and Supply of Endoscopy

A set of change factors for the model were agreed through discussions with the project's expert advisor, the Cancer Research UK reference group and the NHS England Endoscopy Stakeholder Group. These represent the key factors that were thought to have the greatest influence on demand for endoscopy over the time horizon of the model.

Adjustment of baseline activity to match demand in the baseline year

- Diagnostic waiting time (DM01) returns indicate some variance between demand and supply in the baseline year. Before other change factors are incorporated into the model, adjustments are made to activity levels in the baseline year to bring demand and supply back into equilibrium.

- For each CCG and procedure type, we calculate the change in waiting list size between the ends of 2012/13 and 2013/14. Where waiting lists have grown, we conclude that supply was not adequate to meet demand and activity in the baseline year is adjusted upwards accordingly. Similarly where waiting lists reduced we attribute this to non-recurrent initiatives and adjust activity in the baseline year downwards.

- These adjustments are applied as multipliers to screening FOBT and non-emergency symptomatic activity. Differential multipliers are applied by CCG and procedure type.

Demographics and Population Health Status

Population Size and Age Profile

- ONS sub-national population projects indicate changes in population size, gender and age profile by CCG.

- Subnational population projections are published by calendar rather than financial year. Population projections for a financial year, y/y+1 are estimated as $(3p_y+p_{y+1})/4$ where p_n is the population projection in year n.

- Multipliers are calculated as the quotient of the population in 2019/20 and the population in 2013/14. Differential multipliers are applied by CCG, age and gender to all activity in the baseline year to increase / decrease activity in line with these population projections.

Cancer Incidence

- Whilst changes in population size and age profile might be seen as the primary driver of changes in cancer incidence, there are also subtle trends in cancer incidence within age strata. National ONS cancers registration trends were plotted by invasive cancer sites, gender and denary age strata (18-39 est., 40-49, 50-59, 60-69, 70-79, 80+) between 2003 and 2012. The trends appeared broadly linear and so linear extrapolation was used to forecast rates to 2019/20.[34]

- Multipliers were calculated by invasive cancer type (ICD10 groupings: upper GI C15-17, colorectal C18-20, HPB C22-25, other digestive C26), gender and age group as the quotient of the rate in 2019/20 and 2013/14.

- Given concerns about the completeness of registrations of non-malignant tumours including benign colorectal neoplasms (e.g. adenomas), we assume that age specific changes in non-malignant tumours follow the same trajectory as those of invasive tumours.

- These multipliers are applied to symptomatic activity for cancer. Differential multipliers are applied by age, gender and cancer site.

Cancer Survivorship

- If cancer survivorship increases then we might reasonably expect increases in surveillance activity following cancer. A paper in the *British Journal of Cancer*[CX] includes estimates of future increases in invasive cancer survivorship by cancer site and gender. These increases assume changes in population size and age profile and given that this effect is accounted for elsewhere in the model, the published annual increases in cancer survivors were adjusted accordingly to remove these demographic effects. Multipliers were then taken as the $(1+s)^6$ where s is the adjusted annual increase in cancer survivors.

- These multipliers are applied to surveillance activity following cancer. Differential multipliers are applied by gender and cancer site.

[34] Incidence in 60-69-year-olds will have been inflated due to the roll out of bowel screening in the late 2000s which may mean that this linear trend overestimates increase in incidence trend.

Barrett's Oesophagus Incidence

- Age specific incidence of Barrett's oesophagus is thought to be increasing[cxi] and we might expect this to lead to an increase in upper GI endoscopy activity. Following correspondence with Dr Helen Coleman and Prof. Liam Murray, trends between 2006 and 2010[35] were used to forecast the number of new cases of Barrett's oesophagus to 2019/20.

- Multipliers derived from these forecasts were applied to symptomatic activity for Barrett's oesophagus. Differential multipliers were applied by gender and broad age group (<60, 60-79, 80+).

Strategies and Initiatives

Screening > Surveillance

- Screening activity will lead to an increase in the identification of patients with disease. This in turn may lead to increased demand for surveillance endoscopies. A simple Markov model was developed to estimate the increase in surveillance activity that might result from screening.

- Data from the BCSP included information on the number and type of diagnoses resulting from the FOBT and Bowel Scope screening programmes. Recommended surveillance intervals were taken from NICE Guideline CG118. 1 and 5 year age-standardised colorectal cancer survival rates were taken from Cancer Research UK[36] and geometric interpolation was used to estimate survival at years 2, 3 and 4. Survival rates for non-cancer cases were assumed to be equivalent to the background age-specific mortality rates.

- The increase in surveillance activity by 2019/20 was used to derive activity multipliers for lower GI surveillance activity for cancer and adenomas. Differential multipliers were applied by procedure type, surveillance condition and risk level.

BCSP: FOBT > FIT

- There is growing evidence of the benefits of using the Faecal Immunochemical Test (FIT) over the presently used guaiac Faecal Occult Blood Test (FOBT). FIT delivers higher uptake, higher positivity rates and improved positive predictive values[cxii]. Furthermore, early data from the BCSP FIT pilots also indicate that FIT also archives greater uptake in the most deprived subsets of the population and therefore improves equity.

- We used van Rosum's paper[cxiii] to estimate the likely change on screening initiated and surveillance endoscopy activity should the screening programme move from FOBT to FIT in 2017/18.

[35] since these were thought to best reflect changes in incidence rather than ascertainment
[36] http://www.cancerresearchuk.org/cancer-info/cancerstats/types/bowel/survival/bowel-cancer-survival-statistics

- The ratio of endoscopies generated via FIT and FOBT as a direct consequence of a screening programme from van Rosum were applied to the current rate of endoscopies per invited patient (from data supplied by BCSP). The impact on surveillance activity was estimated by adjusting the Markov model described above by multiplying the number of cancers and adenomas currently detected by the programme by the ratio of detections via FIT and FOBT in van Rosum.

BCSP: Raise FIT Positivity Threshold

- The impact of any planned move from FOBT to FIT is likely to be considerable; van Rosum found that the number of screening initiated endoscopies increased almost threefold as a result of higher uptake and positivity of FIT. Given the additional demand that this may generate for endoscopy services, the screening programme have indicated that they may introduce a temporary measure to minimise this impact. The threshold used to indicate a positive result from FIT is conventionally set at 20 µg Hb / g faeces[37]. Alternative positivity threshold can be selected to increase or decrease positivity thresholds. BCSP FIT pilots[38] indicate that a threshold of 180 µg Hb / g faeces would generate a similar level of endoscopies as the current FOBT based programme. At this higher positivity threshold the positive predictive value remains substantially higher than for FOBT. We have therefore assumed that the FIT test will be used at this higher positivity threshold until at least 2019/20, the time horizon of this project. It should be noted however, that BCSP intend to revert to the conventional positivity threshold as soon as endoscopy services can accommodate the additional demand.

BCSP: Bowel Scoping Roll-Out

- Since 2013, the Bowel Cancer Screening Programme has been piloting a new screening test in which a flexible sigmoidoscopic examination is offered to men and women at age 55.

- Data from the BCSP provided information on the numbers of patients invited and the number of flexible sigmoidoscopies and colonoscopies carried out in the pilot areas in 2013/14 and 2014/15. These figures were used to estimate the number of additional flexible sigmoidoscopies and colonoscopies that would be carried out if this pilot was rolled out nationally by 2019/20. Differential multipliers were applied by CCG and gender.

- The Markov model described above was adjusted to reflect the increase in surveillance activity that would be generated as the Bowel Scope screening programme was progressively rolled out, achieving full roll-out by 2019/20.

Increase and reduce variation in two-week-wait referrals

[37] equivalent to 100 ng Hb / mL of buffer solution for the OC Sensa test.
[38] Personal correspondence Professor Stephen Halloran

- Qualitative interviews conducted as part of the wider project indicated issues with both the level and consistency of two-week-wait (2WW) referrals for suspected cancer.

- GP practice two-week-wait referral rates (number of referrals per head of practice population) for suspected lower GI cancers in 2014 were obtained from the NCIN commissioning toolkit. Two adjustments were made to the distribution of two-week-wait by GP practice – see Fig 11 below. The level of variation between GP practices is reduced by half (such that only 0.24% of GP practices fall more than 1.96 standard deviations from the mean) and the rates were increased (such that the new mean rate is equal to the current upper quartile rate, from 372 to 419 referrals per 100,000 registered patients).

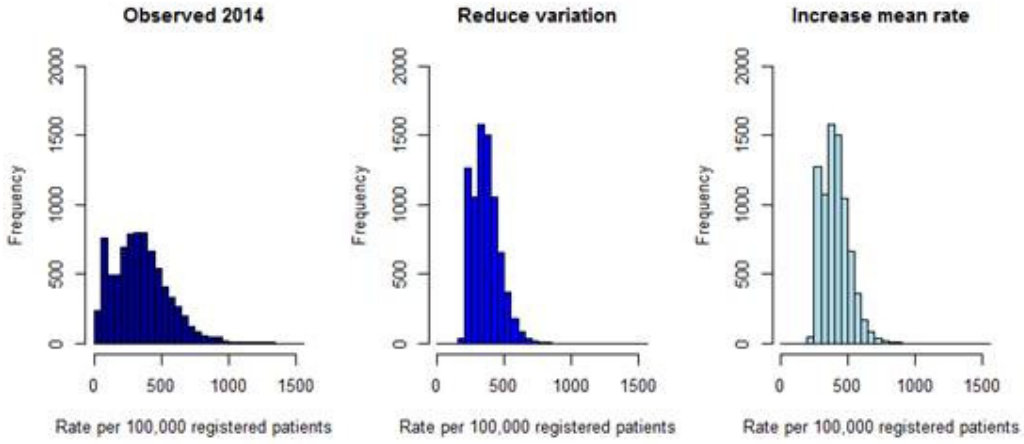

Figure 11: estimating the future distribution of GP two-week wait referrals

- The baseline number of 2WW lower GI endoscopy procedures was calculated from CCG level referral counts assuming, based on the qualitative interviews, that the conversion rate of referral to procedure was 85%. Similarly the expected lower GI endoscopy procedures were calculated from the adjusted distribution of referrals. The difference in the number of procedures due to changes in 2WWs was used to calculate multipliers for non-emergency symptomatic lower GI endoscopy procedures.

- Due to the lack of available data on 2WWs of upper GI and HPB suspected cancers we assume that upper GI and HPB multipliers are the same as lower GI.

- Multipliers were applied for non-emergency symptomatic activity. Differential multipliers were applied by CCG.

Barrett's Surveillance

- Approaches to surveillance following diagnosis for Barrett's oesophagus are thought to be inconsistent. The underlying prevalence of Barrett's oesophagus is thought to

be approximately 2% of the adult population[cxiv]. We calculated surveillance activity rate for Barrett's oesophagus by CCG.

- To reflect increasing consistency in Barrett's oesophagus surveillance we assumed that any CCG with a surveillance activity rate below the CCG upper quartile in 2013/14 will increase to this level by 2019/20. Multipliers were applied to surveillance activity for Barrett's oesophagus. Differential multipliers were applied by CCG.

New NICE Cancer Referral Guidelines

- Cancer referral guidelines were recently updated by NICE and were published in June 2015. The guidelines change the criteria and thresholds that should be applied when determining whether to refer a patient for suspected cancer. Estimates of the impact of these guidelines on endoscopy activity were contained in a NICE costing report (http://www.nice.org.uk/guidance/NG12/documents/suspected-cancer-update-costing-report2) that was published alongside the draft guidelines. (Note that these figures were not updated when the final guidelines were published). This model suggested that the change in referral criteria and thresholds would result in an increase of between 5% and 15% of referrals for lower GI endoscopies. We initially used the mid-point of this interval to derive multipliers for lower GI symptomatic activity. However, following feedback from the NHS England Endoscopy Stakeholder Group[39], we instead used the upper limit of the interval. Furthermore, we assumed that 85% of lower GI referrals would result in an endoscopy.

- The costing report concluded that guidelines would not result in changes in upper GI endoscopy activity although there would be greater use of direct access tests.

Public Awareness Campaigns

- Provisional analysis by Cancer Research UK[40] for NHS England estimates the increase in waiting list endoscopy activity as a result of public awareness campaigns which encourage patients to contact their GP if they experience certain symptoms. CR-UK analyses relate to one local pilot upper GI (Oesophago-Gastric cancer) campaign and one lower GI (bowel) cancer campaign (with a follow up reminder campaign – not used here) and compared change in endoscopy activity before, during and after the campaigns in the pilot and control areas. The difference in observed change in endoscopy activity (pilot vs control) is attributed to the campaigns. We have assumed that the effect of a campaign in any given year is for six months, three months at the 'during campaign' level and three months at the 'after campaign' level.

- Since no forward plan for public awareness campaigns existed at the point of model development, we have assumed that there will be one additional lower GI campaign and one additional upper GI campaign in 2019/20 in comparison to 2013/14.

[39] One of the stated objectives of the NICE Guideline NG12 is to reduce the positive predictive value of GP referrals for suspected cancer from 5% to 3%. At face value one might expect this to lead to a 67% [0.05 / 0.03 -1] increase in referral activity before any additional cancers are detected.
[40] Evaluation of the Be Clear on Cancer Oesophago-Gastric Cancer Awareness Local Pilot: April to July 2012, CRUK; evaluation of campaigns post-2013 is led by NCIN

- Multipliers were calculated for screening and non-emergency symptomatic activity and applied by procedure type.

Technological Change

Decommissioning Barium Enema

- Levels of barium enema activity have decreased rapidly in recent years following NICE guidelines about the efficacy of this procedure for diagnostic purposes. We have assumed that all remaining barium enema activity will be eliminated by 2019/20 and replaced by either CT colonoscopy or colonoscopy.

- We reviewed the primary and secondary diagnoses of patients receiving a barium enema in the baseline year and concluded that approximately 93% would be suitable for CT colonoscopy whereas the remaining 3% for whom there was evidence of a GI bleed / haemorrhage (ICD10 code K922 or K625), may require a colonoscopy.

Zero multipliers were included in the model for barium enema activity. Multipliers were calculated for colonoscopy and CT colonoscopy activity to reflect the anticipated increase in these procedures as a substitute for barium enemas.

Increasing Use of CT Colonoscopy

- Rates of CT colonoscopy have increased substantially in recent years. Changes in need (demography, disease incidence / prevalence) and substitution for barium enema activity can explain only part of this growth and we assume that the remainder is attributable to the diffusion of this new technology. University College London Hospital Trust is seen as an early adopter of this new technology. For the purposes of this model we have assumed that rates of CT colonoscopy will increase such that all CCGs deliver at least the rate per head of patients aged 75+ delivered by UCL to the CCGs of Camden and Islington in 2013/14. The Camden and Islington CCG rates were adjusted to reflect the fact that other provider trusts deliver endoscopy services to these patients. CCGs with CT colonoscopy rates (per head of population aged 75) higher than the Camden and Islington CCG rates were not changed.

- Analysis of the Diagnostic Imaging Dataset (DID) and Hospital Episode Statistics (HES) in 2013/14 indicates that approximately 10.2% of patients receiving a CT colonoscopy receive a colonoscopy shortly afterwards. We therefore increase colonoscopy activity as CT colonoscopy activity increases using 10.2% as the conversion ratio.

- Multipliers are created for all CT colonoscopy activity and for non-emergency symptomatic colonoscopy activity. Differential multipliers are applied by CCG.

Interaction between Model Factors

The multiplicative nature of the model recognises that the model factors interact rather than act in isolation. The combined effect of the change factors is greater than the sum of the individual effects. The model results report the individual effects of each of the change factors as well as the impact of any interaction between the model factors. The difference between the sum of the individual effects of the change factors and their combined impact is equivalent to all of the 2-way, 3-way, 4-way etc. interactions between the change factors.

As an example, the model estimates the impact of bowel scope alone is to increase the annual number of endoscopies by c. 265k, but this assumed that nothing else changes (e.g. population at 13/14 level). However the population aged 55 will grow between the baseline and final year and so the population age profile and the bowel scope factors will interact to create a larger effect.

Appendix 2. Local interviews topic guide

Question 1.

Main question: Can you start by telling me a bit about your own particular involvement in the delivery of endoscopy services?

Possible probes:
- If involved clinically in undertaking endoscopic tests – which ones and how often do they undertake lists?
- Some contextual information on the size of their unit
- If a commissioner – what are arrangements for considering endoscopy services – part of a diagnostics sub-group of CCG? Or endoscopic specific across a number of CCGs?
- If commissioner – how many providers within their patch and configuration of providers i.e. community provision, private providers etc.?

Question 2.

Main question: A great deal of service improvement type work has been done over the course of the last few years with endoscopy services, through the work of the JAG and accreditation and the NHS Improvement Agency (now NHS IQ). How familiar are you with this work? Is it relevant to your everyday practice? Do you think things have changed in your unit as a result of these national initiatives?

Possible probes:
- What has improved?
- And what can still be improved further? Are there any specific causes of wastage, or inefficient practice within your unit that you are working to address?
- If a commissioner - were they expecting this work to deliver specific benefits that have not yet been realised? And if so, why do they think this is?

Question 3.

Main question: What do you see as the key challenges facing your endoscopy service now and over the course of the next five years in managing demand?
Possible probes:
- Challenges in relation to accommodating bowel screening programmes?
- Challenges in relation to impact of other cancer awareness campaigns?
- NICE guidance proposed changes - referral threshold changes – (people don't have to have had symptoms for six weeks – no time duration required)
- To what extent is the ability of your unit to manage GI endoscopy demand affected by other activity that you might undertake? What sorts of activities are these (e.g. bronchoscopy, cystoscopy, clinical research etc.)?
- For commissioners – do they know what the key challenges are facing the endoscopy services they commission?

Question 4.

Main question: What is your unit doing to increase its capacity to cope with rising demand?
Possible probes:

- Physical space – planned capital developments?
- 7 day working/3 session days?
- Waiting List Initiatives?
- Developing a more flexible workforce? Nurse Endoscopists, GP Practitioners?
- How is your unit thinking about job design to ensure roles are attractive and sustainable?
- What role do private providers have in helping your unit manage demand?
- Changes to surveillance protocols?
- Is anyone within your organisation providing your unit with support to address these challenges?
- Is anyone from outside your organisation providing support i.e. SCNs?
- For commissioners – what are the providers of your endoscopy services doing to cope with rising demand?

Question 5.

Main question: How effective have local commissioners been in supporting your unit with these challenges?

Possible probes:

- What role have they played to date that they are aware of? (Developing commissioning strategies, commissioning only JAG accredited units, increasing investment, direct access arrangements?
- How do tariff payments affect what they do within the unit? Does it have any impact on their strategic plans?
- For commissioners – what are you doing to support your providers of endoscopy services with these challenges?

Question 6.

Main question: Do you think more endoscopy work could be undertaken within the community?

Possible probes:

- Screening only centres? Or surveillance of low risk patients in the community?
- What are the opportunities?
- What are the constraints?

Question 7.

Main question: What innovations in the provision of endoscopy services are likely to have an impact on demand over the course of the next five years?

Possible probes:

- Likely increase in virtual colonoscopy (CT colonography)?

- Trans-nasal endoscopy?
- Faecal calprotectin (investigation of diarrhoea)
- Straight to test? (How is triage for this being performed – by Nurse Endoscopists/specialist endoscopy nurses/paper questionnaire etc?)

Question 8.

Main question: How are patients/members of the public involved at a local level to influence the patterns of provision of services, or service development?

Possible probes:

- Is patient feedback routinely collected in the unit?
- What sorts of comments do people make about the experience of having an endoscopy?
- Has the unit changed anything as a result of patient/public feedback?
- For commissioners – are they aware of any feedback/comments from their patients about the provision of endoscopy services? i.e. they want weekend sessions for bowel screening etc?

Question 9.

Main question: Are there any particular aspects of good practice in managing capacity and demand that your unit would like to share with others?

Question 10.

Main question: Is there anything else you would like to add that you think may be helpful or informative to this study?

Thanks and close.

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