



Public Health
England

Protecting and improving the nation's health

Cost-effective commissioning of colorectal cancer care

An assessment of the cost-effectiveness of improving early diagnosis

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About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. We do this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health, and are a distinct delivery organisation with operational autonomy to advise and support government, local authorities and the NHS in a professionally independent manner.

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Executive summary

Colorectal cancer (CRC) accounts for one out of nine cancer cases in England and an estimated 14,000 deaths in 2014^{[1][2]}. The incidence of CRC may grow due to an ageing population and increased environmental and behavioural risks, notwithstanding recent changes in screening policy which may help detect precancerous polyps. Despite improvements, clinical outcomes (as measured by such indicators as five year survival rates) are worse in England than in peer countries and this gap has not closed significantly over time.

Earlier diagnosis of CRC translates to a significantly higher chance of survival: five-year survival rates are c. 90% when diagnosed at the earliest stage of progression but less than 10% at the latest stage. Local commissioners, clinical commissioning groups (CCGs) and local authorities, have a major role to play in improving overall outcomes and, in particular, early diagnosis. They can invest in increasing public awareness, screening, education and training for general practitioners (GPs), added diagnostic capacity (through investment and/or service design) or incentives for GPs to behave differently. However, CCGs are also financially constrained and have an abundance of priorities to balance. CCGs need to know what good CRC care looks like and have sound economic evidence in order to make the case at a local level for investing in earlier diagnosis and intervention. This report, and the accompanying tool, aim to help CCGs understand the economic case for earlier diagnosis.

This report lists the five phases of the CRC pathway and provides a high level look at cost-effective interventions from early diagnosis through end-of-life care (as described in the NICE guidance). Taking into account emerging findings on cost-effectiveness¹, this report analyses variation of cost-effective care delivery and ways to improve care, as well as the costs and incentives relevant to each phase. In focusing on the diagnosis phase of the pathway while also examining treatment, follow-up/surveillance and end-of-life, this report helps commissioners assess the economic case for early intervention.

The accompanying tool to this report aggregates existing research about the costs and benefits of interventions on early diagnosis, as well as CCG-specific data, to estimate the cost and benefit (both financial and quality of care) of making changes to the care pathway by incentivising early detection.

The tool uses the CCGs' own data to estimate the long term benefits of diagnosing people earlier. For instance, if Nene CCG in Northamptonshire increased its colonoscopy referrals by 10% annually, it would result in eight fewer people with stage four cancer each year - a diagnosis with just a 7% five year survival rate). Achieving this

¹ Such as the Report of the Independent Cancer Taskforce on Achieving World Class Outcomes

outcome could involve redesigning services to increase diagnostic capacity, securing more funding for services and understanding the costs of doing so compared with the benefits.

The existing NHS incentive structures are complicated and can hinder the implementations of changes and improvements. An intervention therefore might significantly increase the number of colonoscopies that CCGs must pay for, while resulting in relatively few early diagnoses. For this reason, the case for early intervention is not always compelling for commissioners. This report examines these factors, identifies misaligned incentives and suggests ways to improve current practices.

Introduction

In 2015, Public Health England (PHE) commissioned a programme of work to enable CCGs, local authorities and other commissioners to better understand the health and economic case for increasing investment in prevention and early intervention. Cancer was a key focus area for the programme which aimed to support commissioners in their move toward population-based commissioning of cancer care in order to improve outcomes. PHE led a group of multiple stakeholders in exploring the potential impact of earlier diagnosis of colorectal cancer (CRC).

This report brings together existing CRC research to inform CCGs on cost-effective CRC pathways and to help them consider where and how to invest in earlier intervention to improve clinical outcomes.

The report includes:

- consideration of the end-to-end CRC pathway (excluding prevention, which was out of scope for the work)
- a summary of the return on investment (ROI) tool
- a description of the methodology, source data, and local findings from the tool
- a 'signpost' to other relevant work on the topic

The report does not include:

- a review of costs at the national level, as this area is covered by other recent work including City University, SchARR, York (see references list for more information)
- a copy of the detailed NICE guidelines on stages of the pathway
- an instruction manual for the ROI tool, which is published separately from this report

This report is part of a much wider policy and research discussion on how to deliver cost-effective cancer care. The most notable contribution is 'Achieving World-Class Cancer Outcomes: A Strategy for England 2015–2020', a report by the Independent Cancer Taskforce which includes a set of 96 recommendations to improve cancer care in England and a robust analysis of how cancer care can be better commissioned and coordinated across CCGs and at the national level. In particular, this report is closely linked to recommendation 95: 'NHS England and Public Health England should work with Monitor and other bodies to consider how to develop better health economic evaluation of new service models and interventions.'

Section two of this report considers the phases of the pathway, starting with diagnosis. For each phase, this section:

- describes what cost-effective practice looks like
- analyses the degree of adherence to cost-effective practice
- discusses ways to make care more cost-effective, and then

- sets out the incentives for providers that make cost-effective care more or less likely. (For consistency, the cost-effectiveness summaries are drawn largely from NICE guidance)

Section three describes an easy-to-use ROI tool, a key deliverable of this project which helps commissioners calculate the costs and benefits of earlier intervention in their population. None of the existing guidelines or tools specifically helps commissioners make the case for earlier intervention at the local level. This tool aggregates existing research on costs and interventions and CCG-specific data to estimate the costs and benefits (financial and potential quality adjusted lives saved) to commissioners and to the wider health system. This section also explains how the costs and benefits are calculated so that commissioners can understand the tool's strengths and weaknesses as well as its outputs. After reading this section, commissioners should be able to explain to others in their organisation how the tool works.

Improving the cost-effectiveness of the CRC pathway

Outcomes of the pathway in England today

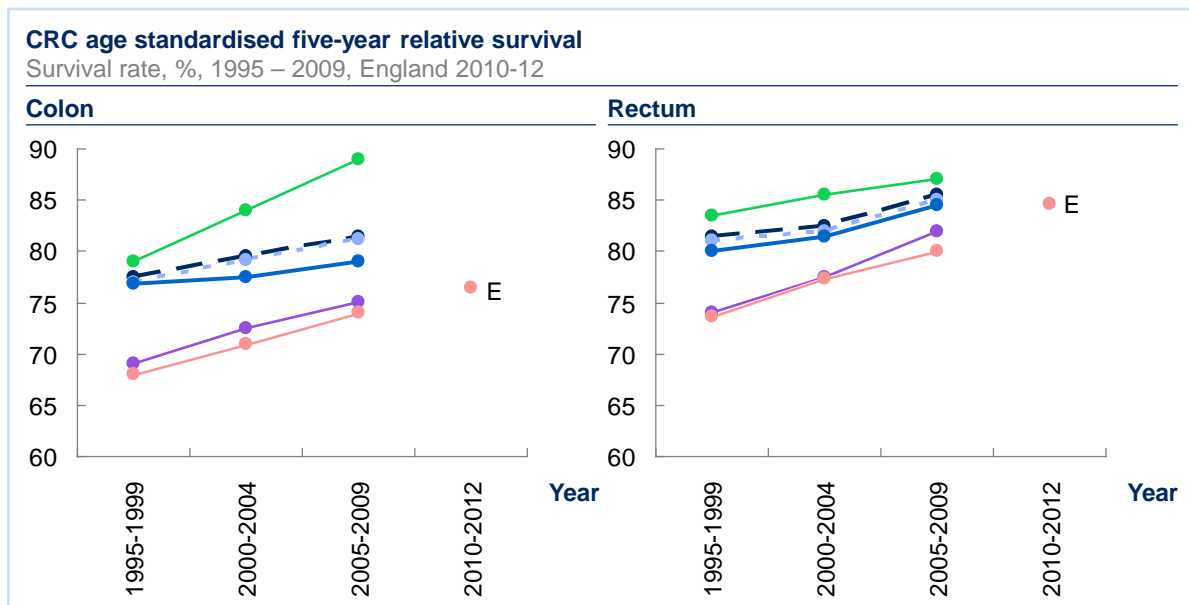
CRC is a major cause of morbidity and mortality in England, accounting for one out of nine cancer cases in England and an estimated 14,000 deaths in 2014 ^{[1][2]}.

Despite improvements, five-year survival rates for CRC in England are worse than in peer countries, and this gap has not closed significantly over time as it has for breast and ovarian cancers. (Figure 1) ^[3]. CRC survival rates also vary significantly across CCGs: the range for one-year CRC survival among CCGs for cancers diagnosed in 2012 was 16% (67-83%) ^{[4][5]}.

Figure 1: Age-standardised five-year relative survival trends, by cancer and by country

CRC outcomes in England (UK) lag behind peer countries in both level and pace of improvement

- Australia
- Norway
- Sweden
- Denmark
- Canada
- UK



SOURCE: Is England closing the international cancer gap in survival, Walters et al, 2015

Improving the cost-effectiveness of the CRC pathway

The CRC pathway extends from primary prevention through end-of-life care and can be thought of as having five phases: prevention, diagnosis, treatment, follow-up and surveillance and end-of-life care.

Figure 2: Components of the colorectal cancer end to end pathway



Alongside the NICE guidelines available for the pathway, a number of detailed descriptions of care along the CRC pathway in England have been set out, including:

- commissioning for colorectal cancer, Avon, Somerset, and Wiltshire Cancer Services and the London School of Economics, March 2014; and
- reappraisal of the options for colorectal cancer screening, the University of Sheffield/SchARR, January 2011.

The focus of this work is early intervention, so the analysis of cost-effectiveness begins with the diagnosis phase of the pathway.² A thorough discussion of interventions that help prevent cancer can be found in ‘Achieving World-Class Cancer Outcomes: A Strategy for England 2015-2020’ (Independent Cancer Taskforce, 2015).

For each phase following prevention we describe what is current ‘cost-effective practice’ (recognising that this is continually evolving) followed by an illustration of the types of variance that exist in cost-effective practice today. We then describe the latest thinking on how to improve care and provide a brief analysis of costs and incentives.

An extensive review of evidence was used to identify effective interventions seen to improve early diagnosis of colorectal cancer. Key sources of evidence were drawn from academic papers and empirical evidence sponsored by research charities together with real world examples taken directly from the NHS. Preference was given to studies that were in peer-reviewed journals, demonstrated a vigorous methodology and a good sample size.

Evidence drawn from the UK health system was prioritised for inclusion in the tool. This was done primarily to take into account critical constraints surrounding health system configuration, its implicit effect on health service delivery and the subsequent capacity

² A thorough discussion of interventions that help prevent cancer can be found in Achieving World-Class Cancer Outcomes: A Strategy for England 2015–2020 (Independent Cancer Taskforce, 2015)

for the system to attain improved patient outcomes. However, given the need to formulate many sensible assumptions to build a fit-for-purpose return on investment tool, research outside of the UK was considered if deemed relevant and no UK research was found.

Phase Two: Diagnosis

Cost-effective practice

The objective of cost-effective practice at the pathway’s diagnosis phase is for patients to be diagnosed as early as possible through the least intensive route. Since doing so can achieve better outcomes (potentially saving lives) and lower cost of treatment, all elements of practice are geared to achieving this aim³.

The level of progression of colon cancer is indicated by the stage at time of diagnosis, with stage 1 being the earliest and stage 4 the latest. [6]. The survival rates for CRC are significantly higher when cancers are diagnosed earlier (see Figure 3).

Figure 3: Diagnosed cases by stage and corresponding relative survival rates

	Colorectal Cases		Relative survival
	% Diagnosed cases, 2014		% 5-year survival
	Colon cancer	Rectal cancer	CRC
Stage 1	13	26	93.2
Stage 2	31	22	77.0
Stage 3	32	29	47.7
Stage 4	24	23	6.6

SOURCE: [NCIN Colorectal Cancer Survival by Stage 1996- 2006](#) & [TNM stage group by CCG by tumour type for 10 tumour types, PHE 2015](#) McKinsey & Company | 14

The total NHS costs of treating the disease for patients diagnosed at stages one and two are also much lower compared with stages three and four. For instance, the total

³ Although, as illustrated later in this report, the overall cost of achieving earlier intervention is likely to increase because of the greater number of diagnostics required.

cost to treat stage 1 colon cancer is estimated at £3,559 compared with £13,206 for stage 4 colon cancer [7].

Three routes lead to diagnosis:

1. The screening route includes patients identified by one of two screening tests: the gFOBT / FIT test and the bowelscope test [8]. CCGs seek to increase their ‘screening uptake%age’ or the share of eligible people who successfully submit their screening kit.
 - gFOBT (soon to be replaced by FIT) screening occurs every two years for people aged 60-74. Patients with an abnormal result are then sent for colonoscopy, after which a cancer diagnosis can be made
 - bowelscope (also known as flexi-sig): patients who are 55 years old qualify for the bowel scope (flexible sigmoidoscopy) screening. The benefit of the additional flex-sig screening is that it can help detect cancers before they arise. Since 80% of cancers arise in people who are 60 or over, the flex-sig screening at 55 helps identify abnormalities before cancer occurs [9]. Patients with abnormal results are referred for a diagnostic assessment with colonoscopy.
2. The emergency route includes people who are diagnosed following accident and emergency (A&E) attendance, usually with a complaint related to a symptom of their cancer, such as an obstruction.
3. The elective route includes the remainder of people diagnosed with CRC. Patients diagnosed through this route are already symptomatic, so their GP refers them as an urgent ‘two-week referral’, non-urgent or they are referred from secondary care.

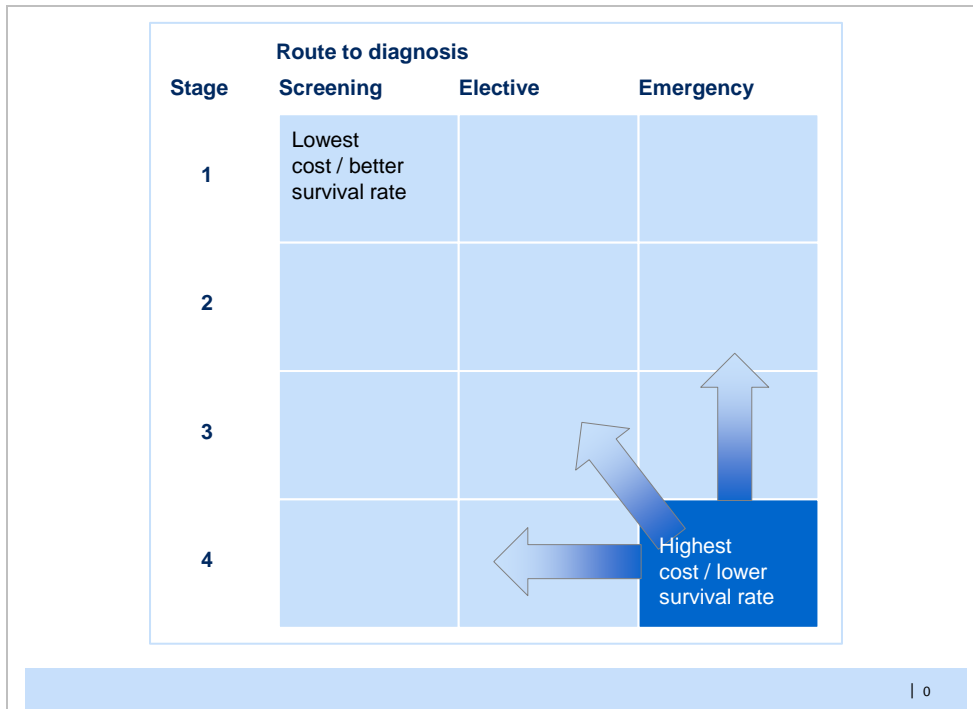
Patients diagnosed through screening and elective routes have higher survival rates compared with patients diagnosed through emergency presentations, which typically implies a more advanced stage of disease at detection.

Figure 4: Relative survival rates by route of diagnosis, England, 2006–2013 [10]

Colorectal		All routes	Screening	Two Week Wait	GP referral	Other Outpatient	Inpatient Elective	Emergency presentation	Unknown
Persons	1-month	92%	100%	99%	96%	94%	97%	78%	87%
	Confidence interval	92% 92%	100% 100%	98% 99%	96% 96%	94% 95%	97% 98%	78% 78%	86% 88%
	3-month	86%	99%	93%	91%	90%	93%	65%	82%
	Confidence interval	85% 86%	99% 99%	93% 93%	91% 91%	89% 90%	93% 94%	65% 66%	82% 83%
	6-month	81%	98%	88%	86%	85%	90%	58%	79%
	Confidence interval	80% 81%	98% 99%	88% 89%	86% 87%	84% 85%	89% 90%	57% 58%	78% 80%
	9-month	77%	98%	85%	83%	81%	87%	53%	76%
	Confidence interval	77% 77%	98% 98%	85% 85%	83% 83%	81% 82%	86% 88%	53% 54%	75% 77%
	12-month	74%	97%	82%	80%	78%	84%	49%	73%
	Confidence interval	74% 74%	97% 98%	82% 83%	80% 81%	77% 79%	84% 85%	49% 50%	72% 74%
	24-month	65%	95%	73%	71%	69%	77%	40%	65%
	Confidence interval	65% 66%	94% 95%	73% 74%	71% 72%	68% 70%	76% 78%	39% 40%	64% 66%
36-month	60%	92%	68%	66%	63%	72%	34%	60%	
Confidence interval	60% 61%	92% 93%	68% 68%	66% 67%	62% 64%	71% 73%	34% 34%	59% 61%	
number in cohort*	262,500	17,853	73,697	64,922	21,795	11,320	64,528	8,385	

Ultimately, the aim is to shift patients from later stage, high intensity of treatment presentations (eg stage four through the emergency route) to earlier stage, lower intensity of treatment presentations (eg stage one through screening) as illustrated in the figure below.

Figure 5: Schematic indicating the desired “direction of travel” from highest cost/poorest outcome to lowest cost/best outcome



Adherence to cost-effective practice

Comparisons with other countries illustrate the opportunities to achieve earlier diagnosis in England:

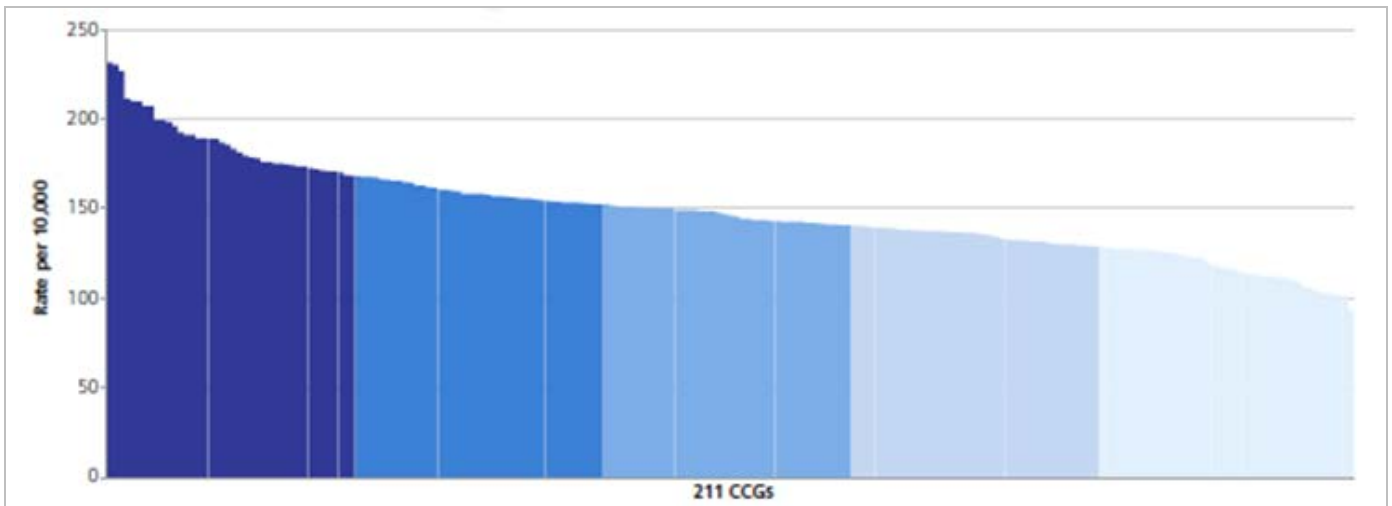
- overall, only 13% of cases in 2014 were diagnosed at stage one, compared with 24% at stage four [5]. Similar analysis in Canada estimated that as much as 17% of colon cancer patients were diagnosed in stage one [7].
- 8% of patients are diagnosed through screening and 53% through GP referrals (two-week urgent referrals and others), whereas 25% are detected in A&E and the remaining 14% through other elective routes. In Sweden, 17% of CRC patients are diagnosed through the emergency setting, about 8% age points less than in the UK [11].

The practices that lead to early diagnosis have significant variation, which can be attributed to a number of factors:

- the variation in screening rates across England is as much 20%, with less than 50% of patients in the worst performing areas participating in screening

- the proportion of people having colonoscopies across the country is also highly varied. The annual rate of colonoscopy and flexible sigmoidoscopy procedures ranged from 106 to 207 per 10,000 persons - almost a twofold variation even when the seven highest and lowest outliers are excluded ^[12]. Qualitative data suggests this result is due to concerns about cost-effectiveness and lack of capacity ^[12].

Figure 6: Rate of colonoscopy procedures and flexible sigmoidoscopy procedures per population by CCG ^[12]



- the ratio of colonoscopy procedures to flexible sigmoidoscopy procedures ranged from 0.75 to 3.74 - a fivefold range in 2012/13. A driver of that variation could be the progress of the bowel scope's national rollout. While both procedures have a role in practice, this level of variation would not be expected on the basis of patient characteristics alone.

Improving the cost-effectiveness of the diagnosis phase

Cost-effective improvements could be achieved through improved screening or earlier detection and assessment of symptomatic patients.

Improving screening uptake rates

Strategic health communication interventions with the public and effectively delivered health promotion programmes can increase bowel cancer screening uptake rates (defined as people who submit screening kits for testing as a percentage of the total people eligible for screening). Research conducted for this report indicated that the following health promotion initiatives can be used to increase the uptake of bowel cancer screening (review of the methods used is given in section 2.2; there may be more interventions available and this selection is based on our review of effectiveness at this time).

Improving GP involvement in the CRC screening process:

- GP endorsement letter for screening (seen to increase screening uptake by approximately 6%)^[13]
- enhanced screening information leaflets (also expected to increase uptake by around 6%)^[13]
- GP endorsement letter and enhanced patient leaflet (12% increase in uptake)^[13]

Providing informative community advice about the screening process:

- telephone advice (8% increase in uptake)^[14]
- face-to-face advice (5% increase in uptake)^[15]

Better collaboration with regional and national stakeholders, such as enhanced gFOBT kits, supplementary information provided by a charity, or advertising can also increase uptake by 6 to 7% [16]

Screening uptake is associated with level of deprivation, with one study finding that uptake ranged from 35% in the most deprived areas to 61% in the least deprived areas^[17]. Deprivation is a factor that, therefore, could be taken into account when aiming to improve uptake.

In 2015, bowel scope screening was introduced for people 55 years old as a one time test for pre-cancerous polyps. Given the recency of the new policy, there is limited analysis of ways to increase bowel scope uptake. However, it might be reasonable to assume promotional efforts that improve screening uptake could also increase bowel scope screening.

Improving elective routes to diagnosis

If a patient is symptomatic but the condition is not yet an emergency, the objective is to achieve a definitive diagnosis in the shortest amount of time, through the most efficient care pathway, and at the earliest stage. The main ways to pursue this goal are to promote symptom awareness, encourage people to discuss relevant symptoms, improve triage and increase access to diagnostics.

GP urgent referral criteria—lowering the referral thresholds

New guidance issued by NICE aims to improve rates of early diagnosis by lowering the urgent referral threshold. Amendments to GP referral criteria aim to decrease the predictive risk rate of cancer from 5% to 3% by effectively referring more patients for specialist services^[18].

The Royal College of GPs, CRUK, Macmillan, Bowel Cancer UK, and the national strategic clinical networks have issued primary care training and communication programmes to support increased adoption of the new referral guidelines. Initiatives include a series of A3 poster decision aids to facilitate referral of suspected cases, GP referral forms enabled on the EMIS programme and GP cancer decision support tools

[19]. The Macmillan cancer decision support tool (CDS) is a good example of a way to improve GP referral quality within the constraints of a 10 minute appointment. Launched in 2013, the CDS has already received positive feedback and won the Cancer Care Patient Safety award by the Royal College of General Practitioners [20].

Redesigning diagnostic services

Improving access to diagnostic endoscopy services

Enabling GPs to have direct access to diagnostic endoscopy services can improve rates of early diagnosis and achieve a lower cost of treatment. Endoscopy services play an important role in ensuring early diagnosis in patient groups that do not meet the criteria for the two-week urgent referral but have symptoms which require further investigation. In a recent study presented at the National Cancer Intelligence Network conference in 2015, patients that were referred directly to endoscopy services and diagnosed with cancer were five times as likely to be diagnosed at stage one than patients referred to the two-week referral system. To a large extent, this result is expected given that the direct-to-endoscopy patients would not have qualified for a two-week urgent referral. That is, they would have symptoms suggestive of earlier stage cancer. However, the finding suggests that direct to endoscopy can help diagnose patients earlier [21] [22].

Increasing access to diagnostic colonoscopy

Access to colonoscopy could be improved by either bringing in new capacity or by increasing capacity within current resources. Current budgetary pressures make paying for additional capacity difficult. Within these constraints, CCGs may at least be able to ask providers to review their colonoscopy (and other diagnostic) services and redesign services to increase capacity without increasing costs. By using lean tools and techniques, CCGs can reduce down times, minimise staff time, adjust staff mix and increase throughput and utilisation.

Implementing 'straight-to-test' services

The implementation of triaged 'straight-to-test' systems has been shown to save both time and money. In these systems, patients presenting to a GP with lower gastrointestinal symptoms are referred to a telephone assessment clinic. The patients may be on the two-week wait or the 18-week pathway. The telephone clinic, usually staffed by specialist nurses, applies an algorithm to triage patients either 'straight-to-test' to colonoscopy or to flexible sigmoidoscopy based on the reported symptoms. The triage system helps cut time and expense in the pathway by getting patients a definitive diagnosis faster, in fewer appointments and often at a lower cost. For example, in a recent pilot study at Barts Health NHS Trust, 725 patients were referred to the triage system leading to a 50% reduction in the need for an outpatient visit, an estimated £160K in direct savings and the indirect benefit of earlier diagnosis for patients who are no longer forced to wait or circulate through the system [23].

Costs and financial incentives

The diagnosis phase of the pathway costs £400 to £700 per patient, taking into account the costs of specific interventions such as colonoscopies and CT scans, as well as the estimated proportion of patients receiving the intervention ^{[6] [24] [25] [26]}. A significant portion of the total costs CCGs pay across all patients for this phase is for the 90% of patients who undergo diagnostics but are not ultimately diagnosed with cancer. An intervention therefore might significantly increase the number of colonoscopies CCGs pay for while resulting in relatively few early diagnoses. This is one of the reasons why the case for early intervention is not always compelling for commissioners.

Furthermore, achieving aligned incentives in the diagnosis stage of the pathway is particularly difficult because of the number of stakeholders involved and the extent to which various budgets are siloed.

Incentives for improving screening and elective routes to diagnosis

Although improving screening and elective routes to diagnosis is cost-effective, issues related to incentives make it harder to invest in earlier diagnosis. Bowel screening is administered by a dedicated NHS national programme, which typically finances commissioners on a per head basis for a set amount of screening kits and follow-up diagnostics. CCGs view this amount as their “baseline” funding for screening each year. To ensure maximum uptake of screening, CCGs should have the same incentive as the screening programme, since patients detected through screening will have better outcomes and lower lifetime costs than if cancer is detected later.

In fact, CCGs may have a short-term disincentive to promote screening or elective referrals due to the impact on waiting times if more patients are sent for diagnostics (for example, colonoscopies). Since diagnostic facilities are contracted for a specific level of activity from the screening programme (that is, the ‘supply’ of diagnostics), increased demand for diagnostics due to greater screening uptake or more referral activity would result in longer waiting times and more pressure on CCGs to meet targets for timely results. Eventually, CCGs would need to procure more diagnostic capacity, which can be expensive and in limited supply. Transformation funding to redesign diagnostic services in CCGs is one way to overcome the existing capacity hurdle which disincentivises CCGs to seek earlier diagnosis over the short term. Benefits of earlier diagnosis (ie fewer late presentations) should accrue to CCGs over the long term.

Local GPs are another key stakeholder for improving early diagnosis. Even though CCGs pay for diagnostic procedures, GPs may be reluctant to refer more patients for colonoscopy because of real or perceived capacity constraints. GPs may also lack sufficient confidence in their own detection and referral skills.

Time constrained GPs may not respond adequately when informed that their patient has not taken advantage of bowel screening or has had a positive FOBT but not seen the

nurse. GPs may need an incentive (eg peer review, commissioner scrutiny) to prioritise these actions.

Local authorities may also have a financial disincentive to spend on screening promotion efforts, since the health and financial benefits from earlier detection accrue to the CCG through lower treatment costs over time. This disincentive could be mitigated, however, by payments from central government for improvements to the public health outcomes framework ^[27]. Notably, this issue might be further alleviated as closer collaboration between CCGs and local authorities, as well as system-level collaboration across CCGs, enables more CCGs or health systems to pool budgets and share risk. The current sustainability and transformation-planning process should help local health economies move in this direction.

Reducing emergency presentation of CRC

For instances where patients are diagnosed through the emergency route, CCGs pay for the A&E visit, emergency procedures and initial hospitalisation, in addition to subsequent definitive treatment for the cancer. CCGs should see the financial (as well as clinical) incentive to minimise emergency presentation by promoting screening and early referral but this task is likely complicated by the incentive issues above. Hospitals typically seek to minimise emergency activity because of the operational implications on their performance. Emergency demand makes it difficult for hospitals to meet national waiting time targets, and hospitals are not fully reimbursed for excess emergency demand due to the national 'emergency threshold', which pays only 30% of the full tariff for emergency visits above a hospital's historical benchmark.

Phase Three: Treatment

Cost-effective practice

NICE recommendations are summarised as:

- laparoscopic resection (removal of the tumour) as an alternative to open resection for patients with resectable tumours. Although laparoscopic resection is more costly than conventional open resection, patients treated laparoscopically have reduced hospital stays. Therefore, it should be considered as a means of initial treatment for CRC ^[28].
- subsequent chemotherapy for patients with high-risk CRC. Evidence suggests that high-risk patients are likely to gain three disease-free years when treated with chemotherapy ^[29].
- advanced chemotherapy (for example, FOLFOX and XELOX) for metastatic colorectal cancer

It is estimated that 70% to 80% of all CRC patients will be surgically treated and cured of the disease, with the remaining 20% to 30% having to rely on other treatment modalities such as chemotherapy and/or radiotherapy ^[30].

Adherence to cost-effective practice

National and population-level data about treatments is largely absent, even though such data would be very valuable in understanding the sequence of events that leads to the most cost effective outcomes for certain types of tumours. The data that do exist show that too many resections are done as emergency surgery in parts of the country. In 2014-15, some areas performed four times as many emergency surgical resections as others, and in certain regions 50% of admissions were considered an emergency^[31]. Outcomes also vary considerably by the type of patient admission: 30-day post operative mortality was nearly double for emergency versus elective admissions.

Improving care

The NHS Five Year Forward View makes a compelling case for the greater concentration of specialist acute services to ensure care is not only safe but also sustainable. A broad body of evidence indicates a strong link between the number of patients undergoing a particular specialised treatment and the overall quality of patient care. This result is due mainly to the fact that a greater concentration of such services allows for improved and sustainable access to necessary specialist clinical expertise and high-value specialist equipment, which helps to deliver standardised quality care.

Creating health economies in which patient flows are efficiently managed at scale can support sustainable CRC services and promote cost-effective care and improved outcomes. The recent effort to create regional Cancer Alliances should help establish these health economies and promote coordination among providers. Similarly, smaller acute trusts could consider federated ways of working to ensure that the appropriate surgical expertise is present, thus enabling the local provision of non-complex surgery such as laparoscopic resection.

The enhanced CRC recovery programme for colorectal surgery should also be adopted across local health economies to improve cost-effective care (a 2014 UK study found that the enhanced recovery programme could reduce the length of stay by 0.5 to 3.5 days)^{[32] [33]}.

To provide safe specialist surgical care for CRC, the proper facilities must be available to manage complications if and when they occur. A number of other similar codependencies should be considered when delivering care^[34].

To make treatment more cost-effective, hospitals could pursue one of two different approaches. At the simpler end, they could promote the use of laparoscopic rather than open surgery, which reduces recovery times. Hospitals would most likely be eager to take this approach if they are still allowed to charge at the current tariff (since lower costs will produce higher margins) and less keen if the tariff is changed to match the lower cost structure. Tariff based approaches have previously been used successfully to switch activity from elective inpatient to day case where appropriate.

In more complex cases, CRC surgery and radiotherapy/chemotherapy could be reorganised into centres of excellence which would direct volume away from many hospitals and into a few. CCGs could use their ability to negotiate local variation in contract pricing with hospitals to create disincentives for performing procedures that could otherwise be done by a local centre of excellence. However, the benefits of centralisation need to be balanced with the advantages of keeping radiotherapy/chemotherapy closer to home for the patient.

Last, information technology can allow the sharing of patient information and care plans across different settings to ensure the wishes of patients are being followed. Investments in technology have also been shown to enhance the communication and co-ordination of care within and across settings, thus helping to improve outcomes while lowering costs. For instance, research highlights the value of using data and information technology at the beginning of the CRC pathway to identify eligible patients for screening and send electronic reminders when screening should take place ^[35].

Costs and financial incentives

The costs of this phase of the pathway depend significantly on the stage of the cancer at time of diagnosis, as well as the route to diagnosis. For example, treatment costs can range from £1,600 for stage one to more than £7,000 for stage 4 ^[6]. Treatment via the emergency route includes the additional cost of treating the obstruction which led to the emergency.

Incentive issues between CCGs and specialised commissioning

In the treatment phase of the pathway, CCGs pay for surgical treatment and hospital stay. Specialised commissioning pays for some (usually expensive) drugs. Most CCGs pay hospitals by unit of activity (ie HRG on payment by results tariffs). Since treatment at earlier stages is less intensive, CCGs and specialised commissioning are incentivised for earlier detection. However, some CCGs still use block contracts, reducing the direct link between treatment activity and total price paid.

Earlier detection increases the likelihood of a cure through surgery alone and less need for expensive and sometimes debilitating chemotherapy. This outcome should be aligned with specialised commissioning's interest to manage its own budget and limit overspending.

On the other hand, because CCGs do not pay for chemotherapy, the cost to them of a patient with stage three cancer may not be much more than treating an individual with stage two cancer. Consequently, this structure may reduce their financial incentive to drive early diagnosis (bearing in mind that cost in this sense is defined by a CCG's cash outflow rather than cost in a broader sense of psychological support needed to progress with treatment or illnesses aggravated by the cancer). Since chemotherapy is a substantial cost to the system, it is important that CCGs see these costs and take them into account when analysing the ROI associated with early detection interventions.

Potential solutions to these issues

A type of 'risk-sharing' arrangement with specialised commissioning might help align incentives with CCGs. For example, a local threshold of stage four cancer presentations could be set (similar to the threshold for emergency presentations) above which a commissioner bears part of the cost of chemotherapy.

The move toward place based commissioning of services is a welcome development, as working in a more integrated way across sustainability and transformation plan (STP) or Cancer Alliance footprints helps to better align incentives. For instance, in STP footprints where some commissioners run surpluses while others run deficits, pooling funds to pay for the new diagnostic capacity would benefit the full footprint. The Cancer Alliance footprints, designed with the aim of helping plan cancer services for their population and designing care pathways, should also help address cross-organisational disincentives ^[36].

Incentive issues for hospitals

Hospital financial incentives may be mixed with respect to early diagnosis. On the one hand, increasing earlier diagnosis means finding more cancers, which means more treatment and more surgical and inpatient activity. On the other hand, finding more cancers earlier means lower revenues for a hospital in the future as treating a stage 1 cancer today is less expensive than the cost of treating a stage three cancer in a couple of years.

Also, over time, finding and treating CRC at earlier stages might reduce the need for radiotherapy and chemotherapy which are primarily used to treat later-stage cancers. In theory, this shift would reduce utilisation of these high fixed cost cost centres in a hospital.

Potential solutions to these issues

Given the undeniable clinical benefit of earlier diagnosis and the tendency to focus on near term financial impact rather than the longer-term implications, we expect that the loss of higher future revenue from later diagnosis of cancer will not be a factor in hospital decision making. Furthermore, the existing hospital cost base could be at least partially covered in the future by revenue increases driven by the expected increase in CRC incidence over the years.

In recent years, fixed cost centres for radiotherapy and chemotherapy have had limited capacity in health systems and increasing demand. We would expect that any extra capacity created through earlier CRC detection would be taken up by other demand (in particular if CRC incidence continues to increase).

Phase Four: Follow up and surveillance

A large number of CRC patients now go on to survive longer or live with cancer. As a result, patients increasingly have to manage the effects of either past or ongoing treatment. Currently, an estimated 250,000⁴ people are living with CRC [29]. As noted in the 2013 Macmillan report 'Cured - but at what cost?', not all cancer survivors 'are living well'. In fact, at least one in four cancer survivors in the UK face poor health or disability after cancer treatment^[24].

Cost-effective practice

NICE recommendations can be summarised as:

- a follow up appointment for patients four to six weeks after curative treatment
- regular surveillance with minimum of two scans of the chest, abdomen, and pelvis in first three years
- regular tumour marker blood tests every six months in the first three years
- surveillance by colonoscopy conducted a year after initial treatment; if results are normal, colonoscopic follow-up should be considered after five years

Adherence to cost-effective practice

Although we have a clear idea of what cost-effective practice looks like in the hospital, more measurement is needed on adherence to NICE recommendations for follow-up and surveillance.

Improving care

Follow up care aims to provide support to CRC patients post treatment - physical as well as emotional support. The provision of such services aims to promote the early detection of recurrent cancer and empower patients to manage their symptoms. Traditionally, such programmes would routinely take place in the acute outpatient facility with a specialist oncologist. However, provision of such services can at times be ineffectual and costly, with wide variation in the availability and quality of follow up care.

The National Cancer Strategy recommends stratified follow up pathways and a recovery package. The latter was developed by the National Cancer Survivorship Initiative (NCSI) as a combination of interventions to improve detection of the consequences of treatment. As described in the 2015 National Cancer Strategy report, stratified follow-up pathways 'comprise needs assessment, support for patients to self-manage, remote monitoring, and re-entry pathways'. The report goes on to describe a Northern Ireland

⁴ Figure based on UK estimates of total cancer prevalence based on patient diagnosed from 1971 to 2004 taken from Trent Cancer Registry in 2008. This figure aligns with Cancer Research that estimated a 10-year prevalence of approximately 150,000.

pilot for breast cancer and CRC which applied stratified follow-up pathways to eliminate the need for thousands of outpatient appointments^[37]. Broomfield Hospital Mid Essex NHS Trust has also succeeded in applying stratified pathways to improve outcomes and reduce outpatient appointments by approximately 600 a year^{[38] [39]}.

Supported self-management in the form of remote follow up can play a vital role in helping patients to take an active lead in their recovery, rehabilitation, and ongoing care^{[40] [41]}. Remote aftercare services aim to move away from the model of planned episodes of outpatient care to a system where patients are 1) empowered to self manage their aftercare, and 2) able to receive specialist advice without having to obtain an unnecessary re-referral from their GP^[42]. Nurse led follow-up care is also a specific model which has been produced positive experience for patients and been cost-effective in some cases^[43].

Costs and financial incentives

The cost of follow up and surveillance is spread throughout a multiyear period. Inclusive/CRUK 2014 suggests that the total average cost of follow-up is £1,246 per patient. Since these costs are paid by CCGs, we would not expect efforts to increase early detection to create any major incentive issues in this stage of the pathway.

Phase Five: End of life

Cost-effective practice

The goal for end-of-life care is to ensure that patients are treated with dignity and respect, have their voices heard, receive detailed high-quality information about the options available to them and are supported in making treatment and care choices. A key outcome metric at this phase of the pathway is the percentage of patients who died in their preferred setting.

NICE recommendations are summarised as:

- improved assessment of the individual needs of people with cancer, including all the domains of physical, psychological, social, and spiritual care
- access to high-quality information, including better “signposting” of statutory and voluntary information and support services
- active promotion of self-help and support groups, recognising the large role played by people with cancer in managing their own care
- enhanced provision of supportive and palliative care services to meet current unmet needs

Adherence to cost-effective practice

Evidence shows that end-of-life care is more cost-effective when provided in the community than in the hospital. An analysis by the End of Life Care Intelligence Network

estimated the cost difference at almost £1,000^[37]. Dying at home is also consistent with many people's preferences. A 2015 National Survey of Bereaved People (VOICES) England found that 17% of respondents who witnessed their loved ones dying in hospital indicated that they did not die in the right place. This belief dropped to 3% when patients died at home.

Improving care

Multiple interventions can take place at the end of a patient's life to ensure they are treated with respect and dignity and remain as comfortable as possible. The Gold Standards Framework (GSF) was initiated in the UK in 2004 and continues to develop guidelines to improve the organisation and quality of community end-of-life care. This systematic, evidence-based approach seeks to optimise care built on the seven Cs (Communication, Coordination, symptom Control, Continuity out of hours, Caregiver support, Care of the dying). The GSF also serves as a training platform to build capacity among general health workforce, palliative care nurses, care homes, and hospices^[44]. Additional efforts to enable more cost-effective care include access to a 24 hour helpline, rapid response services and advance directives and preferences^[45].

Costs and financial incentives

CRUK/Incisive 2014 suggests that the total average cost of end-of life care is £7,703 per patient. Of course, the likelihood of receiving end-of-life care depends significantly on the stage of the cancer, with stage one patients spending very little on end-of-life care.

Once again, CCGs pay for this phase of the pathway. We would not expect efforts to increase early detection to lead to any major incentive issues.

Return on investment analysis

The above review of CRC pathway performance makes it clear that there are many opportunities to deliver better outcomes and to do so cost-effectively across the colorectal care pathway. This section of the report deals with improving the pathway by increasing the rate of early diagnosis.

None of the guidelines or tools currently available for commissioners specifically helps them make the case for earlier intervention at the local level. A key deliverable of this project is an easy-to-use tool that helps commissioners calculate the costs and benefits of earlier intervention in their population. The tool draws on existing information on costs and interventions as well as CCG specific data to estimate the costs and benefits to commissioners and to the wider health system.

The purpose of this section is to explain how the costs and benefits are calculated so that commissioners understand the tool's strengths and weaknesses within their local context. This section describes the methodology (outputs of the tool, the available inputs, and the logic that connects the two), provides an illustration of the tool for one CCG, and assesses the tool's overall strengths and weaknesses.

Methodology

In this methodology section we start with the desired outputs of the ROI tool, then we describe the data available and finally, we describe the logic that goes from data to outputs. A ten year time horizon was used throughout so that a 'steady-state' of benefits and costs over time could be achieved following any intervention in the starting year.

Outputs

The tool's output represents an answer to these three questions for commissioners:

1. How is my CCG performing today?
2. What is the health gain associated with earlier intervention?
3. What is the economic impact associated with earlier intervention?

We assess CCG performance by looking at metrics such as:

- CRC survival rate
- average scheduled spending per elective presentation
- CRC diagnoses split by stage at time of diagnosis and route to diagnosis (see the tool for the full list of available metrics)

We assess health gain by estimating the future split of CRC diagnoses by stage and route to diagnosis, based on the intervention selected. We assess economic impact by estimating a selected intervention's total cost and future cost trajectory.

Figure 7: Tool output for CCG performance

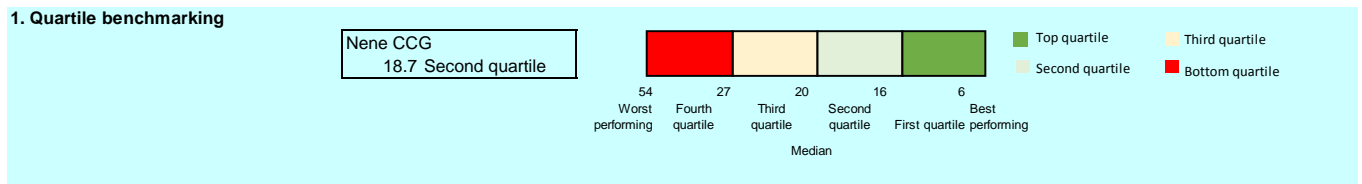
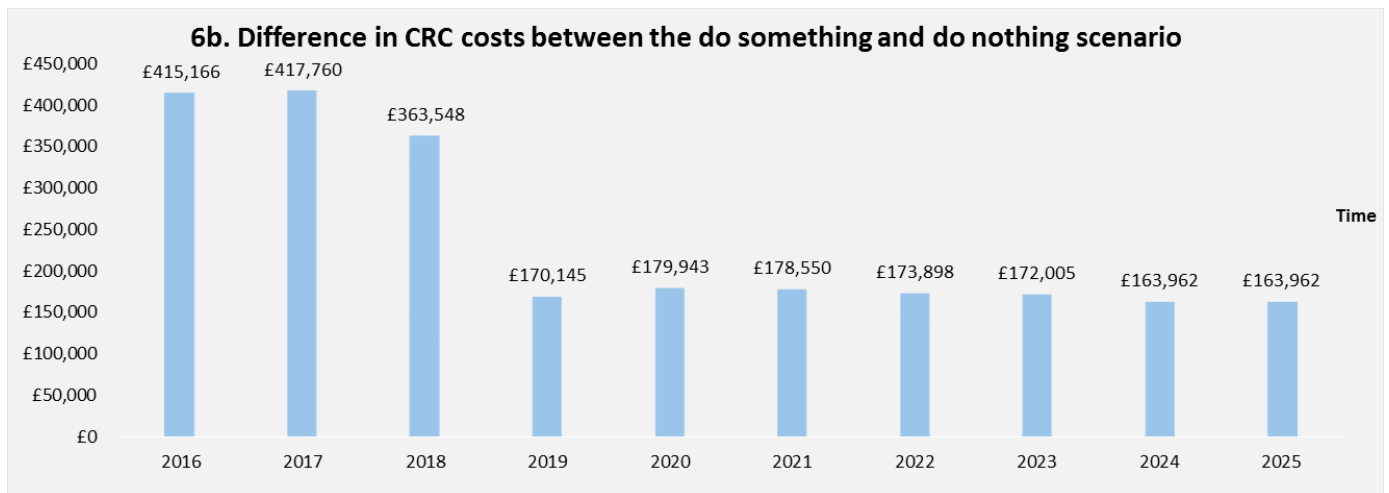


Figure 8: Tool output for economic impact



Available data

There are four types of data needed to produce the desired outputs: CCG performance, the number of people diagnosed, the cost of the pathway and the interventions to increase early diagnosis. The available data sources used here are defined as follows:

CCG performance

A number of publicly available sources from Public Health England and the Department of Health were used to identify metrics such as survival rates, screening levels, and diagnostic capacity.

Local population diagnoses

Public Health England provided an extract from its Cancer analysis system (CAS) database with summary information about each CCG population that described the number of diagnoses by stage and route to diagnosis.

Costs

This work draws on five extensive analyses of CRC pathway costs in England prepared since 2004, with the most recent published this year. The cost analyses calculate total CRC costs from the specific units of activity that happen to an ‘average’ patient along each step of the pathway. Each analysis, however, differs in some key respects, so a triangulation was needed.

For instance, some analyses calculated costs based on all of the activity that happens to a patient diagnosed with cancer, including activity not related to the cancer ('cost of treating the patient'), while others figured cost based on just the activity needed to diagnose and treat the cancer ('cost of treating the disease'). Some analyses broke down costs by stage at time of diagnosis, and others by route to diagnosis

The primary source of cost data in the tool is the 2014 CRUK/Incisive paper, 'Saving lives and averting costs'. This paper calculates the 'costs of treating the disease' and looks at each phase of the pathway from diagnosis to end-of-life care. Since this paper did not specify the cost difference between emergency and non emergency presentations, an assumption was made based on the reference papers. CRC cost is an active area of research, and work by City University London (led by Mauro Laudicella) is expected to provide more recent and highly granular cost data which builds on his existing research in this area ^[46].

Costs are separated between system level (defined as CCGs and specialised commissioning) and CCG costs, as chemotherapy costs are assumed to be not borne by CCGs but by specialised commissioning.

Further detail on the specific cost assumptions by stage and route to diagnosis can be found in the tool itself.

Interventions

Evidence was aggregated through a search of the available literature on interventions to increase the effectiveness of screening (described in section 2.3.3)

Underlying logic

The tool uses the CCG's own data to estimate the benefits (in terms of fewer late presentations) that could accrue over time from diagnosing people earlier. The primary goal is to diagnose more people at an earlier stage to avoid a later diagnosis in the future. The following steps cover both the intervention that achieves earlier diagnosis and the estimated benefit.

Step 1. An early intervention increases the number of people screened or referred for a colonoscopy after an elective presentation.

Step 2. The CCG pays for all of the people referred for colonoscopy, and some of those people are diagnosed with cancer. Since the diagnoses resulted from screening or elective referral routes, the evidence suggests these people would be diagnosed at an earlier stage of the disease.

Step 3. If the CCG had not intervened early, some of the people diagnosed in step two would have been diagnosed later through a more intensive route such as A&E. We estimate where and when these people would have been diagnosed based on the CCG's split of staging and route to diagnosis today and the natural progression of CRC.

The output of Step 3 is a calculation of economic impact (cost difference) and estimated health benefit (number of late diagnoses). The illustration below describes how economic impact and health benefit is defined in the model.

Illustration

The ROI tool's insights are most relevant at a local level. Therefore, to illustrate its value, we have chosen to show how a single CCG (in this case, Nene CCG) might use the tool to gauge current performance and to evaluate the case for a screening intervention and elective referral intervention.

Nene's current performance

The ROI tool indicates that Nene CCG commissions services for a relatively large population (around 700,000 people) in Northamptonshire. In 2013, Nene diagnosed 405 new CRC cases and spent nearly £3 million on treating these patients in its 2013-2014 programme budget⁵ [47] [48]. Nene diagnoses the median number of CRC patients per year per 100,000 population and, each year, Nene performs about 4,500 colonoscopies. Nene performs better than the median in terms of having a low percentage of people waiting more than four weeks for a colonoscopy but is in the bottom quartile with regards to the 'one-year survival rate' metric.^{[49] [50]}

Case for a screening intervention

As noted in Improving the cost-effectiveness of the diagnosis section above, the distribution of GP endorsement letters together with enhanced leaflets can increase the screening uptake rate by 12%. For Nene, that means an additional 6,383 patients are screened, an additional 319 get colonoscopies and an additional 16 people are diagnosed with CRC each year. The intervention itself costs £53,000 (the expense of mailing letters to the population eligible for screening⁶), and additional diagnostics and screening total around £240,000.

The combined costs of diagnostics and treatment after the intervention add around £310,000 annually to system costs compared with taking no action (system costs include both Nene's costs and the costs of chemotherapy which are assumed to be paid for by specialised commissioning) in the first couple of years after the intervention. Even after the cost reductions of fewer late presentations kick in, the system still pays approximately £142,000 more annually than if it did nothing (in year 10). For that £142,000 in cost, however, Nene patients are receiving a significant quality return. By year 10, five fewer people each year are being diagnosed with stage four colorectal cancer, which has a 7% five-year survival rate. When calculated by the cost per healthy

⁵ Based on latest available data for all CCGs; individual CCGs may have more up to date local data.

⁶ Assuming a unit cost of £1

life year gained, the intervention is estimated to cost only £950 per healthy life year gained, a highly cost-effective result⁷. Earlier diagnosis increases the odds of treatment success, resulting in fewer complications and better quality of life.

Case for an elective intervention

Elective interventions include GP referral criteria, GP training to improve detection, or reconfiguring diagnostic services. Unfortunately, there is limited evidence on the likely impact such actions might have on diagnostic referrals such as colonoscopies. Therefore, the tool enables Nene to estimate the direct cost-effectiveness of expanding diagnostic (for example, colonoscopy) capacity. If, for example, Nene increased the number of colonoscopies performed by 10%, it would result in an additional 566 colonoscopies annually at a total cost of just above £300,000.

The combined costs of diagnostics and treatment after the intervention add approximately £415,000 annually to system costs in the first couple of years compared with no change. Even after the benefits of fewer late presentations kick in, the system still pays just above £160,000 annually more than if it did nothing (in year 10). For that £160,000 in cost, however, Nene patients are receiving a significant return. By year 10, Nene CCG is diagnosing eight fewer people with stage 4 colorectal cancer each year. When calculated by the cost per healthy life year gained, the intervention is estimated to cost only around £734 per healthy life year gained, a highly cost-effective result.

Strengths and limitations

Despite some limitations, the tool represents a major step forward. We briefly describe the strengths and limitations of the approach taken.

Strengths

- this is the only tool currently available that calculates the benefits of earlier diagnosis at a local level
- the tool is specifically designed 'out of the box' to help users develop business cases for early intervention
- the tool uses the latest CCG level data from the CAS database, which only started tracking robust data on staging and route to diagnosis after 2013
- supplementary CCG data is not needed to use the tool.
- the tool benefits from recent research into the costs of the pathway

⁷ Healthy life years are quality adjusted based on evidence from a 2012 Dutch study and the Dutch SF-36 quality-of-life scoring survey (best available evidence).

Limitations

- the tool's output is a 'what if' scenario based on a number of strong assumptions that tomorrow's patients will look like today's and that the disease will progress as expected if nothing happens
- the cost data uses the current estimate of costs at a national level rather than actual events that happen at a local level for each patient in each CCG
- the tool only considers shifting people between stages of the illness. Screening can, however, help identify pre-cancerous polyps with significant savings to the health system, and this is not considered in the model.
- the tool is not based on a statistical simulation (for example, Monte Carlo) that generates a numerical confidence interval around the outputs

Conclusions

This project confirms that there is substantial opportunity to improve the cost-effectiveness of CRC outcomes in England. This report describes the pathway in detail as well as the most cost-effective ways to improve early diagnosis. The accompanying tool helps commissioners evaluate just how cost-effective those interventions might be in their region.

Many approaches go even further in the pathway analytics that can help commissioners improve care. In the future, we would want to use even more granular data about the events that affect the patient along the pathway, such as what medicines each patient received and the timing, to predict outcomes. Important incentive issues must also be tackled, in particular the disincentive for CCGs to do things that might increase colonoscopy demand. Ultimately, we hope the outcome of the work is more informed decision making by local leaders on the benefits and trade-offs associated with earlier diagnosis of CRC and shifts in the pattern of investment toward early intervention.

Appendix

Additional detail on how to improve screening rates

Improving GP involvement in the CRC screening process

More should be done across the system to integrate primary care involvement with the national screening process. The National Bowel Cancer Screening Program (NBCSP) largely operates in parallel to primary care service provision. More specifically, invitations to screening are sent out by the five NHS Bowel Cancer Screening Programme hubs, independent of GP practices. Patients found to have abnormal results are invited by the programme to local screening centres for further diagnostic assessment^[51]. Ultimately, this approach means that GPs have limited involvement in the screening process, with doctors receiving a copy of the results only when final letters are sent out to patients.

In comparison, managed care organisations in the United States see health promotion and health care as intimately intertwined, with the latter used as an opportunity for health promotion. For example, whenever a patient interacts with the healthcare system, whether at a pharmacy, a GP practice or an A&E with an unrelated condition, a ‘flag’ on their health record identifies that they have not participated in a screening programme. This interaction offers an opportunity for the healthcare provider to encourage participation and even to book an appointment or give out a screening kit

GP endorsement letter of screening

Personally addressed GP endorsement letters sent to eligible screening participants have increased uptake rates by more than 6%. Letters are sent from GPs to inform patients about the importance of completing the CRC screening process. The letters offer to support patients if they had any questions surrounding the screening process overall, emphasise the importance of recognising symptoms of bowel cancer, and recommend that patients take the FOBT test. Messages surrounding GP endorsement were communicated in the “gain-framing” approach to optimise FOBT return rates.

Figure 9: Number of people returning FOBT kits within 20 weeks ^{[13] [14]}

	Number of participants	Screening—FOBT tests returned	Difference in screening update
Usual care - no involvement	159	49.4%	-
GP letter only	177	55%	5.6%
GP letter signed	155	64.9%	10.8%
Enhanced leaflet only	178	55.3%	5.9%
GP letter plus enhanced leaflet	197	61.2%	11.8%

Enhanced screening information leaflets

Commissioners should actively work to provide practical and easy-to-follow advice around stool application on testing kits. Enhanced literature that clearly provides step-by-step information around stool sample collection can play a critical role in encouraging patients to return testing kits. CCGs should work to provide practical information which actively addresses the key barriers to completing testing kits. Effective patient literature works to actively address patient reservations around 1) time required to take the test; 2) the unpleasant, messy nature of stool collection and 3) subsequent storage^[16].

Distribution of such improved literature (language that is easy to read yet sufficiently detailed on the stool collection process) has increased rates of screening by around 6%.^[16]

GP endorsement letters plus enhanced screening leaflet

Distribution of both GP endorsement letters and enhanced screening leaflets can nearly double the rates of screening uptake. Combinations of both methods of intervention have produced an additive effect, increasing rates of FOBT by approximately 12%^[13]. Commissioners should work to distribute communication that strategically addresses key considerations around 1) the clinical need for screening by providing a GP endorsed letter and 2) provide a practical how-to-guide that addresses perceived barriers around stool collection^[13].

Informative community advice

Interactive live advice that aims to provide a supporting hand for patients embarking on the screening process can also lead to improvements in participation. Indeed, giving participants the opportunity to talk to trained community advocates can provide a vital route to engaging hard-to-reach populations which are eligible for bowel screening. More specifically, follow up telephone advice together with face-to-face advice can improve rates of screening participation in lower socioeconomic groups and within certain ethnic groups where English is a second language.

Follow-up telephone advice

Rollout of telephone advice intervention led to an overall increase of more than 8% in bowel-cancer screening^[15].

Face-to-face group information sessions

Face-to-face group information sessions can also improve uptake. As with the previous example, a practice endorsed letter sent to participants to inform them about the screening process and invite them to join group information sessions at their GP practice followed by further reminder phone calls, was shown to increase screening uptake by 5%^[15].

Better collaboration with regional and national stakeholders

CCGs should collaborate with regional and national stakeholders to improve early diagnosis through screening. Increasing the rollout of campaign documentation endorsed by nationally accredited charities and implementation of joint commissioning arrangements to deliver enhanced testing kits along with advertising campaigns are just some of the ways commissioners can improve uptake.

A combination of interventions delivered by multiple stakeholders has also improved rates of screening uptake. Enhanced gFOBT testing kits, including latex gloves and 'poo catching' equipment which slipped over toilet seats, were distributed to make sample collection easier. Supplementary information endorsed by Cancer Research UK, distributed alongside kits to increase understanding around the process and encourage individuals to complete screening, can help. Last, advertising campaigns placed in local newspapers, at bus stops, and with printed pharmacy bags and digital GP 'Amscreens' can increase uptake by 6.1% for those aged 60–69 and 7.3% for those aged 70–74 ^[52].

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